



Math in *Motion*

a K–12 resource for system leaders

Issue #3 • February 2014

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

Studying Young Mathematicians

Across the province, school board Early Years leaders are engaging in ongoing professional learning conversations that include a focus on mathematics in the early years. Over the course of three regional meetings, the Early Years Division has engaged these system leaders in observing, documenting and discussing mathematical behaviours using videos, photographs and other evidence of children's learning from full-day kindergarten classrooms.

The following observation protocol adapted from Elmore's "Instructional Rounds" has framed discussions:

1. Observe what is seen and heard without judgment
2. After sharing what is observed, conjectures and suppositions are offered in group discussions e.g., "when I saw/heard... I am thinking that ... I am thinking ... based on ... as evidence".
3. "Why this learning for this child/these children at this time?"

To support the dialogue, Early Years leaders refer to several Ministry of Education monographs and DVDs such as "Mathematics in the Early Years", "Leaders in Educational Thought" and "Paying Attention to Mathematics." In addition, connections were made to the principles in "Paying Attention to Literacy."

Student Success School Support Initiative: Finding the Seven Key Levers of Success

The Student Success School Support Initiative (SSI) is a strategic and targeted intervention that supports low performing secondary schools across the province.

These are schools where pass rates in Grades 9 and 10 Applied compulsory courses are below the provincial rate and where, therefore, students may not be on track to graduate within 4/5 years.

Ongoing monitoring (student work, observation and conversation) has surfaced seven key levers and drivers

that have proved to be integral to the success of the SSI. Those key elements are:

- Leadership is provided by a senior staff member (usually a superintendent) within the board who ensures that the goals of the School Support Initiative are known, understood and shared by the schools participating in the initiative. This person also ensures that the work of SSI is coherent and aligned with the system directions as outlined in the Board Improvement Plan for Student Achievement.

continued on next page

Math in Motion is published monthly except during the summer. For more information about this newsletter or to make a comment, email the editor: [Roderick Benns \(roderick.benns@ontario.ca\)](mailto:roderick.benns@ontario.ca)

Math in Motion is available each month at EduGains. To access them, visit [here](#).

Student Success School Support Initiative: Finding the Seven Key Levers of Success – Continued

- The instructional leadership of the principal, actively engaged in the work of the Professional Learning Team.
- On-going monitoring of student success indicator data – both pass rates and achievement levels.
- A focus on teaching and learning in the context of the secondary school.
- A focus on student intellectual engagement through the strategic selection and effective implementation of evidence-based instructional strategies and the creation of conditions supportive to student learning.
- Strategic, targeted and differentiated professional learning sessions for principals and professional learning teams.
- Support documents and structures provided through professional learning sessions and through an e-community.

In each of the five years since the initiative has been underway, math has consistently been identified by

schools as the subject that shows the greatest need for improvement, and in each of the first four years OnSIS data indicates that SSI schools focused on math showed increases in the course pass rates at a greater rate than the province. In the 2012 – 2013 school year over 70% of the SSI schools that focused on math showed improvements in their pass rates.

Qualitative data collected from principal and superintendent reflections, as well as feedback from participants in professional learning sessions also indicated:

- Growth in the capacity of the principal as the instructional leader.
- Enhanced instructional practices in the classroom.
- Shifts in the culture of the school with regard to teaching and learning.

In the 2012 – 2013 school year approximately 13,500 students in Grade 9 and 10 Applied math were impacted by the School Support Initiative.

Spotlight on: Paying Attention to Algebraic Reasoning, K–12

The following are short excerpts from *Paying Attention to Algebraic Reasoning, K–12*, now available [here](#).

Algebraic reasoning permeates all of mathematics and is about describing relationships among quantities – as opposed to arithmetic, which is carrying out calculations with known quantities. In its broadest sense, algebraic reasoning is about generalizing mathematical ideas and identifying mathematical relationships.

Algebraic reasoning connects the learning and teaching of arithmetic in elementary grades to functions and calculus in secondary grades. It provides a foundation for the development of abstract mathematical understanding. We hope this document serves to spark discussion and learning about this complex and important topic, both with colleagues and with students in your schools and classrooms.

Everyone has the capacity to think algebraically because algebraic reasoning is essentially the

way humans interact with the world. We look for patterns, pay attention to aspects of the pattern that are important, and then generalize from familiar to unfamiliar situations. Algebraic reasoning is present in many instances of our lives; for example, comparing which cellphone provider offers a better contract or determining times and distances when driving involves thinking algebraically. Algebraic reasoning is also part of many careers:

- Architects and construction experts use algebraic reasoning to design buildings and determine materials needed to build structures.
- Software developers use algebraic reasoning when creating codes.
- Bankers use algebra to figure out mortgage and interest rates.
- Scientists use algebra in almost every field.

