Issue #11 • June 2015

Math in *Motion*

A K–12 newsletter that fosters numeracy and mathematics awareness and shares research, resources and actions

And the Learning Goes On

From collaborative inquiries, to improvement planning to focused interventions, the ministry supports a variety of improvement initiatives. We also offer signature events, including partnership tables, congresses and symposia, where we engage with our partners and advisors, seek their input, get advice and collaborate in implementing **the Ontario vision**.

The guideposts for action that emerged from these discussions are relevant for our ongoing work in mathematics:

- greater focus on distributive leadership and on agile leadership (e.g., being willing to try new things, adapt and innovate)
- greater collaboration between ministry, boards, local communities and parents
- clearer priorities (e.g., focus on key areas, go deeper, explore practicalities of the "how")
- leverage existing resources and make more efficient use of assets and partnerships
- adopt a view of children and youth as competent and capable (e.g., a growth mindset)
- put student voice at the centre of all we do, including differentiation of supports
- look at "best" practices as "next" practices and provide forums for sharing and recognizing ideas and contributions
- greater support for job-embedded collaborative learning

Over the course of the year, the province's educators have embraced the principles of the **math action plan**, placing their own mathematics learning as a high priority. This is a great foundation for the journey ahead of us.

Teachers have welcomed the opportunity to take Additional Qualifications (AQ) courses in mathematics and, to date, there has been tremendous uptake on the ministry's mathematics AQ course subsidy.

School leaders and school teams have also engaged in new mathematics learning. The new **Guest Webinar Series: Explore the Mathematics** was consistently oversubscribed. In 2015–16, the Student Achievement Division, partnering again with the principals' associations, will offer these highly popular sessions and expand them to meet the growing demand.

Following the success of the school-year institutes, summer mathematics institutes for principals and vice-principals will be held again in July and August. Contact your principal association for further information.

For more information about this newsletter or to make a comment, contact Dianne.Oliphant@ontario.ca.

Listening, Learning & Leading: Pedagogical Possibilities from the 2015 Student Work Study Provincial Symposium

The work of a SWS teacher is to be responsive and adaptive to students' learning needs. SWS teachers have been demonstrating their dedication to mathematics by actively sharing documentation of mathematical student learning, sharing research literature about mathematics teaching and learning and facilitating one-on-one capacity building around content knowledge and pedagogy in mathematics with educators.

Emerging learnings and insights from SWS teachers and their host teachers about mathematics include:

- **Students as Partners** – Student input, such as how students use pictures and manipulatives to represent their mathematical thinking, is informing pedagogical practices and deepening educators' conceptual understanding of mathematics ideas. Transparency through sharing professional learning goals with students is leading to a more responsive pedagogy that is deeply influenced by students' actual mathematical learning needs.
- **Mathematics Discourse as Assessment** – Using "math talk" to build teacher and student capacity in mathematics is proving to be a valuable assessment tool in addition to other traditional mathematics assessment strategies such as, PRIME, EQAO results, report cards and surveys.
- **Student Agency in their Mathematics Learning** – The classroom conditions that foster student ownership and agency in mathematics learning encourage students to become an active community of mathematics learners. SWS teachers describe how students now engage in mathematical thinking and discourse with their peers by posing mathematical challenges to each other, requiring reasoning and proving with increasing levels of sophistication.
- **Mathematics Self-efficacy** – SWS teachers report increases in students' positive attitudes towards mathematics, engagement in taking risks to further their learning, willingness to learn from mistakes, and general sense of confidence and capability as mathematical thinkers.
- **Using Research to Provoke Professional Thinking** – Resources and professional educational research are continually being used within the regular practice of teaching to provoke thinking about both student and teacher understanding of mathematics and their interrelations.
- **Mathematics Learning** – Last but not least, SWS teachers report incremental gains in achievement in areas such as, fluency with quantity relationships, conceptual understanding and procedural understanding.

This year's symposium was a great opportunity for SWS teachers to share their learning with each other as well with board leaders.

System Implementation and Monitoring SIM Spring 2015

The ministry is generating trending news on how to support and monitor mathematics learning – #SIMK12 ranked as the fifth most frequently used hashtag in Canada during the month of May 2015.

The SIM spring sessions' focus was on how classroom discourse creates a space for individual thinking and for collaborative mathematical explorations. The most frequently tweeted quote was "The solution to a math problem is not a number; it's an argument, a proof" (Harvard mathematician, Paul Lockhart).

A Call to Action

Supporting First Nation, Métis and Inuit Learners in Mathematics

Indigenous knowledges value harmony with the environment and the understanding that knowing is tied to one's particular context. As Albert Marshall said, "We need teachers who can weave back and forth between the knowledges" (**Unama'ki Institute of Natural Resources, Jan. 16, 2009**). To support your capacity to weave back and forth, here are some suggestions:

- **Explore and understand your local history and context.**
  What traditional territory (First Nation, Métis or Inuit) are you located on? What historical actions have impacted your relationships?
- **Know your student context.**
  Who are the students sitting in your classrooms? What are their stories? Who are their families and where are they from?
- **Make connections with your community to understand your context.**
  Who in your board is the Aboriginal Lead? Elders, community members, knowledge keepers, cultural agencies are invaluable to your learning. Who can you connect with?

To increase student mathematical learning for all students, you may wish to consider the following classroom practices explored in ministry First Nation, Métis and/or Inuit collaborative inquiries over the course of the year:

- **"Verbification" of math language:**
  Through building an understanding of how the language is structured, one can begin to understand how students might think.

  "As soon as I transitioned from asking noun-based questions such as "What is the slope?" to asking verb based questions such as "How is the graph changing?" I found that students often understood better" (**Lunney Borden, 2011**).
- **Honouring thinking time:**
  Recognizing the importance of developing an environment that honours thinking time.

  "Listening is a skill, as opposed to speaking. Speaking is emphasized as a skill in Western culture. But listening is not taught. Learning to listen effectively is very important" (**Dolittle, 2014**).
- **Recognize diversity in and among your learners who are First Nation, Métis or Inuit.**
  "I think the greatest impact that teachers can have or educators can have with elementary and secondary school students is to be open to their experience. The lived experience that they have." (**McGregor, 2014**)

Through our collaborative inquiries, we are learning how crucial it is to explore our role in co-creating mathematics classrooms that reflect our First Nation, Métis and Inuit learners because culturally-relevant teaching can be transformative for all students.

That is our call to action!

Research Profile

Working together to improve Grade 9 Applied Mathematics

Supported by ministry funding, and in partnership with the Ontario Association of Mathematics Educators (OAME) and the Ontario Mathematics Co-ordinators Association (OMCA), ten school teams are participating in a research project to investigate a self-selected problem of practice around the learning and teaching of Grade 9 Applied Mathematics. School teams include teachers of Grade 9 Applied Mathematics, school administrators, student success teachers and special education teachers. Each team is assigned a research facilitator under the leadership of Dr. Chris Suurtamm from University of Ottawa.

At this year's OAME annual conference, many of the teams shared their findings and the next steps they plan to take. The project has been extended for a second year to continue the learning for the teams. Stay tuned for a public sharing of this work in 2016.

Highlighting Math at Home

Are you looking for ways to communicate with parents about how to support their child's math learning? You may wish to explore the following resources.

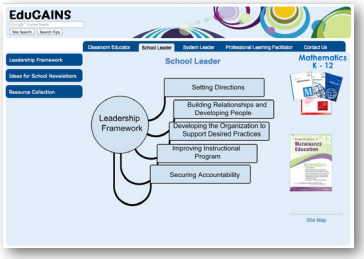
Coming soon …

At the January meeting of the Council of Ontario Directors of Education, the ministry and four district school boards partnered to develop content – tips, examples, resource links and graphics – for boards to use when communicating with parents about what mathematics teaching and learning looks like in schools and classrooms today. The intent is to facilitate communication, whether newsletters, ebulletins or websites, by providing some ready-made answers to questions that parents/guardians may have about mathematics teaching and learning and to give illustrations of mathematics in everyday life to help parents/guardians support their children's mathematics learning. The content, to be completed in late August/early September, will explore:

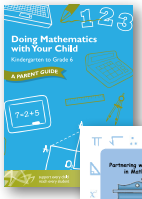
1. What is the truth about mathematics learning?
2. What does a mathematics classroom look like?
3. What is in the Ontario mathematics curriculum?
4. What will help my child to think mathematically?
5. What is my child learning as a math student?
6. What can I, as a parent/guardian, do to support my child's mathematics learning?
7. What does mathematics learning look like in my school? In my district school board?

Keep in mind …

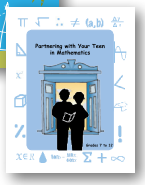
On the *EduGAINS Math – School Leader page*, administrators can find *Ideas for School Newsletters* – a repository of practical tips, activities and resources designed for communicating with parents about mathematics. These short pieces include topics such as Talking about Math, Everyday Math, Growth Mindset, Homework Help, Ontario Curriculum, Making Mistakes, Thinking Tools, Supporting Teams and mathies.ca. A great new tip supports connecting math and sports in the upcoming PanAm Games.



Helpful links …



Doing Mathematics with Your Child, K–6



Partnering with Your Teen in Mathematics Grades 7–12

Free Homework help line

Check out Dr. Michelann Parr's blog Engaging Families, Engaging Schools. Of special interest: Family-School Math Adventures (includes resources for schools to highlight math at home).

Expanded Summer Learning Program!

This summer, all 72 district school boards and two school authorities will be offering summer learning programs, K to 5, up from 64 boards offering programs, K to 3, in 2014. With a total of 555 classes (of about 15 students each) being offered across the province, the summer learning program is expected to reach approximately 8,340 students this year.

To learn more: **www.ontariosummerlearning.org**.