

MATH STRATEGY

CONTEXT

The York Region District School Board (YRDSB) recognizes the importance of mathematics as a critical life skill for students. This key understanding aligns with the direction of the Ontario Ministry of Education's Provincial Mathematics Action Plan. Staff members in YRDSB are eager to expand their mathematical professional learning. They recognize the critical role they play in ensuring that all students are equipped with the mathematical capabilities essential for participation in society. Students have indicated that the mathematics they learn in class needs to be relevant and useful for everyday life and connected to real-life problems. District, provincial and international assessment results in mathematics consistently indicate the need to focus on thinking, application and problem solving skills.

The Math Strategy provides direction for actions in classrooms, schools and the system to support students in becoming confident problem solvers who use mathematical knowledge, skills and processes essential for participation in a changing society.

To support understanding of a specific school context, visit [tools to access school reports/data](#) and YRDSB's [math targets](#).

FOUNDATIONAL PRACTICES THINKING PROMPTS

The following three thinking prompts are designed to assist in fostering an Equity, Innovation and Leadership mindset. While reviewing the contents of the Math Strategy, these questions provide a lens through which decisions should be filtered.

1. Who might share leadership (Formal leaders/Informal leaders/Student leaders/Other) in implementing an action? How might implementing this action both engage and develop leadership skills more broadly?
2. How will we ensure that our diversity strengthens our implementation of an action? How might we identify and reduce barriers in order to increase equity and inclusion in our implementation?
3. How might innovations in our practice (processes, technologies, resources) improve our implementation of an action? How might we consider local and global research in implementing this action?

To further support the implementation of the actions, visit [foundational practices core resources](#).

MATH THEORY OF ACTION

If we:

- build our knowledge and capacity;
- engage in deep learning, innovative teaching and sound assessment within a Comprehensive Math Program;
- provide early and ongoing interventions; and
- engage families and communities as partners in mathematics education,

then students will be confident problem solvers who use mathematical knowledge, skills and processes to be contributing members of a changing society.



BUILDING KNOWLEDGE AND CAPACITY

Building Knowledge and Capacity involves connecting current research and practice regarding the developmental nature of mathematics in a Comprehensive Math Program. Valuing YRDSB learning as research enables educators to build capacity as change agents in the math classroom.

ACTIONS

System

Build a collective understanding of a [Comprehensive Math Program](#) and make connections among the components ([Environment](#), [Learners](#) and [Learning](#)) through professional conversations and the development of professional learning opportunities

Learn with and from researchers and educators to support ongoing strategic planning, implementation and monitoring of the Math Strategy

Investigate diverse and emerging resources about learning and teaching mathematics and communicate this learning using the BWW math page [Research and Learning](#)

Design and provide additional qualification (AQ) courses rich in math content, curriculum, pedagogy and assessment

Explore and integrate the innovative use of emerging technologies and digital learning resources to enhance and transform teaching practices and student learning experiences

Support [Administrators](#), [Regional Math Leaders](#), [School Math Representatives](#), and [Math Subject Heads](#) in math learning and leading

School

Explore the Instructional Core within a [Comprehensive Math Program](#) through professional conversations, school improvement planning and co-learning opportunities

Review BWW math page [Research and Learning](#) to build capacity

Engage in co-learning regarding the developmental nature of mathematics

Explore diverse resources, including ministry resources at [EduGAINS](#) and [LearnTeachLead](#)

Participate in Ministry of Education learning opportunities

Identify teachers to support staff learning in the area of mathematics

Classroom

Apply new learning into program planning and practice to enhance student learning experiences and outcomes (e.g., a [Comprehensive Math Program](#))

Identify, learn about and implement research-based instructional and assessment strategies found on the BWW math page [Research and Learning](#) to support student learning

Integrate the innovative use of emerging technologies and digital learning resources to enhance and transform student learning experiences

Develop mathematical understanding through research (e.g., growth mindset, pedagogical math content)



LEARNING, TEACHING AND ASSESSMENT

Learning, Teaching and Assessment in mathematics reflects the interconnectedness of the [Environment](#), the [Learners](#) and the [Learning](#) in a [Comprehensive Math Program](#).

ACTIONS

System

Create resources to support educators in understanding and implementing a [Comprehensive Math Program](#) reflecting the interconnectedness of the [Environment](#), the [Learners](#) and the [Learning](#)

Design and provide mathematics learning opportunities focusing on curriculum expectations, math content, pedagogy and assessment

Promote professional learning by means of social media communities (e.g., on Twitter [#YRDSBchat](#), [#YRDSBmath](#), etc.)

Create a school-based collaborative learning proposal process to honour local work and support the process with both financial and human resources

School

Deconstruct a [Comprehensive Math Program](#) to identify areas for professional learning related to the interconnectedness of the [Environment](#), the [Learners](#) and the [Learning](#)

Unpack Ministry and YRDSB math resources in school teams to support a collaborative learning culture

Engage as a collaborative school team in professional math learning

Analyze student learning to develop lessons that address student interests as well as strengths and needs while developing a deeper understanding of curriculum and mathematical continuums

Participate in social media professional learning communities (e.g., on Twitter [#YRDSBchat](#), [#YRDSBmath](#), etc.)

Submit a school-based collaborative learning proposal

Classroom

Implement a [Comprehensive Math Program](#) reflective of the interconnectedness of the [Environment](#), the [Learners](#) and the [Learning](#).

Environment - Create a safe, inclusive and responsive learning environment:

- [Set up collaborative work spaces](#)
- [Promote positive dispositions towards mathematics and learning](#)
- [Build a talk community](#)

Learners - Build on learners' interests and strengths to personalize learning experiences and respond to needs:

- Ensure equitable access to learning
- Use fair, transparent and equitable assessment practices in mathematics

Learning - Use a variety of learning experiences to support problem solving:

- Design opportunities where problem solving is central to learning mathematics
- Responsively plan, assess and teach to impact student learning
- Understand mathematical content knowledge for teaching to support student learning
- Engage in ongoing professional learning to inform pedagogy and assessment practices



INTERVENTIONS

Interventions are early and ongoing supports and personalized programming which enhance learning and promote success for all students.

ACTIONS

System

Create supports for educators in building safe, responsive and inclusive mathematics learning environments to reduce math anxiety and improve dispositions towards mathematics

Connect staff to resources, through the BWW math page [Learners](#) to support students who may be at risk of not succeeding

Provide focused, school-based collaborative inquiry opportunities on responsive, assessment-based instruction for all students

Expand upon partnerships with Student Services, Inclusive Schools and Community Services, Leadership Development and Curriculum & Instructional Services to create, implement and monitor learning supports

Support educators to understand, plan and implement the necessary teaching strategies and accommodations to support all students

Create a waterfall chart related to learning disabilities and mathematics

Design a credit-bearing learning strategies course to support students in transition from elementary to secondary mathematics

Participate in Ministry of Education learning opportunities

Revise the Individual Education Plan (IEP) programming pages for mathematics through collaboration between Student Services and Curriculum and Instructional Services

School

Understand how a [Comprehensive Math Program](#) supports all learners

Develop a broader understanding of curriculum, mathematics content, assessment and pedagogy to support program planning for all learners

Learn strategies and accommodations to support student learning needs

Collaborate with [Regional Math Leaders](#), [School Math Representatives](#), and [Math Subject Heads](#), SERTs, EAs, ESL teachers and other human resources to support student learning

Create collaborative school teams to support students who are at risk of not succeeding (e.g., [Collaborative Assessment of Student Learning](#) teams, in-school teams, collaborative planning teams, co-teaching teams, etc.)

Classroom

Identify, learn about and implement research-based instructional and assessment strategies found on the BWW math page [Learners](#) to support students who may be at risk of not succeeding

Design safe, inclusive and responsive learning environments that leverage learners' assets and social identities to personalize learning experiences to meet the needs of all learners

Work with learners to be self-reflective and advocate for their learning

Understand students' exceptionalities to inform planning and provide supports and targeted interventions

Review and update IEP based on analysis of student learning in mathematics

Consider English Language Learners proficiency using [Steps to English Proficiency \(STEP\)](#) when designing learning and assessment

Investigate learning pathways and how to support the well-being and achievement of students who may be at risk of not succeeding

Integrate the innovative use of emerging technologies and digital learning resources to enhance and transform learning experiences for students who may be at risk of not succeeding



FAMILY/COMMUNITY ENGAGEMENT

Family/Community Engagement recognizes the important partnerships among educators, families, and communities that support mathematics education. Educators value the role of families and communities in supporting student learning.

ACTIONS

System

Identify mathematics as a focus for parent/guardian/family learning (e.g., symposiums, forums, etc.)

Create [resources on the YRDSB's public website](#) to support parents/guardians/families in understanding mathematics

Create resources on the BWW to support teachers in their work with parents/guardians/family around mathematics

Use the new K-12 Student/Teacher/Family Engagement Platform to support communication and engagement in the area of mathematics

Update Trustees and Advisory Committees (e.g., PEAC, SEAC, etc.) about the YRDSB mathematics strategy

Support school teams in accessing [provincial parent resources](#)

Explicitly gather feedback about mathematics programming through the [School Climate Survey for Parents/Guardians](#)

Support, and communicate about, community connections designed to learn from and with each other in supporting student learning in mathematics

Provide multilingual support in understanding resources to meet the needs of the community

School

Provide an overview of a [Comprehensive Math Program](#) and how parents/guardians/families can support mathematics learning, using multilingual supports

Provide opportunities for families to engage in mathematics together to develop a growth mindset and positive disposition towards mathematics learning

Include a mathematics focus in school communications

Provide ongoing mathematics updates at School Council meetings

Invite in community partners to enhance students understanding of mathematical contexts and related careers

Establish structures to regularly gather feedback and promote mathematics education with family and community members

Classroom

Nurture a collaborative relationship with families to support effective learning environments at home, based on each child's strengths and needs

Access and share appropriate resources with parents and community to support student learning (e.g., as found on the BWW math page [Home School Connections](#))

Include information and supports regarding mathematics in classroom communications to parents/guardians

Promote experiential mathematics learning opportunities through community partnerships (e.g., Junior Achievement, The Learning Partnership, etc.)

Increase awareness of multiple pathways in mathematics education

PROFESSIONAL LEARNING

Continuous professional learning is a crucial part of board and school improvement processes. The following principles have been identified to support planning for professional learning.

Principles for Effective Professional Learning

- Professional learning is effective when it is:
- responsive to students' identities, thinking, learning, achievement and well-being as evidenced by a range of data gathered from and about students, including perceptual, demographic, program and achievement;
 - developed through inquiry, as educators, facilitators, researchers, and/or partners engage in co-learning;
 - based on high-quality, evidence-based research;
 - built upon a collaborative culture of curiosity and risk-taking;
 - differentiated by the educator's readiness and needs, recognizing that different people learn in different ways (e.g., experiential, social, formal) and through different modalities;
 - an iterative approach, informed by ongoing analysis, reflection and feedback; and
 - focused on developing, deepening and connecting both content knowledge, pedagogy and pedagogical content knowledge.

[Mathematics Professional Learning Opportunities](#)

RESOURCES

Aligning resources effectively, purposefully and efficiently to focus on what matters most is a key leadership function. Resources have been identified to support the implementation of the Math Strategy.

They are organized into four categories:

- Core Resources
- Supporting Specialized Populations Resources
- Parent/Guardian/Family Resources
- Facilitation Resources

[Math Strategy Resources](#)

MONITORING

Monitoring is the ongoing gathering, reviewing and assessing of information to track and document progress towards goals. It is an integral part of board and school improvement processes. The following principles have been identified to support collective monitoring.

Principles of Effective Monitoring

- Monitoring is effective when it is:
- shared collaboratively by those who are implementing the improvement plan and who have agency to act upon the results;
 - reciprocal, involving a two-way flow of information across classroom, school and system to inform responsive action at all levels;
 - based on criteria against which evidence from multiple sources (e.g., conversations, observations, products) can be examined;
 - focused on the gathering and analysis of the evidence;
 - a continuous loop of action, analysis, reflection and response;
 - timely and ongoing while implementation is still in progress;
 - able to yield timely, precise, and descriptive feedback to inform next steps; and
 - rooted in professional discourse in which questions are drivers for deeper understanding of what makes a difference for student achievement and well-being.

[System Improvement Learning Cycle \(SILC\)](#)

TARGETS

Targets support the evaluation process. Clear identification and communication of the targets are key to board and school improvement planning. The following principles have been identified to support effective target setting.

Principles of Effective Target Setting

- Targets are effective when they:
- are established through a collaborative process;
 - are specific and based on identified needs;
 - align with the collective and strategic efforts within the system, school and classrooms;
 - identify the progress expected at specific checkpoints;
 - are ambitious and attainable predictions of intended results;
 - are motivational for continuous improvement; and
 - evaluate the impact of strategic actions on student achievement and well-being.

Three Types of Targets: Implementation, Perception, Achievement

Implementation targets are established to measure whether strategic actions in the BIPSA are being implemented as intended.

Perception targets are established to measure the perceptions of students about their school environment with regard to their learning and well-being. Revised school climate survey questions will be implemented in 2017 to gather baseline data specific to the current BIPSA and to set targets for the mid-cycle and five-year checkpoints.

Achievement targets are established to measure whether desired results are being realized with regard to student achievement.

[Mathematics implementation, perception and achievement targets](#)