

Math in *Motion*



“It’s all about the math ... ” Year-End Report-Backs Track Growth in Mathematics Practices



School boards report on their successes – and their challenges – with respect to ministry initiatives. They describe not just how ministry funding was spent, but how initiatives were implemented and with what evidence of impact. This knowledge enables the ministry to adapt, improve and refine its strategies over time – to take an approach to the use of evidence in practice referred to as “learning as we go.”

Over the years, the Literacy and Numeracy Secretariat has evolved an online reporting tool, the Year-End Report-Back (YERB), to elicit feedback about **LNS initiatives**. The latest round of reports clearly indicate that a provincial shift to a focus on mathematics has taken place. Boards also identify the practices that they feel are making the most difference to student mathematics achievement in their district.

Perhaps, not surprisingly, most boards (almost 90 per cent in the English language system) identify a strong learning culture as the key to success in mathematics. They emphasize that teachers in their district are increasingly participating in AQ courses and LNS math initiatives and voluntarily participating in before- and after-school sessions focused on improving content knowledge and pedagogy. Additionally, while boards highlight the value of district collaborative inquiries as creating a space for productive co-learning in mathematics, they also emphasize the need for mathematics consultants/experts. Other key practices that they

emphasize as crucial are differentiated instruction to reduce learning gaps, the use of the three-part lesson structure (with an emphasis on the consolidation phase) and co-constructing learning goals and success criteria to facilitate student self-assessment.

While the snapshot of mathematics across the province provided by the YERB is cause for celebration, it does not, of course, provide the whole story. EQAO analysis of last year’s results reveals a growing literacy-mathematics gap – indeed a 15 percentage point difference between the reading and writing assessments and the mathematics assessments, indicating both the hard work Ontario educators have invested in literacy and the hard work that lies ahead in mathematics. The promising practices study, reported on in the February issue of *Math in Motion* affirms that the key will be the development of a strong collaborative learning culture. The schools that have increased and sustained their mathematics scores from below to above standard in the past five years have also made significant parallel gains in reading and writing.

In the weeks and months ahead, as the Ontario 2014–15 Mathematics Action Plan is implemented, board reports will continue to play a role in sparking discussion and prompting adjustments and *Math in Motion* will keep you posted about these actions.

System Learning in Mathematics – Ontario leaders are doing the math (and loving it, too)

K–12 System Implementation and Monitoring (SIM) Winter Sessions – Participating in a rich task ...

During the K–12 SIM Winter sessions, system leaders and their district teams explored what makes a mathematical task *rich* by participating in “Time for Chocolate!” (Clarke, 2011). This purposeful representative task provided teams an opportunity to reflect on the potential impact of mathematical tasks as one component of effective mathematical pedagogy – and a chance to share some chocolate, too. The partition of the chocolate bars was presented as a way to develop experiential understanding of the fractions construct as fair share (fraction as a quotient or division), one of four constructs examined in *Paying Attention to Fractions*.

The activity began by placing three chairs out in front of the room, with one block of chocolate on each chair. Ten volunteers were asked to leave the room, and then return, one at a time, and choose a chair at which to stand, using the principle that “more chocolate is better.” As each individual selected a place and explained his or her thinking, the teacher (in this case, it was Education Officer and mathematics specialist Dr. Frank Leddy) played a facilitating role in orchestrating a productive mathematical discussion, seeking to draw out what could be learned and generalized about fractions.

K–12 SIM school teams later engaged in critical dialogue on the features and attributes of this and other tasks and examined the leadership implications

of supporting the planning, developing, selecting, analyzing and refining of a balance of task types.

For the conversation tool the K–12 SIM sessions used to provoke reflection on rich mathematical tasks, [click here](#).

Pedagogical Leadership K-3 / Small and Northern Boards – Seeing math through your “mind’s eye” ...

Significant research confirms the close connection between spatial thinking and mathematics performance, prompting a call to action for “educational researchers and system leaders to develop better understandings and supports to foster spatial literacy in students” (National Research Council, 2006, p. 5). In Ontario, educators are deepening their understanding of spatial reasoning in two provincial initiatives – **Pedagogical Leadership K–3** and **Small and Northern Board Numeracy Facilitators**.

Educators participating in the Small and Northern Board initiative are using a modified lesson study cycle to build capacity in spatial reasoning. They are investigating the “spatial-ness” within the Geometry and Spatial Sense mathematics strand and investigating where students’ strengths and challenges lie. They are also exploring the malleability of spatial thinking through a variety of experiences and promoting the importance of students’ visualizing, verbalizing and verifying as a way to “generate, retain, retrieve, and transform well-structured visual images (Lohman, 1996, p. 98)” – to see through their “mind’s eye,” a concept that has previously not received much attention.

“All educators – classroom teachers, early childhood educators, school principals and other instructional leaders in the education system – use a variety of critical thinking and problem-solving strategies to engage all students in making connections between content and process as they work toward a thorough understanding of mathematics.”

*Paying Attention to Mathematics:
Seven Foundational Principles for
Improvement in Mathematics, K–12*



In the Pedagogical Leadership K-3 sessions, leadership teams have been studying student thinking using pedagogical documentation. Slowing down, studying and being

able to revisit the student learning evidenced in a moment of time allows educators to better understand students' thinking about spatial reasoning. By studying students' use of visualization, gestures, representations of learning, etc., they can build on student learning.

K-12 Capacity Building Sessions Spring 2015 – Trying out new tools!

April 2015 marks the spring round of the regional K-12 Capacity Building Sessions for literacy and mathematics facilitators. The focus of these professional

learning sessions will be deepening mathematics content knowledge through a focus on fractions, including:

- connecting to spatial, algebraic and proportional reasoning
- focusing on the key concept of unit fractions
- identifying explicit facilitator “moves” to build educator efficacy

Bring your devices to the spring sessions!

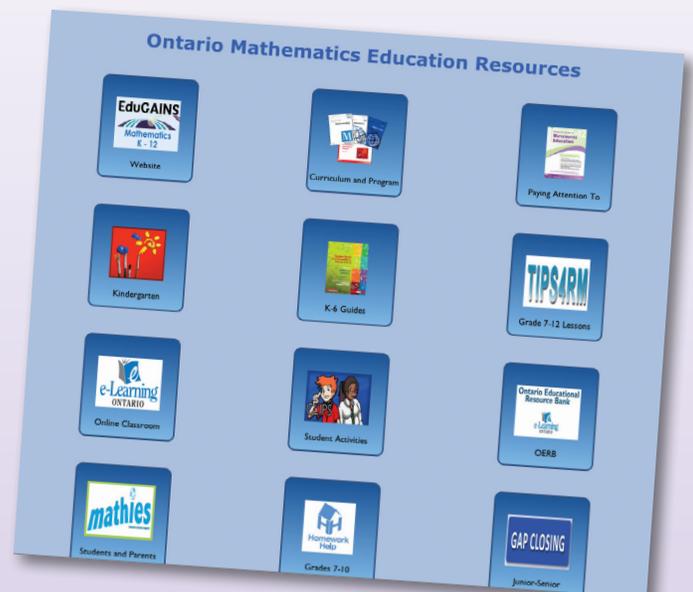
The spring sessions will explore some powerful digital resources to support problem-solving fractions tasks, with a special focus on the benefits these tools may have for students with learning disabilities. Participants are encouraged to bring their devices to sessions to access the tools – from fraction strips to relational rods and more!

[Click here](#) to try out the digital learning tools that the ministry provides.

Ontario Mathematics Education Resources – All in one place!

You can now access – all in one place – the comprehensive collection of resources developed or licensed by the Ontario Ministry of Education to support student learning in mathematics. Whether you're looking for video or curriculum documents, student activities or homework help, you'll find what you're looking for on the Ontario Mathematics Education Resource Website.

- Access the OntarioMathEdResources.ca and save as a bookmark on your laptop or desktop or mobile device.
- Upload as a free App from the iTunes or Google Play store (coming spring 2015) search for the [Ontario Mathematics Education Resource](#).
- Create a shortcut icon to the OMER website on your board's Virtual Learning Environment (VLE).

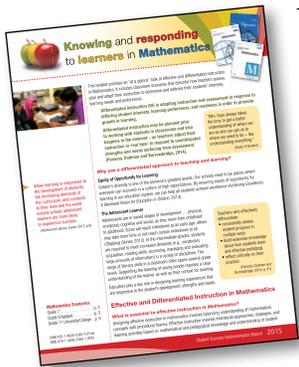


Differentiated Professional Learning Opportunities

The ministry offers a range of learning opportunities and resources to support professional learning, including but not limited to the resources and learning sessions below

Knowing and Responding to Learners in Mathematics

"Mrs. Vyas always takes the time to get a better understanding of where we are so she can get us to where we need to be – like understanding everything." (Grade 9 Student)



This new booklet from Student Success provides an “at a glance” look at effective and differentiated instruction in mathematics. It includes classroom scenarios that describe how teachers assess, plan and adapt their instruction to determine and address their students’ interests, learning needs and preferences. This resource

will be of particular interest for educators teaching Grades 7 through 11 mathematics, Applied, University/College level courses.

To access [click here](#).

Assessment to Promote Mathematics Learning with Dr. Chris Suurtamm

(Webconference)

On Thursday, March 26, Dr. Chris Suurtamm hosted an interactive webconference on the importance of assessment for understanding the complex ways that students come to learn mathematics. Dr. Suurtamm explored both classroom assessment and large-scale assessment in mathematics education. The discussion of large-scale assessment looked at both the opportunities and the constraints that large-scale assessment

(such as EQAO, PISA, PCAP) create for mathematics teaching and learning.

[Click here to access this session](#)

Explore the Mathematics Webconference Archives for 2014–2015



Teaching Fractions – What’s the Big Deal with Dr. Cathy Bruce
November, 2014

To access [click here](#) or [click here](#)



A Focus on Proportional Reasoning in Mathematics Gr. 4 to Gr. 8 with Dr. Marian Small (February 24)

To access [click here](#)



Confronting Myths and Challenges in Mathematics Education with Dr. Chris Suurtamm
(November 28, 2014)

To access [click here](#)

What does good teaching and learning in mathematics look and sound like? with Dr. Chris Suurtamm (January 18, 2015)

To access [click here](#)

Assessment to promote mathematical learning with Dr. Chris Suurtamm (March 26, 2015)

To access [click here](#)

Are you looking for newsletter ideas?

The ministry has created a repository of practical tips, activities and resources to help inform parents about how they can support their children in the learning of mathematics. School leaders may include these ideas in their communications (e.g. newsletters, websites) with parents/guardians. In order to build the repository, contributions of resources and ideas are welcomed. Submit these to theodora.vales@ontario.ca. All contributions will be acknowledged through mention of the school board name.

[Click here for Ideas for School Newsletters](#)