

MATHEMATICS

ACTION PLAN

2018-2021

“We believe that everyone can learn mathematics.

We cherish wonder, curiosity and awe.

We honour the gifts of each person and hold their dignity in our hearts.

We strive to create a journey of equity for all.

We believe in the solidarity of a community of co-learners.

We constantly question and think.

We respond intentionally to each child.

We gather relevant and meaningful evidence of learning.”

(Eastern Ontario Catholic Curriculum Corporation, 2014)

“Be shepherds of God’s flock that is under your care, watching over them- not because you must, but because you are willing, as God wants you to be...eager to serve.”

1 Peter 5:2

HCDSB’s 2017-2021 revised Math Strategy provides direction for actions in classrooms, schools and the system.

As we continue to deepen our thinking and understanding of effective instructional and assessment practices in mathematics, we will concentrate our learning on the following key areas:

- Deepening our mathematical content knowledge (e.g. understanding the importance of ‘big ideas’ in mathematics, early numeracy development, developmental continuums, reasoning Proportionally and Spatially)
- Co-ordinating and strengthening mathematics leadership by building an understanding of effective mathematics instruction;
- Incorporating intentional instructional practices (e.g., rich tasks, teaching through problem solving, thinking tools, effective questioning, accountable talk)
- Early identification and ongoing intervention for students who are struggling in mathematics;
- Assessment *for* and *as* Learning practices (e.g. learning goals, success criteria, descriptive feedback, effective questioning, triangulation of evidence)

Theory of Action

If we increase our mathematical content knowledge and pedagogical expertise, then we will have greater understanding of how to notice, name and interpret the significance of student thinking.

If we engage in a responsive math program that includes sound assessment practices (*for, as, of*), then students will have greater ownership regarding their learning, what they need to focus on to be successful, and will feel more confident and capable to use and apply their mathematical knowledge, skills and processes in meaningful ways.

If we engage in a monitoring learning cycle we will better understand our student/teacher/administrator learning needs in order to create meaningful learning opportunities that will help us reach our desired outcome.

If we provide early and on-going interventions, then student misconceptions will be identified, enabling teachers to respond and target instruction, minimizing gaps in understanding.

If we engage families and communities as partners in mathematics education, then student well-being and achievement will improve, and a strong vibrant community will be developed.

Focus: Building our Knowledge and Capacity - Increasing Educator Math Knowledge and Pedagogical Expertise

“The teaching of mathematics well calls for increasing our understanding of the mathematics we teach, seeking greater insight into how children learn mathematics, and refining lessons to best promote children’s learning.” (A Vision for Mathematics Learning, NCTM, 2009)

Actions:

System Level-

- Learn and collaborate with researchers, as well as fellow educators, to support on-going strategic planning, implementation, and monitoring of the math strategy (Lead Math Sessions, Collaborative inquires, C-ILM, CIDI)
- Develop a data monitoring strategy that includes indicators of effective mathematics teaching

School Level-

- Engage in co-learning about effective mathematics teaching practices, including the developmental nature of mathematics
- Explore diverse resources, including ministry resources on EduGAINS (<http://www.edugains.ca>) and The Learning Exchange (<http://www.thelearningexchange.ca>)
- Empower teachers to work, learn and support one another in the area of mathematics teaching and learning
- Engage in Ministry of Education learning opportunities (Virtual Learning sessions) that align with needs the school has identified

Classroom Level -

- Apply new learning (e.g. knowledge of developmental continuum) into program planning and practice to offer personalization and precision to student learning experiences
- Identify and implement research-based instructional and assessment strategies to support student learning
- Develop mathematical understanding through professional learning (e.g. growth mindset, pedagogical math content knowledge) and engage in Collaborative Professional Learning in Mathematics with colleagues

Focus: Building Understanding of Effective Mathematics Instruction

“In planning for learning, effective teachers put students’ current knowledge and interests at the centre of their instructional decision making. Instead of trying to fix weaknesses and fill gaps, they build on existing proficiencies, adjusting their instruction to meet students’ learning needs. Because they view thinking as “understanding in progress”, they are able to use their students’ thinking as a resource for further learning. Such teachers are responsive both to their students and to the discipline of mathematics.”

- (From *Effective Pedagogy in Mathematics* by Anthony and Walshaw)

Actions:

System-

- Support educators in understanding and implementing a balanced 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

School-

- Deconstruct a balanced math program to identify areas for professional learning related to the interconnectedness of the Environment, the Learners and the Learning (Pedagogical System/ Vision of the Mathematics Learner) as well as the instructional core (interaction between teacher, student and content in the classroom)
- Increase knowledge of the developmental nature of mathematics learning (with support from curriculum team)
- Focus on teaching for conceptual understanding (building procedural fluency from conceptual understanding)

Class-

- Design, implement and engage students in lessons that promote positive dispositions toward mathematics, including curiosity, self-confidence, flexibility, and perseverance
- Create tasks that require students to reflect and connect procedures with underlying concepts, justify their processes and give self-explanations
- Give priority to the mathematics processes, such as problem-solving, reasoning and proving (constructing viable arguments)
- Use knowledge of the developmental nature of mathematics learning (i.e. What to Look For (Lawson, 2015), HCDSB’s developmental continuum) to support program planning, implementation, and monitoring

*Definition: A balanced mathematics program includes a variety of instructional/ assessment approaches in rich learning contexts and focuses on the development of conceptual and procedural understanding, skill development and problem-solving. A balanced program begins with the learner profile and includes guided/ direct instruction, as well as opportunities for student inquiry that allows students to generate their own solutions. A variety of groupings for collaborative learning with peers as well as time for independent learning are essential.

Focus: Engaging in Assessment Practices that Support the Teaching & Learning of Mathematics

“Assessment *for* learning has been described as “the single most powerful tool we have for raising standards and empowering life-long learning- If we want to enhance learning for all students, the role of assessment *for* learning and assessment *as* learning takes on a much higher profile than assessment *of* learning.” (from the article *Assessment for Learning Across Canada*, CEA, June 2015)

Effective teachers make use of a wide range of formal and informal assessments to monitor learning progress, diagnose learning issues, and determine what they need to do next to further learning. In the course of regular classroom activity, they collect information about how students learn, what they seem to know and be able to do, and what interests them. In this way, they know what is working and what is not, and are able to make informed teaching and learning decisions. (Learning for All, A Guide to Effective Assessment and Instruction for All K-12)

Actions:

System Level:

- Identify and provide learning around research-based formative assessment strategies that will support student learning
- Support administrators in creating a monitoring and intervention learning cycle that focuses on formative assessment practices

School Level:

- Promote the use of effective mathematics assessment practices that support student learning (e.g. triangulation of data, assessment *for*, *as* learning)
- Learn about and implement research- based formative assessment strategies to support student learning (e.g., how is data being used to improve learning and instruction in mathematics?)
- Make decisions about program interventions for students-at-risk (e.g. creating intentional learning opportunities based on strengths and needs identified, tracking progress to monitor impact of intentional programming)

Classroom Level:

- Use information gathered (e.g. from observations, conversations, product) to adjust teaching and learning based on leveraging student strengths
- Provide students with a clear and understandable vision of the learning target (learning goals and success criteria)
- Provide regular, descriptive feedback that is timely and provides students with guidance on how to improve *during* the learning

- Develop student self- and peer- assessment skills

Focus: Implementing Intervention Practices that Support the Teaching & Learning of Mathematics

“An extremely effective approach to assessment and intervention is the ‘tiered’ approach, which sequentially increases the intensity of instructional interventions.” (Vaughn & Fuchs, 2003, as cited in Education for All, K–6, p. 60)

Actions:

System Level:

- Focus on creating conditions for School Improvement Planning in mathematics with identified schools (with involvement at different levels from Superintendents, Consultants, itinerants and school teams)
- Support will be provided to administrators in deepening their understanding of ‘thinking tools’ & strategies that support success in mathematics teaching and learning (MathUP Project)
- Involvement in Early Years Numeracy Screener project with University of Western’s Numerical Cognition Lab (piloted in 8 schools in 2017-2018)

School Level:

- Focus on the importance of strong mathematical foundations in the early years – Project with the Numerical Cognition Lab at University of Western Ontario
- Students identified as ‘at-risk’ are monitored on a continuous basis (diagnose, intervene, evaluate, repeat)
- Administrators request regular updated data on students identified ‘at-risk’

Classroom Level:

- Response to Intervention tiered approach (RTI)- early identification of students at-risk of poor performance (using diagnostic assessments such as Leaps and Bounds, What to Look for Developmental Continuum, Numeracy Nets, Gap Closing)
- Differentiation of mathematics program based on student needs identified in diagnostic (e.g. Tier 1 or Tier 2)
- Small group instruction takes place frequently for students requiring more explicit teaching of mathematics
- Frequent progress monitoring- Assessments are collected continuously and used to re-examine progress and status

Focus: Engaging families and Establishing Strong Home Connections

Parent engagement matters. Study after study has shown us that student achievement improves when parents play an active role in their children's education, and that good schools become even better schools when parents are involved.... (Ministry of Education, "Parent Engagement")

Actions:

System Level:

- Provide tools and resources to support parent engagement at home through Board mathematics page
- Provide webinar opportunities that support initiatives outlined in Board Math Action Plan

School Level:

- Provide parents with learning opportunities (i.e. family math nights) that support the development of knowledge, skills, and tools they need to support student learning at home
- Encourage a broad understanding of what it means to "help" at home (e.g. listening, reacting, praising, guiding, monitoring, discussing and (most important) asking questions that elicit conversation)

Classroom Level:

- Seek information from parents about what they want and need for their child's success
- Communicate shared understanding about what the child will learn this year and how their learning will be assessed
- Provide clear, transparent and responsive communication about student achievement in mathematics (i.e. what students are showing evidence of understanding, and what the next steps in learning must be)