Annual Report on Mathematics, 2021-2022

To: Program and School Services Committee

Date: 6 April, 2022

Report No.: 04-22-4299

Strategic Directions

- Transform Student Learning
- Provide Equity of Access to Learning Opportunities for All Students
- Allocate Human and Financial Resources Strategically to Support Student Needs

Recommendation

It is recommended that Annual Report on Mathematics for 2021-2022 be received.

Context

Mathematical skills, knowledge and processes play a crucial part in developing active and informed citizens in a society where data and technology continue to play greater roles. Fostering joy and developing an appreciation of mathematics helps to build students' identities as lifelong math learners. In recognition of these goals, it is important that all students' learning opportunities are mathematically rich, meaningful, and expand their understanding of the world around them. The Toronto District School Board (TDSB) is committed to ensuring that mathematics teaching and learning meets these objectives.

The Multi-Year Strategic Plan (MYSP) identifies goals and actions that guide the work of the system, schools and classrooms to support students' development of procedural fluency, conceptual understanding, problem solving skills, and productive disposition towards mathematics. The Vision for Learning illustrates that deep learning opportunities that allow students to make sense of complex mathematical ideas and develop foundational skills through experiences, are vital for learners to view mathematics as worthwhile and themselves as capable math learners.

Through the TDSB's commitment to equity, inclusion and anti-oppression, mathematics instruction should reflect the voices, identities, abilities, lived experiences and expertise of students through an inclusive approach. It is also through this commitment that systemic barriers to high-quality mathematics education are identified, addressed and eliminated.

The system goals as identified in the MYSP include:

- Increase teacher and leader capacity in mathematics knowledge for teaching and in the effective implementation of research-informed instructional and intervention practices.

- Increase teacher and leader capacity in supporting mathematics learning for students with special education needs in the most inclusive learning environment.

- Improve academic outcomes in mathematics for historically marginalized students who have faced significant barriers in the TDSB, such as Indigenous and Black students, through professional learning and the use of effective evidence-based practices.

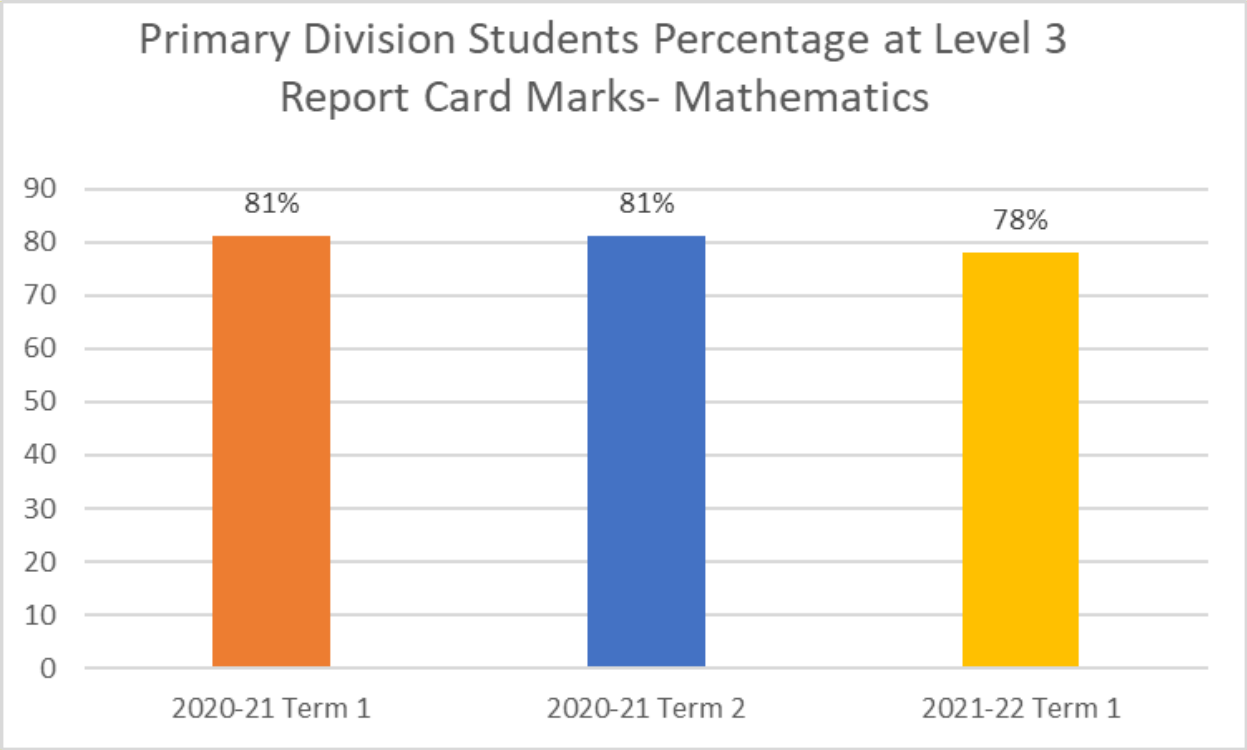
- Ensure all students in Grade 2 have the required foundational skills and concepts in mathematics through engaging classroom programs.

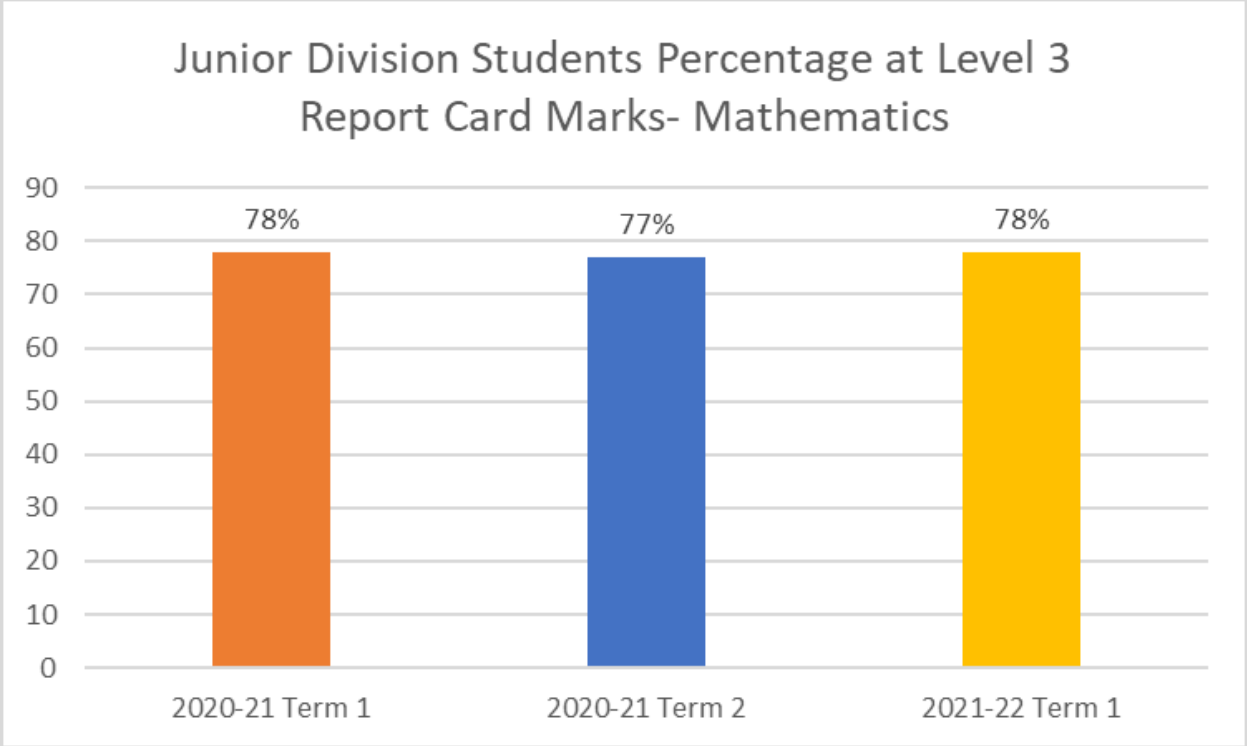
- Support the majority of students to study Grade 9 and 10 Academic mathematical courses.

- Provide all students with deep learning opportunities, supported by technology, leading to strengthening of global competencies and improved achievement.

Elementary School Mathematics Student Outcome Data

While students continued to face challenges in their learning experiences due to the COVID-19 pandemic throughout the past year, the proportion of students who have achieved Level 3 or provincial standard consistently across the most recent three reporting periods has remained stable and high across all elementary school grades. Equally, there is strong consistency of performance across Grades 1 to 8 in relation to proportions of students receiving a Levels 1, 2, 3, and 4. This consistency suggests some reliability in ways teachers are summatively assessing students' mathematical ability throughout elementary school through report cards.


Primary Division Students Percentage at Level 3
Report Card Marks- Mathematics
90
80
70
60
50
40
30
20
10
0
81%
81%
78%
2020-21 Term 1
2020-21 Term 2
2021-22 Term 1


Junior Division Students Percentage at Level 3
Report Card Marks- Mathematics
90
80
70
60
50
40
30
20
10
0
78%
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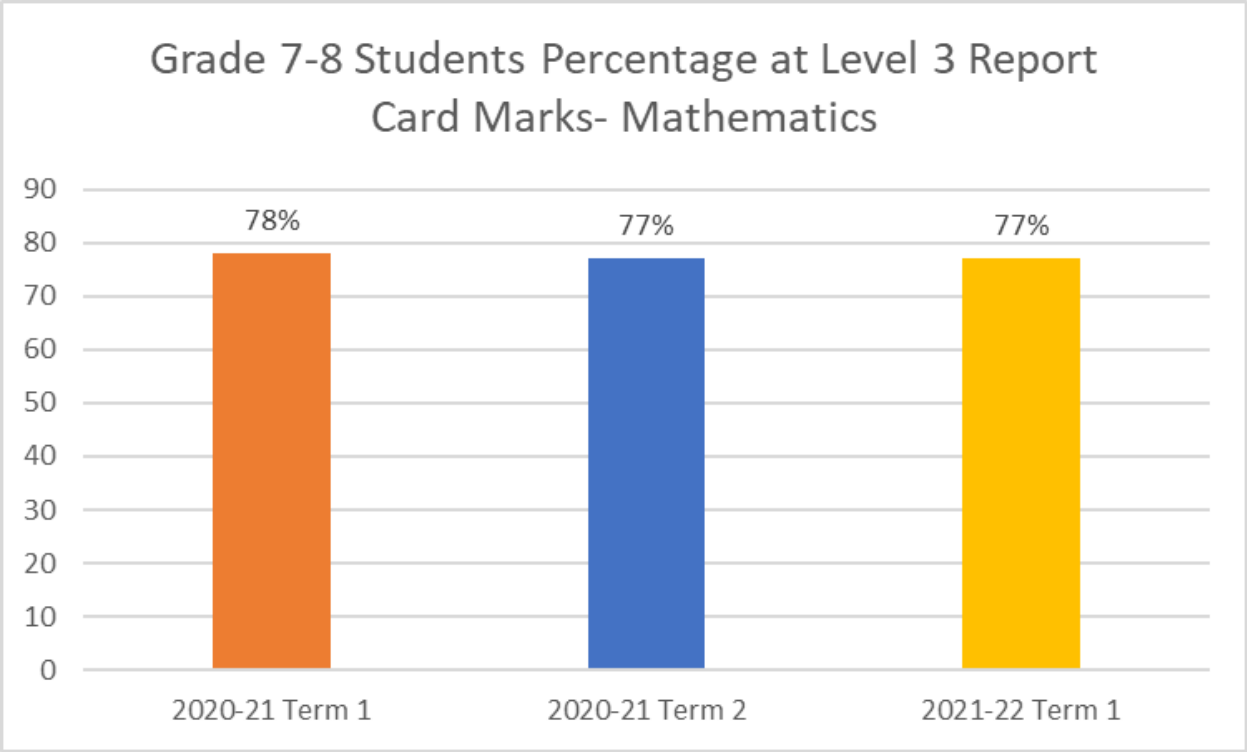
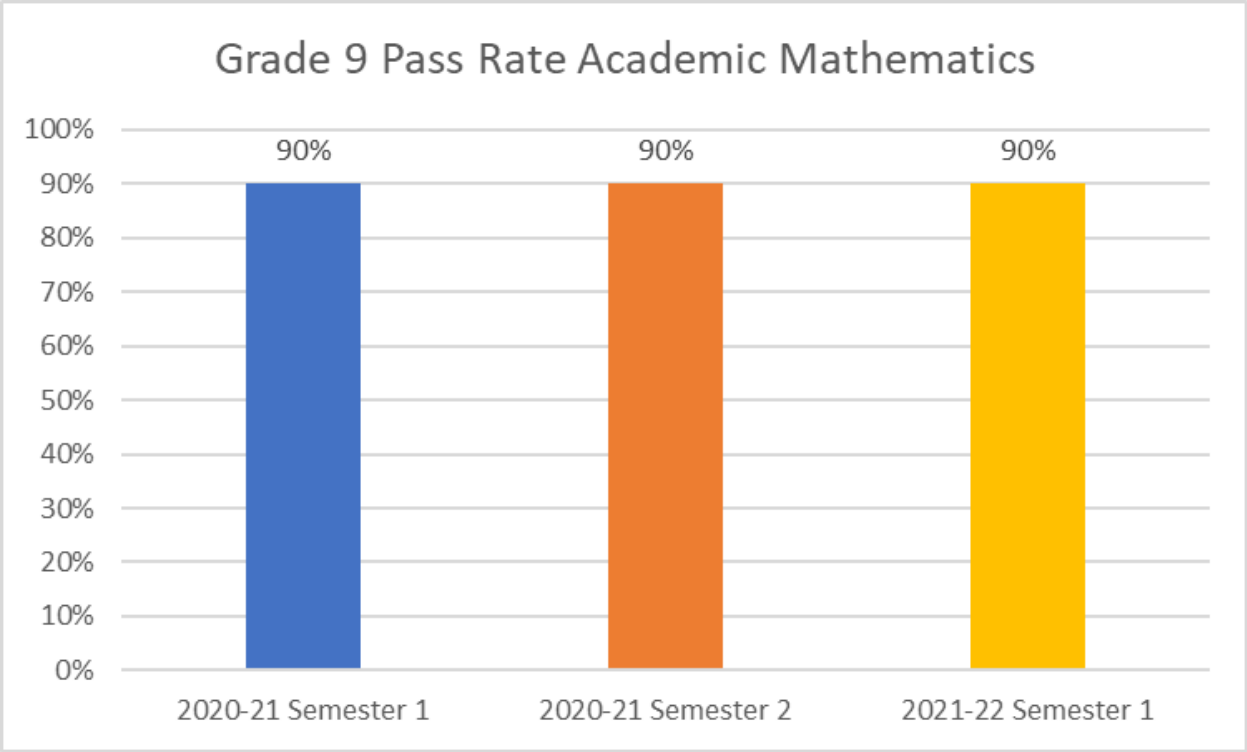
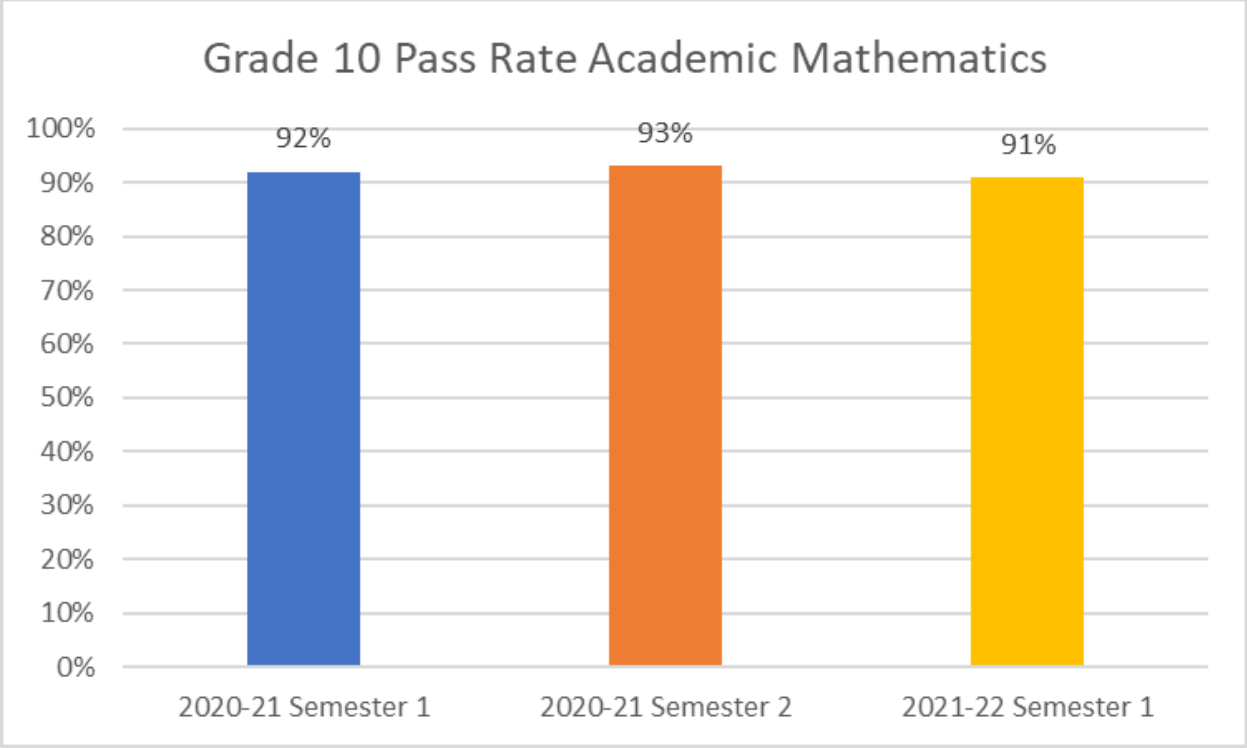
2020-21 Term 1
2020-21 Term 2
2021-22 Term 1



Secondary School Mathematics

Proportions of students who have earned a credit in either Grade 9 or Grade 10 mathematics have remained nearly the same and very high despite the significant increase in students moving from Applied mathematics or Grade 8 circumstances that would have previously resulted in their participation in Applied mathematics in Grade 9. As an example, in semester 2 in 2021 there were 601 students in the Applied mathematics course across the TDSB. The following semester, there were only 81 students. Pass rates or credits earned in Academic courses in Grades 9 and 10 are key performance indicators for post-secondary school success. High percentages of students receiving credits in a key academic course area is very encouraging for potential post-secondary school success.





Overview of System Supports for Deep Learning in Mathematics

The TDSB Mathematics Action Plan was developed in 2019 through stakeholder consultations and aligns with the TDSB's vision, mission and values. It provides directions to the system, schools and classrooms for actions and ongoing improvement efforts to develop students' mathematical skills and thinking. The Mathematics Action Plan guides educators, administrators and system leaders in supporting strong math programs.

Innovative research partnerships are being developed to capture novel math and STEM education practices within the TDSB. The system is currently engaged in five different projects with post-secondary institutions and research organizations that inform innovation and knowledge for the ongoing adaptation of the Mathematics Action Plan. These projects address key focus areas including destreaming, supporting underrepresented groups in STEM professions and implementing research-informed instructional practices.

Key system strategies and actions have been developed to support classroom educators, school leadership teams and system/Learning Centre leaders and focused within the following categories: Building Capacity and Content Knowledge; Ensuring Coherence; Differentiating Assessment and Instruction; Challenging Streaming and Promoting Inclusion; and Engaging Parents, Families and Communities. There are a number of system-level supports in place to support deep learning in mathematics and provide direct support to educators and/or students.

Building Capacity and Content Knowledge

At the centre of effective mathematics instruction is high expectations for all students, deep math content knowledge for teaching and effective instructional practices anchored in Universal Design for Learning, differentiated instruction and assessment, and culturally responsive pedagogy. Building teacher and leader capacity and content knowledge for teaching improves learning experiences and outcomes for students.

The challenges with school staffing, disruptions to schedules, and the redeployment of central coaching staff in the 2020-2021 and 2021-2022 school years caused by the COVID-19 pandemic have been a significant inhibitor of system-wide capacity building in mathematics. Despite these challenges, professional learning opportunities have adapted to take place primarily online and on an optional basis at the school, Learning Centre and system levels. These virtual learning opportunities increased accessibility and provided opportunities to deepen knowledge of the use of virtual tools, resources and instructional strategies. Sessions also illustrated ways for educators to effectively incorporate new elements of the 2020 Grades 1-8 and the 2021 Grade 9 destreamed mathematics curriculum, including coding, financial literacy, and mathematical modelling, into practice. Virtual job-embedded learning using Early Years classrooms to highlight mental math strategies was one example of the innovation used to continue engaging in professional learning. The TDSB has also provided an additional qualification (AQ) course in mathematics to over 200 teachers since 2020 and subsidized AQ tuition for almost 400 teachers to encourage them to deepen their mathematics teaching practice.

Capacity-building in mathematics has also taken place for school and system leaders. Learning opportunities have included sessions for aspiring, new and experienced administrators to learn more about the new mathematics curricula and how to lead ongoing school improvement. Staff who work directly to support classroom educators (e.g., K-12 Learning Coaches, Middle Years Student Success Counsellors) have also taken part in a series of learning sessions to deepen their understanding of inclusive

mathematics pedagogy. During the 2020-2021 academic year, capacity building opportunities highlighting effective practices in implementing equity in the mathematics classrooms were offered. As part of these experiences, pedagogical considerations for equitable and culturally relevant and responsive mathematics were developed to further assist educators in being responsive to the needs and lived experiences of students. With the support of Equity Coaches, school-based opportunities for educators to critically reflect on practices connected to selecting mathematics tasks as well as making instructional decisions to support student success and well-being were facilitated.

Furthermore, through active collaboration with the Centre of Excellence for Black Student Achievement, educators were offered an opportunity to examine the impact of racial identity within their mathematics pedagogical practices. This learning experience explored the sociopolitical and sociocultural factors that impact Black youth's mathematics experiences, and highlighted tangible ways to support racialized students to ensure greater humanistic mathematics teaching and learning.

Ensuring Coherence

The Mathematics Action Plan was developed to support coherence across our system. Aligning with the MYSP and the Pandemic Recovery Plan, connections are made between the learning taking place within the classroom, the school improvement plan and system level support for educators and leaders. A focus on the allocation of human resources, instructional practices and developing and sharing educator resources has supported coherence.

Aligning human resources includes utilizing the Math Strategy funding towards eight K-12 Math Learning Coaches. These coaches were hired to work directly with schools to collaborate with teachers to support math instruction. They also have an opportunity to collaborate across the system with the 28 K-12 Learning coaches, 20 Early Reading Coaches and 65 Middle Year Student Success Counselors allowing for alignment of best practices in Mathematics. However, the redeployment of these central staff during the 2020-2021 and 2021-2022 school years had a negative impact on the opportunity to support alignment across the system.

Across the TDSB Mathematics and Numeracy Department, Learning Centers and other TDSB departments, instructional and assessment best practices are aligned with the Ontario mathematics curriculum, related Ministry of Education policy documents, and current research. System-wide professional learning is offered for educators, administrators and coaches. Digital and non-digital resources and tools are available to the system via the Virtual Library to support access to some common tools and resources across the system (e.g., Knowledgehook and Brainingcamp digital manipulatives).

Differentiating Assessment and Instruction

In order to meet the learning needs of all students, educators must recognize their differences in readiness, interests, and learning profiles and differentiate learning experiences accordingly. Such is true for adult learning and to support educators to obtain a better understanding of math content knowledge and pedagogical practices, various learning opportunities have been created for educators to engage in and with.

To support educators with differentiating their instruction and assessments, staff were provided with asynchronous learning opportunities, including teacher leaders in mathematics through a Math Symposium for secondary math curriculum leaders. The various workshops offered can be found in Appendix B. Working to shift the paradigm of assessment within the education system is challenging. Assessment practices should support and advance student learning. It has been realized that traditional paper-pen tests and exams are a very limited way of learning about what students know. Rather, allowing students various modes and opportunities of showing their understanding of mathematical concepts. This requires educators to utilize varied assessment practices, allowing educators a better sense of student learning and understanding of the material, while also providing educators the feedback they need to modify instruction or re-teach concepts, and support students in gaining a better understanding of mathematics.

Challenging Streaming and Promoting Inclusion

The ongoing system focus on Academic Pathways, culminating with the Ontario Ministry of Education's development of the 2021 Grade 9 destreamed mathematics curriculum, has encouraged secondary math teachers to learn and implement culturally responsive teaching practices that promote inclusion of students from a wide range of readiness, interests and learning profiles. That learning was supported by a series of system-wide virtual sessions by the Mathematics and Numeracy Department from January to May 2021 that involved educators from almost all of TDSB's 105 secondary schools, focusing on inclusive classroom instruction and assessment in mathematics. Hybrid Teacher-Coaches in Mathematics and K-12 Math Learning Coaches facilitated additional hands-on workshops on differentiated instruction. To support the implementation of the 2021 Grade 9 destreamed mathematics curriculum, teachers and administrators attended sessions to unpack the new curriculum and take part in classroom activities that illustrated several of the new expectations. Also, a team of centrally-assigned teachers developed classroom resources, including course plans, lessons, and assessments, for teachers to use with students. This past fall, students participated in the new Grade 9 destreamed mathematics course (MTH1W) and achieved a pass rate of 90%, which is consistent with the previous years' Grade 9 Academic math pass rates. This is promising evidence that a destreamed learning environment of students with a wide range of readiness, interests and learning profiles, supported by inclusive instructional strategies, can lead to academic success for students that would have previously been streamed into Applied level mathematics.

Efforts to effectively address and eliminate academic streaming in mathematics must also involve elementary schools and staff, as streaming begins as early as kindergarten

through structures such as special education, educator biases and learning environments that are not inclusive for all students. To provide guidance to elementary school staff about their role in supporting destreaming, the central Mathematics and Numeracy Department released *Supporting Inclusion in Mathematics through Individual Education Plans and the 2020 Ontario Mathematics Curriculum, Grades 1-8* to provide guidance to staff when developing an IEP for a student and to promote grade-level learning as much as possible. Special Education Inclusion Consultants also took part in a series of sessions to deepen their understanding of inclusive mathematics practices and better support school teams with servicing students with special education needs. Also, the use of 389 MathUP Classroom licences by teachers for lesson resources and professional learning videos have supported more effective implementation of differentiated instructional practices to better meet students' varied learning needs.

Critical to the inclusion of classroom-based learning and school improvement plans, are intentional opportunities for students to explore areas of interest and academic pathways aligned with their passions. The commitment of the Centre of Excellence to improve the academic outcomes and experiences of belonging for Black students, has led to the development of diverse student programming opportunities for Black-identifying students. As part of their mandates, student programs, initiatives and opportunities are co-developed with community partners focused on honouring Black students' experiences and strengths. Some of these numeracy-focused student programming opportunities offered by the Centre of Excellence for Black Student Achievement include:

- *Black Students in Business Collective:* In collaboration with Ivey Business School at Western University, Schulich School of Business at York University, and Smith School of Business at Queen's University, Gr. 10 Black students who have expressed an interest and passion within business are able to explore different career pathways in business, postsecondary programs and receive guidance throughout their business journey.
- *Interac Partnership:* This quarterly program offers participating students opportunities to engage in learning experiences and experiential opportunities situated within informational technology and coding.
- *Music Industry Discovery Program:* In collaboration with ADVANCE Canada's Black Music Business Collective, participating students explore pathways into the Music Industry (e.g. data analyst, royalty administrator, marketing manager, etc.) during this 9-week program. It features high profile guest speakers and mentors from a variety of areas in the business supporting student understanding and pathway exploration.
- *Intuit Partnership:* In school-teams, Black-identifying students in conjunction with families and community engaged in a challenge to develop a community-based plan to address barriers connected to financial literacy and digital equity.

Engaging Parents, Families and Communities

Educating students is a collaborative effort which requires support from all stakeholders: students, teachers, parents/caregivers, and the community. The pandemic highlighted the need to support all stakeholders, as such, the central Mathematics department, in collaboration with Parent Involvement Advisory Committee (PIAC), middle year student success coaches (MYSSC), K-12 math learning coaches and schools, have supported schools' family math nights and developed learning opportunities for parents/caregivers and the community. During the Parents as Partners Conference, the department provided sessions for 46 parents and caregivers on supporting math learning at home. Furthermore, in collaboration with the Centre of Excellence for Black Student Achievement, families and communities were offered an opportunity to engage in STEM-equity learning with Dr. Eugenia Duodu Addy. This session focused explicitly on creating nurturing spaces and meaningful engagement opportunities for Black women and girls in STEM.

Alongside family engagement sessions, the Centre of Excellence for Black Student Achievement offered weekly student broadcast experiences within the STEM fields in collaboration with community partners from January to March 2022. This partnership sought to ensure students and their families remained connected to their school community during transitional periods of in-person and remote learning. Key foci of these experiences include honouring and affirming Blackness and embedding African-centred practices in STEM pedagogy. Some of the learning experiences included: African Women in STEM, examining the mathematical contributions and legacies of people of African descent, and Black Space Innovators.

As a central resource for parents, caregivers and the wider TDSB community, the TDSB Mathematics for Families & Caregivers website was created to support math learning at home in partnership with teachers at the child's school. The site includes virtual math resources, support to engage in math talks with children and additional resources to support mathematics at home.

To support the TDSB educator community, the central Mathematics department has designed a Mathematics for Educators website to support K-12 mathematics. The site is updated with resources as they are procured and as needs arise. In addition to the curricular support, virtual teaching resources are housed there as well as professional learning resources, to support school-staff engaging in professional learning with respect to mathematics. The site was intentionally designed to support various needs within the systems, from the classroom teacher, to a K-12 Learning coach or administrator supporting math professional learning at local schools.

Action Plan and Associated Timeline

The Action Plan for Deep Learning in Mathematics has identified goals to build teacher and leader capacity in mathematics through the School Improvement Process and to use research-informed instructional and assessment practices to help all students develop strong math skills.

Resource Implications

The 2021-22 school year is the third year of the Ministry of Education's four-year Math Strategy, which provides funding to all school boards in Ontario to support their focus on fundamental math concepts and skills, ensuring teachers are confident and capable in teaching math, and increasing parent engagement in math learning. The TDSB allocated funding through this initiative to meet the Ministry of Education goals to support implementation of the 2020 elementary math curriculum and Grade 9 destreamed math course, strengthen educator math content knowledge and pedagogy on the fundamentals of math, build awareness for parents and ensure students, parents, teacher and leaders have the support, tools and resources they need to improve student learning and confidence in math.

To support the implementation of the math strategy, the allocated funds are distributed to schools to support educator release for professional learning and purchasing math related resources (e.g., digital tools, manipulatives, math teaching and learning resources) based on the local needs of the school. The funding allocation also supports the staffing of board math leads as well as eight K-12 math learning coaches.

The COVID-19 pandemic has continued to highlight the need to increase supports available for learning resources and enhance access to digital tools that support student learning in mathematics. Resources have been allocated to support board-wide access to digital math tools and resources which are available to students and educators.

The TDSB also received subsidy funding for elementary and secondary educators who complete mathematics Additional Qualification courses. Since the funding began in 2020, we have provided almost 400 subsidies.

Next Steps

- Ongoing analysis of achievement data and other system indicators to support improvement efforts and focus of professional learning.
- Support the continued system implementation of Grades 1-8 Mathematics Curriculum, Grade 9 destreamed Math course MTH1W and the new Grade 10 Principles of Mathematics addendum through professional learning (e.g., September PA Day Choice Board Elementary and Secondary, Passport to School Leadership).
- Ongoing professional learning for teachers and administrators to meet the goal set out in the MYSP to build teacher and leader capacity in mathematics through the School Improvement Process, and to use research-informed instructional and assessment practices to help all students develop strong math skills. Continue to offer TSDB led Mathematics, Primary and Junior, Parts 1, 2 and 3 in the TDSB.
- Sharing effective practices and working collaboratively with Learning Centres and centrally assigned staff to continue to challenge streaming and close gaps in student learning in mathematics.

- Development of a toolkit for school leaders and educators that highlights best practices in mathematics across the TDSB. This toolkit may be used to facilitate local professional learning through an inquiry lens.
- Monitoring student learning and achievement in mathematics through the School Improvement Process.
- Use research partnerships with scholarship to evolve and adapt Math and STEM strategy with cutting edge knowledge in relation to K-12 pedagogical approaches to mathematics teaching and learning.

Communications Considerations

N/A

Board Policy and Procedure Reference(s)

- Policy P038 - Transforming Student Learning in Literacy and Mathematics

Appendices

- Appendix A: TDSB Mathematics Action Plan
- Appendix B: Key Actions and Impact
- Appendix C: Annual Math Report 2020-21 PDF

From

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APPENDIX A

TDSB MATHEMATICS ACTION PLAN

SETTING THE CONTEXT

Mathematical skills, knowledge and processes play a crucial part in developing active and informed citizens in a society where data and technology continue to play greater roles. In recognition of this, it is important that all students' learning opportunities are mathematically rich, meaningful to students, and serve to expand their understanding of the world around them. The Toronto District School Board is committed to ensuring that mathematics teaching and learning meets this objective.

The Multi-Year Strategic Plan identifies goals and actions that guide the work of the system, schools and classrooms to support students' development of mathematical thinking, procedural fluency and conceptual understanding. The Vision for Learning illustrates that deep learning practices, supported by technology, are vital for modern learners to view mathematics as worthwhile and themselves as effective math learners and doers. Through the TDSB's commitment to equity, inclusion and anti-oppression, mathematics instruction should reflect the voices, identities, abilities, lived experiences and expertise of students through an Inclusive Design approach. It is also through this commitment that systemic barriers to high-quality mathematics education are identified, addressed and eliminated.

The TDSB Mathematics Plan has been created through consultations with various stakeholders and in alignment with the board's vision, mission and values. It provides more specific directions to the system, schools, and classrooms for actions and ongoing improvement efforts in the service of developing students' mathematical skills and thinking.

DRIVING QUESTIONS

The seven questions below guided the discourse amongst various stakeholders across the TDSB and the eventual development of the TDSB Mathematics Plan. School teams are invited to use the following questions to begin local discourse on improving mathematics teaching and learning within the context of this system plan:

- What barriers might be preventing our underserved students from achieving the expected outcomes in mathematics?
- How might we differentiate assessment and instruction to support learners with special education needs in mathematics classrooms?
- What's working/not working with respect to capacity building in mathematics?
- How do we know we are building educator content knowledge and pedagogy in mathematics?
- What evidence will indicate impact?
- What does the evidence indicate about the actual impact? How do we know?
- How do we build coherence and embed differentiation in professional learning to improve achievement?

SYSTEM GOALS

Based on the Multi Year Strategic Plan, which reflects the TDSB's commitments to equity, achievement and well-being, the following system goals in mathematics have been identified:

- Increasing teacher and leader capacity in mathematics knowledge for teaching and the effective implementation of research-informed instructional and intervention practices.
- Increasing teacher and leader capacity in supporting mathematics learning for students with special education needs in the most inclusive learning environment
- Improving academic outcomes in mathematics for Black and Indigenous students through professional learning and the use of effective evidence-based practices
- Ensuring all students in Grade 2 will have the required foundational skills and concepts in mathematics through an engaging classroom program
- Supporting the majority of our students to study Grade 9 and 10 Academic mathematics courses
- Providing all students with deep learning opportunities, supported by technology, leading to the strengthening of global competencies and improved achievement

SHARED BELIEFS AND BARRIERS

Some Shared Beliefs:

- All students are capable of high levels of achievement in mathematics.
- All students are entitled to the most enabling learning environments possible.
- Transforming student learning in mathematics is a shared responsibility.
- The most effective professional learning builds educator capacity, provides opportunity for job-embedded learning, results in permanent changes to practice and supports student achievement.

Some Barriers:

- Deficit views of underserved students lead to some students not held to high expectations of success, which further exacerbates and perpetuates a cycle of marginalization.
- Disproportionately high numbers of underserved students are streamed to Applied and Locally Developed courses in Grade 9 and continue to experience high rates of underachievement and poorer educational outcomes.
- The disconnect between understanding different ways of knowing and doing mathematics across cultures and reflecting this math diversity in classrooms and professional practice.
- Some professional learning foci do not yet enhance teachers' content knowledge, math teaching skills, and student engagement.

KEY MONITORING ACTIONS

- Superintendent of Education (SOE) and school administrator observations regarding mathematics knowledge for teaching in schools and classrooms.
- Utilize a SOE monitoring tool to monitor school-based practices in relation to Inclusive Design.
- Utilize math developmental continua to determine the progress of student learning, particularly with Grade 2 students and foundational math skills.
- Utilize the process of collaborative analysis of student math thinking to assess students' and educators' learning over time.
- Develop measurements to assess the effectiveness of digital tools and the quality of their implementation.
- Gather educator reflections on self-efficacy in math knowledge for teaching and leading.
- Assess participants' reactions to and learning from professional development sessions.
- Monitor the enrollment of TDSB mathematics AQ courses and their impact on educators' math knowledge for teaching.
- Monitor the number of students underachieving in numeracy receiving accommodations and/or modifications in their math curriculum as identified by students' Individual Education Plan.
- Monitor the percentage of students enrolled in academic, applied and locally developed math courses in secondary schools.
- Gather student feedback (e.g., focus groups) on mathematics learning and the changes they are experiencing over the implementation of this plan.
- Gather classroom educator, school leader, family and community feedback on the content and implementation of this plan

INDICATORS OF SUCCESS

- Students will experience a greater sense of belonging to school, as well as the joy of mathematics. Students will come to understand and appreciate the relevance of mathematics in their lives and see themselves as effective mathematics practitioners, leading to enhanced self-efficacy.
- Effective professional learning will enhance teacher capacity in terms of content knowledge and pedagogical practices, including the use of accommodations and modifications, and achievement scores will improve for all learners, including students from historically marginalized groups.
- All students will experience deep learning opportunities, supported by technology, leading to improved achievement.
- EQAO assessments will indicate an improvement in Mathematics (Grade 3, 6, and 9 Applied and Academic).
- A greater proportion of students will access post-secondary programs.
- Teacher and Principal/Vice-Principal participation rates will increase in mathematics AQ courses.
- Improvements would be observed through - student achievement data including report cards and EQAO, classroom observations, Superintendent of Education school visits, web analysis, surveys (AQ courses), focus groups, professional learning feedback.
- Ministry of Education funds for mathematics will be used to support the building of content knowledge and instructional capacity.

KEY SYSTEM STRATEGIES AND ACTIONS

BUILDING CAPACITY AND CONTENT KNOWLEDGE

CLASSROOM EDUCATORS

- Apply professional learning to program planning, instruction, and assessment practices to enhance mathematics teaching and learning.
- Implement, through professional inquiry, the use of tools and representations to support the development of students' conceptual understanding and procedural fluency.
- Engage in system, school- and self-directed professional learning grounded in research.

SCHOOL LEADERSHIP TEAMS

- Develop data-informed school improvement plans and professional learning needs as a staff focusing on enhancing mathematics teaching and learning for underachieving and underserved students.
- Engage in job-embedded collaborative inquiry as teams of educators, including support staff and administrators with the strategic support of learning coaches, to build capacity and collective efficacy.
- Provide ongoing opportunities for educators to collaborate in job-embedded professional learning (e.g. observations, co-planning, co-teaching, and debriefing).
- Align resources to support school improvement efforts related to mathematics.
- Engage in research-based mathematics resources, such as the Guides to Effective Instruction, Paying Attention to Mathematics Education, and Ministry monographs.

SYSTEM/LEARNING CENTRE LEADERS

- provide professional learning opportunities that build on existing mathematical ideas as a resource for learning math content, and inclusive instructional and assessment practices (e.g., Universal Design for Learning, differentiated instruction).
- Provide professional learning on early numeracy development for system leaders and school teams.
- Use an Inclusive Design approach to professional learning with a focus on leadership capacity and critical practice.
- Consult with external mathematics educators and researchers.
- Establish strategic school clusters to engage staff in relevant job-embedded professional learning.
- Support the use of digital tools to develop students' mathematical thinking and enhance engagement.
- Support Learning Coaches as they work collaboratively with Student Success Transitions Counsellors, and classroom teachers to close learning gaps for all students.
- Enrol school teams in TDSB mathematics Additional Qualifications courses.
- Engage as system leaders in Ministry of Education learning sessions.
- Monitor the effectiveness and impact of professional learning on teacher practice and well-being, student achievement and well-being, and equitable outcomes.

ENSURING COHERENCE

CLASSROOM EDUCATORS

- Apply professional learning and implement initiatives aimed at addressing the goals of the school improvement plan.
- Utilize math tools, resources, and instructional approaches that are supported by the system and grounded in research.
- Ensure assessment practices and instruction are aligned with the Ontario mathematics curriculum and related Ministry of Education policy documents.

SCHOOL LEADERSHIP TEAMS

- Ensure goals within the school improvement plan are aligned with Learning Centre and system math plans.
- Explore as a staff the TDSB Mathematics/Numeracy K-12 Expected Practices.
- Provide feedback regarding the direction and implementation of system and Learning Centre math plans to the Leadership, Learning and School Improvement department and Learning Centre leadership.

SYSTEM/LEARNING CENTRE LEADERS

- Develop a TDSB math team representing a diversity of roles and voices to co-develop and monitor a system-wide mathematics plan.
- Align math plans and professional learning amongst TDSB Mathematics and Numeracy Department, Learning Centers and other TDSB departments to transform student learning.
- Identify students who are underserved, their strengths and areas of improvement to inform professional learning.
- Establish exploration classrooms in each learning centre to support consistent adoption of evidence-based instructional strategies and math digital tools.
- Organize system-wide conferences (e.g. Eureka!, STEM Equity) that mobilize knowledge and expertise across schools and learning centres.
- Discuss and examine math improvement efforts in schools during Learning Network meetings.
- Update resources on internal and external TDSB math websites.
- Create a monthly Mathematics Communication that goes out to the system to share system messages, math research, links to articles, resources, and links back to our math webpage.

DIFFERENTIATING ASSESSMENT AND INSTRUCTION

CLASSROOM EDUCATORS

- Develop teaching that uses students' existing mathematical ideas as a resource for learning.
- Differentiate assessment (observations, conversations, products) to inform program development, and instruction (e.g. guided group, parallel tasks, math centres) to respond.
- Use math tools, beyond paper, pencil and calculator (e.g. digital tools, concrete and virtual manipulatives) to deepen students' conceptual understanding, enhance learning experiences and improve performance.
- Develop students' learning profiles by identifying strengths and areas of growth, and utilize profiles to inform instruction.
- Provide students with opportunities to engage in deep learning opportunities supported by technology.

SCHOOL LEADERSHIP TEAMS

- Track students over time at the school level so that effective instructional strategies are passed on from year to year and educators can build a network of supports.
- Support educators with the development of learner profiles to inform differentiated instruction and assessment planning.
- Ensure that throughout the school year, students are provided with the accommodations they need to demonstrate the full extent of their understanding.
- Ensure students are accommodated during EQAO assessments in a manner that aligns with the EQAO's revised assessment and accommodations policies and their Individual Education Plan, if applicable.
- Recognize opportunities to support student learning of mathematics that exist outside of the math classroom - including technological education and other experiential learning opportunities

SYSTEM/LEARNING CENTRE LEADERS

- Review existing mathematics assessment tools and provide professional learning on their effective use.
- Provide ongoing professional learning opportunities on developing effective learner profiles with respect to mathematics and effective teaching strategies in response to students' strengths and areas of growth.
- Support teachers in developing an understanding of which tools, models and representations to select and when to use them in order to reveal, push and or develop mathematical thinking.
- Model effective differentiation during professional learning sessions in authentic contexts (e.g. demonstration classrooms, job-embedded learning opportunities).
- Promote the Technological Education curriculum for all students to support deep learning and the hands-on application of mathematical thinking.

CHALLENGING STREAMING AND PROMOTING INCLUSION

CLASSROOM EDUCATORS

- Review the effective use of Universal Design for Learning.
- Ensure that teaching practices reflect high expectations, students' identities and lived realities while honoring and developing students' voice and expertise.
- Implement mathematics lessons that are culturally relevant and responsive, as well as regularly incorporate issues of social justice in mathematics learning.
- Build positive relationships and learning spaces that focus on inclusive instruction tied to high expectations, in an environment that develops their identity as mathematical thinkers and increases student confidence in math.

SCHOOL LEADERSHIP TEAMS

- Welcome all students, while providing open, inclusive and enabling learning spaces.
- Encourage and support the inclusion of students with special education needs in regular classes.
- Engage in ongoing examination of mathematics curriculum and courses of study through the critical integrative approach to inclusive schools, including integrating multiple centres of knowledge.
- Monitor disproportionate representation of underserved student identities in non-academic math programming and in-risk situations regarding mathematics achievement.

SYSTEM/LEARNING CENTRE LEADERS

- Provide support and professional learning necessary to effectively challenge streaming and promote inclusion from K-12, in areas including but not limited to:
  - Students' acquisition of required foundational math skills and concepts by Grade 2, designed with the Early Years Department.
  - Universal Design for Learning and differentiated instruction, designed in collaboration with special education consultants.
  - Supporting students with learning disabilities in math, with a focus on Junior and Intermediate grades.
  - An Academic Math Strategy that outlines professional learning for ACLs and secondary math teachers, supports for students and parents/caregivers and cross-panel collaboration, developed with Learning Centre math teams.
  - A network of excellence in inclusive mathematics whereby school teams can visit classrooms where inclusion is effectively closing achievement gaps for students with special education needs.
- Examine critically the mathematical needs of students with special education needs (e.g. how can assistive technology and manipulatives be used to enhance students' math experiences?).
- Collaborate with the Urban Indigenous Education Centre to develop professional learning on mathematics through Indigenous perspectives and ways of knowing.
- Provide system-wide professional learning on teaching mathematics for social justice and using culturally responsive and relevant pedagogy in mathematics.
- Monitor and report on rates of special education needs identifications, student achievement and credit accumulation in academic mathematics courses, student choice in math for Grades 11 and 12, and post-secondary enrollment by demographic groups.

ENGAGING PARENTS, FAMILIES AND COMMUNITIES

CLASSROOM EDUCATORS

- Honour student and parent voice by acting on explicit information/feedback gathered about mathematics programming.
- Utilize community resources to learn about different cultural ways of knowing and doing mathematics and provide opportunities for experiential and transdisciplinary learning opportunities with mathematics that enhance students' development of global competencies.
- Plan responsive instruction that honours students' identities, abilities, lived experiences and expertise by building collaborative partnerships with families and the wider community.

SCHOOL LEADERSHIP TEAMS

- Host school-wide math-focused learning opportunities that engage parents and caregivers as partners.
- Increase awareness of multiple post-secondary pathways in mathematics to parents/caregivers and students.
- Facilitate sessions to enhance parents' and caregivers' understanding of Ontario Ministry curriculum and Focus on the Fundamentals of Math documents.

SYSTEM/LEARNING CENTRE LEADERS

- Implement Learning Centre-based math-focused parent symposia that enhance capacity and lead to increased parental engagement.
- Partner with community and social agencies to create expanded opportunities for innovation and external support.
- Promote resources, including provincial parent resources and online support, on the TDSB external webpage to support parents and staff.
- Seek ongoing feedback from various stakeholders regarding elements of the TDSB Mathematics Plan.
- Provide math updates through communications at all levels (system, Learning Centre, school and classroom).

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Appendix B: Key Actions and Impact

Building Capacity and Content Knowledge **Focus Areas:** ● **Professional learning to support the effective implementation of the 2020 Grades 1-8 mathematics and the 2021 Grade 9 destreamed mathematics curricula** ● **Build math content knowledge for teaching and leading to support effective instruction in mathematics classrooms**
Key Actions and Impact
Facilitation of sessions by Centrally Assigned Principals, Coordinators and Coaches for classroom teachers and administrators to learn: ● more about the background and rationale for the new Grades 1-8 or Grade 9 math curriculum ● how to effectively implement new curriculum expectations, including social-emotional learning, coding, financial literacy, mathematical modelling and mental math. ● how to use virtual tools to support students' learning of mathematics, including Brainingcamp, Desmos, GeoGebra, MathUP Classroom, TVO mPower, and TVO Mathify. **Measure of impact**: 1503 educators attended 1 or more sessions.
Facilitation of sessions for school leaders to build their capacity in mathematics content knowledge, including the Principal Development Course Leadership in Mathematics, administrator sessions on leading the new Grades 1-8 math and Grade 9 destreamed math curricula, and Learning Centre and Learning Network-focused co-learning opportunities.
Centre of Excellence for Black Student Achievement: Facilitation of the session *Impact of Racial Identity in Mathematics Learning* by Dr. Molade Osibodu to build understanding of concrete strategies to support positive racial identity development within mathematics classrooms.
Equity, Anti-Racism, Anti-Oppression: Facilitation of professional development focused on equitable practices within mathematics teaching and learning. These sessions were complemented by modelling and scaffolding usage of the Mathematics Toolkit, which was also supported through in-class co-planning and co-teaching opportunities.
Direct instructional coaching support for classroom teachers by K-12 Learning Coaches and K-12 Math Learning Coaches **Measure of impact:** K-12 Math Learning Coaches, K-12 Learning Coaches and Middle Years Student Success Counselor supported schools and teachers to engage in professional learning as determined by each school's improvement professional learning plan. Each Learning Centre analyzed various system data points to implement a differentiated plan for support.

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140 schools provided direct support from October to December 2021
Facilitation of *Mathematics, Primary & Junior, Part 1* additional qualification courses for TDSB staff. **Measures of impact:** ● 147 educators received an additional qualification in mathematics through the TDSB from 2020-2022. ● 98% of participants stated that it is likely that the course will result in permanent changes to their teaching practice, with 64% stating it is highly likely.
Subsidization of tuition for additional qualification courses in mathematics for elementary and secondary teachers **Measure of impact:** 385 educators received a subsidy to cover the tuition of their additional qualification courses in mathematics from September 2020 to March 2022.

Ensuring Coherence **Focus Areas:** ● **Connection between professional learning and school improvement across schools and Learning Centres, and between classroom, school, and system levels** ● **Alignment between classroom practice and board/Ministry policies** ● **Effective communication between the TDSB Mathematics and Numeracy Department and all schools.**
Key Actions and Impact
Developed and implemented system Math Action Plan to support school improvement process aligned with our commitment to human rights, equity, inclusion and anti-oppression in mathematics.
Update of the Approved Diagnostic Assessments (Tier 1) and Intervention Tools (Tiers 2 and 3) in Mathematics, as per PPM 155.
Bi-weekly system newsletter, *Math Matters!* provides news, professional learning opportunities and teacher resources to improve classroom practice. **Measures of impact:** 1946 educators have subscribed to receive the newsletter, with an average readership of 530 staff. The newsletter is also shared through TDSB Direct Line.

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Differentiating Assessment and Instruction

Focus Areas:

- **Review existing mathematics assessment tools and provide professional learning on their effective use.**
- **Provide ongoing professional learning opportunities on developing effective learner profiles with respect to mathematics and effective teaching strategies in response to students' strengths and areas of growth.**
- **Support teachers in developing an understanding of which tools, models and representations to select and when to use them in order to reveal, push and or develop mathematical thinking.**
- **Model effective differentiation during professional learning sessions in authentic contexts (e.g. demonstration classrooms, job-embedded learning opportunities).**

Key Actions

Professional learning from Hybrid Teacher-Coaches in Mathematics and the central Mathematics and Numeracy Department (e.g. learning sessions for math department heads, virtual book club).

Supported educators to build their capacity in mathematics knowledge and practice through professional learning opportunities in:

- Coding in the new K-8 Math Curriculum
- Humane Assessment for Academic Pathways
- Computer Algebra System for Academic Pathways
- Open Questions for Academic Pathways
- Parallel Tasks for Academic Pathways
- Thinking Classroom for Academic Pathways
- Coding (Scratch) in Math Secondary
- Technology (Desmos) in Math Secondary
- Engagement through the 3 part lesson framework in Math Secondary
- Humane Assessment for Destreamed Math Program
- Building Assessments with Multiple Entry Points
- Creating Desmos Assessments
- Introduction to Coding in Grade 9 Math Series (Part 1, Part 2 and Part 3)
- Grade 9 Sandbox Collaborative Workspace (433 teachers)
- Exploration classrooms (virtual and in person 2-5 teachers per session)
- Resource: Coding in the secondary grades website
- One-to-one support with engagement, assessments and use of technology in math

- Creation of the Supporting Inclusion in Mathematics through Individual Education Plans and the 2021 Grade 9 Destreamed Mathematics Curriculum document that will support math instruction.
- Reviewed and updated the Approved Diagnostic Assessments (Tier 1) and Intervention Tools (Tiers 2 and 3) in Mathematics document

- 389 centrally-provided licences for MathUP Classroom have been provided to Math Strategy Focus Schools to support educators in implementing differentiated

instruction and assessment

- Professional Learning facilitated by Centrally Assigned Principals and Student Achievement Officers to build capacity of K-12 Coaches, K-12 Math Coaches and Middle Years Student Success Counsellors

Measures of Impact: 28 K-12 & Math Coaches and 65 Middle Years Student Success Counsellors engaged in four professional learning sessions

Challenging Streaming and Promoting Inclusion

Focus Areas:

- **Promote and support grade-level learning in elementary mathematics for students with special education needs**
- **Support secondary teachers with professional learning and instructional resources to effectively implement Grade 9 destreamed and Grade 10 Academic-only mathematics programs**
- **Develop curriculum to better transition students from school to the workplace for students with intellectual or developmental disabilities**

Key Actions

Facilitation of sessions by Centrally Assigned Principals, Coordinators and Coaches for classroom teachers and administrators to learn:

- more about the background and rationale for the new Grade 9 math curriculum
- about inclusive, differentiated, and culturally responsive mathematics teaching at the secondary level
- how to effectively implement new curriculum expectations, including coding, financial literacy, mathematical modelling.
- how to use virtual tools to support students' learning of mathematics, including Desmos and GeoGebra.

Measure of impact: 338 educators attended 1 or more sessions.

Funding of TDSB K-12 staff by the Mathematics and Numeracy Department to attend the Ontario Association of Mathematics Educators provincial mathematics conference: *Equity Counts*.

Measure of impact: 727 educators attended.

Development of course plans, lessons, and activities for the Grade 9 destreamed math class by Central Lead Teachers of Secondary Mathematics and Academic Pathways

Measure of impact: 2 course plans and 34 lessons and assessments have been used by TDSB staff and are readily available on the internal TDSB Math for Educators website.

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Creation of the documents, *Supporting Inclusion in Mathematics through Individual Education Plans and the 2020 Ontario Mathematics Curriculum, Grades 1-8* to promote grade-level learning and *Supporting Inclusion in Mathematics through Individual Education Plans and the 2021 Grade 9 Destreamed Mathematics Curriculum* to guide educators in destreamed classrooms.
Essential Math Skills for the Workplace Resource integrates a multimodal set of math and numeracy diagnostic, teaching, assessment, and evaluation materials for TDSB students who have intellectual (MID) and/or developmental (DD) disabilities.
Facilitation of full-day professional learning for secondary Curriculum Leaders of mathematics in the Fall 2021 to support Indigenous mathematics and game-based learning in the Grade 9 destreamed mathematics curriculum. **Measures of impact:** ● 170 educators attended ● 83% of feedback respondents indicated the session deepened their understanding of Indigenous education, 75% deepened their understanding of culturally responsive pedagogy in mathematics, and 72% felt the session deepened their understanding of the Grade 9 destreamed math curriculum
Facilitation of system-wide book clubs using the *Catalyzing Change* series published by the National Council of Teachers of Mathematics. **Measure of impact:** 92 elementary educators (teachers and administrators) and 52 secondary teachers took part.

Engaging Parents, Families and Communities **Focus Areas:** ● **learning opportunities and resources for parents, caregivers and the wider TDSB community to support our students.** ● **school and home connections** ● **Partner with community and social agencies to create expanded opportunities for innovation and external support.** ● **Promote resources, including provincial parent resources and online support, on the TDSB external webpage to support parents and staff.**
Key Actions
Developed Mathematics for Families website to engage families to support math learning at home and includes family mental math at home, links to resources and digital tools.
Centre of Excellence for Black Student Achievement: To promote students and their families remaining connected to their school community during transitional periods of in-person and remote learning, diverse learning experiences focusing on enhancing joy,

building positive racial identity development and affirming Black students' experiences and identities in STEM were offered: ● Feb. 3 - African Canadian Inventors and Innovators ● Feb. 10 - African Women in STEM ● Feb. 24 - A Day in the life of a Forensic Scientist ● Feb. 24 - Black Space Innovators ● Mar. 3 - Want to be an Archaeologist? ● Mar. 10 - Extracting DNA - Experimentation!
Centre of Excellence for Black Student Achievement: Facilitation of the session *Advancing STEM Equity: Opportunities for supporting meaningful inclusion and belonging in STEM* by Dr. Eugenia Duodu Addy. This session supported families and communities in thinking through creating nurturing spaces and meaningful engagement opportunities for Black women and girls in STEM.
Presentations to parents and caregivers at Parents as Partners and PIAC Conferences on Supporting Math Learning At Home. **Measure of impact:** 46 parents attended sessions in the 2021 PIAC Conference

APPENDIX C

Math Annual Report 2021-2022

Program and School Services Committee

April 6, 2022

Andrew Gold, Associate Director, Student Well-Being and Innovation
Dr. David Cameron, Senior Manager, Research and Development
Wendy Terro, Centrally Assigned Principal, Learning Transformation and Equity
Jason To, Coordinator, Secondary Mathematics and Academic Pathways
Mahfuza Rahman, Coordinator, Mathematics, Science/STEM and Robotics

Multi-Year Strategic Plan System Goals In Mathematics

Research-informed instruction

Foundational skills by Grade 2

Inclusion

Grade 9 and 10 Academic

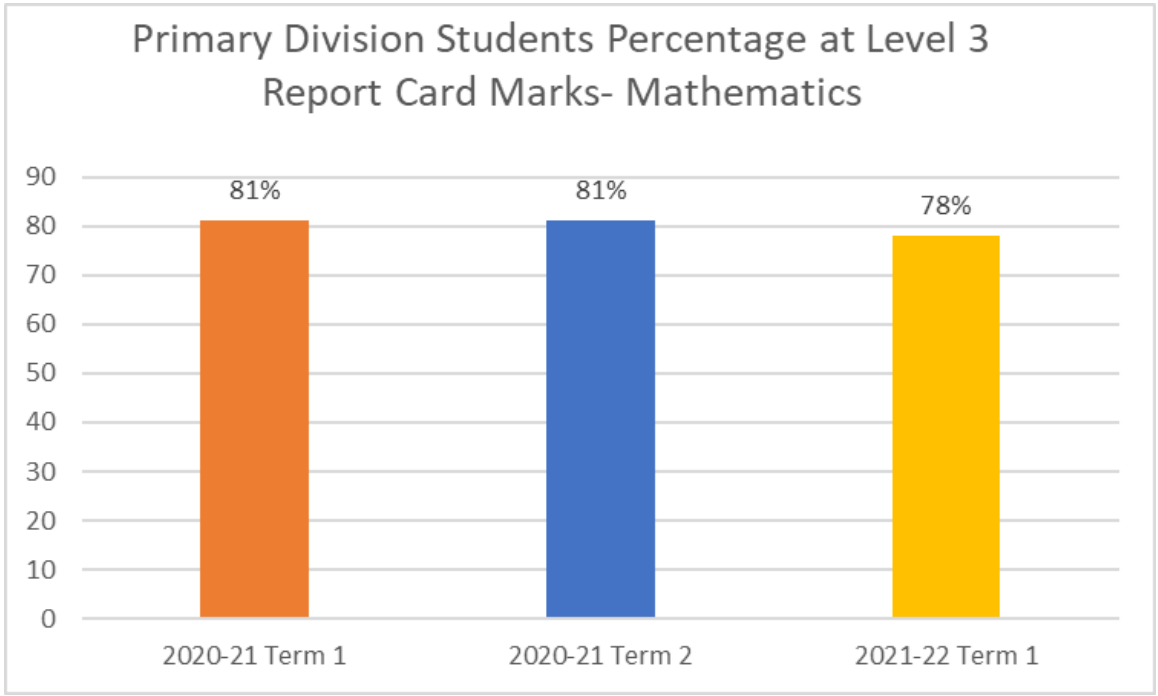
Removing barriers

Deep learning supported by technology

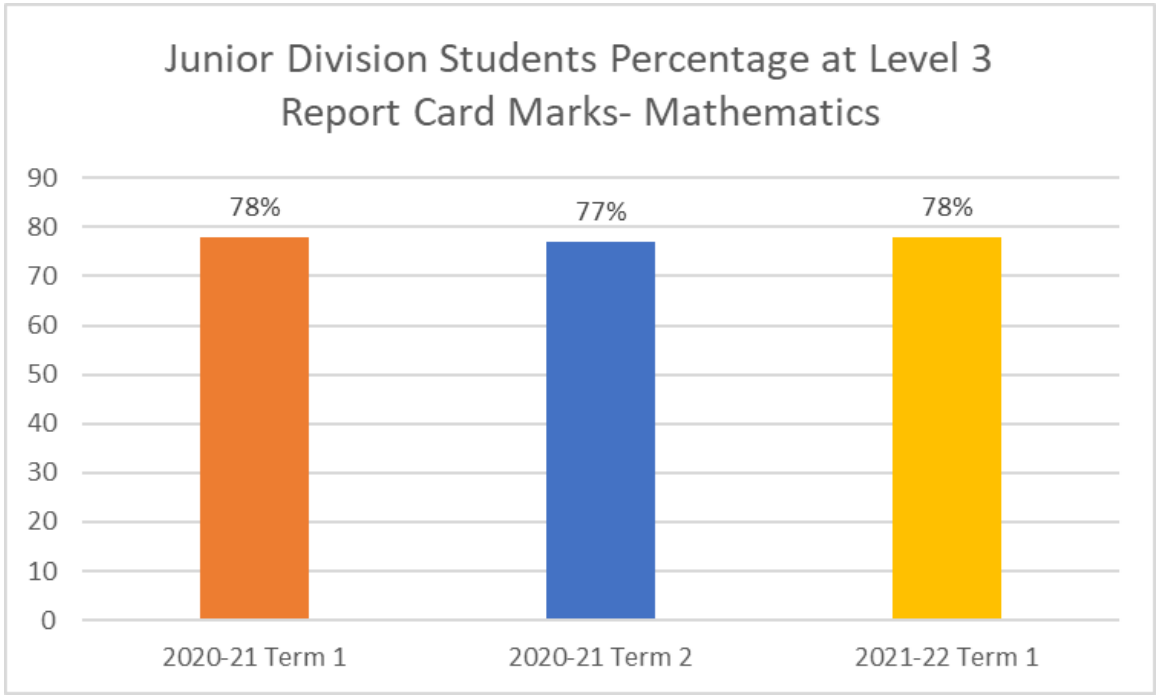
System Overview for Deep Learning in Mathematics

- P038: Transforming Student Learning in Literacy & Mathematics
- Mathematics Action Plan & Pandemic Recovery Plan
- Ministry of Education Math Strategy
- New math curricula for Grades 1-8 and Grade 9
- Innovative research partnerships

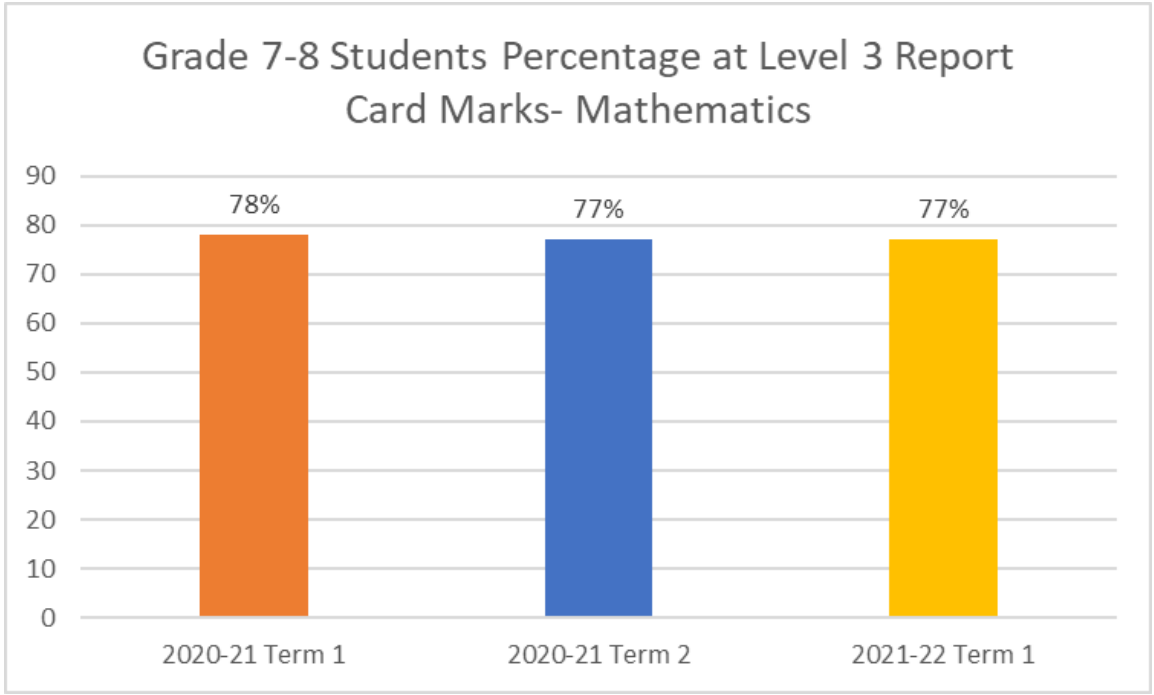
Elementary School Mathematics Student Outcome Data



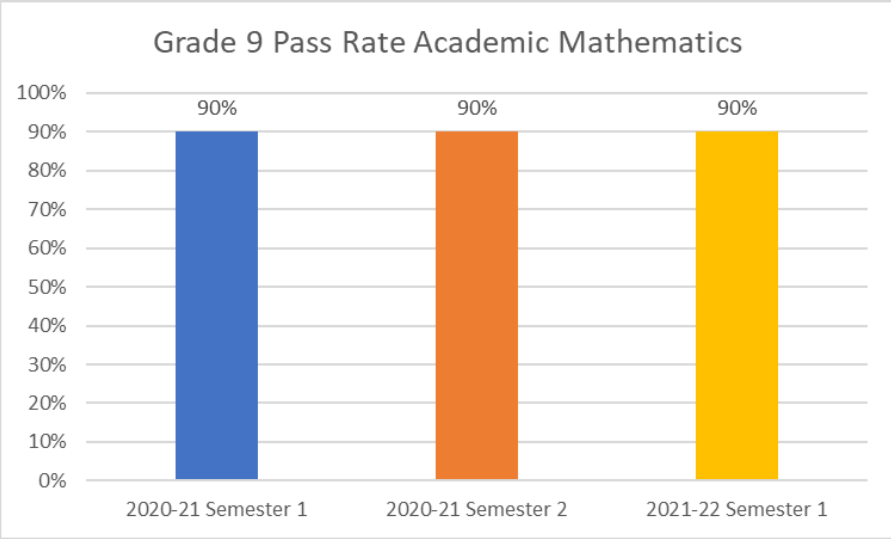
Elementary School Mathematics Student Outcome Data

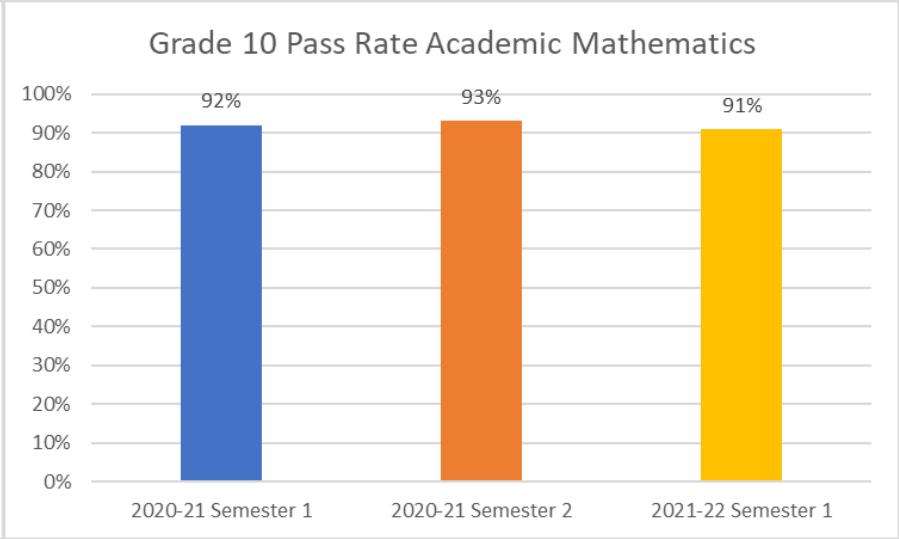


Elementary School Mathematics Student Outcome Data



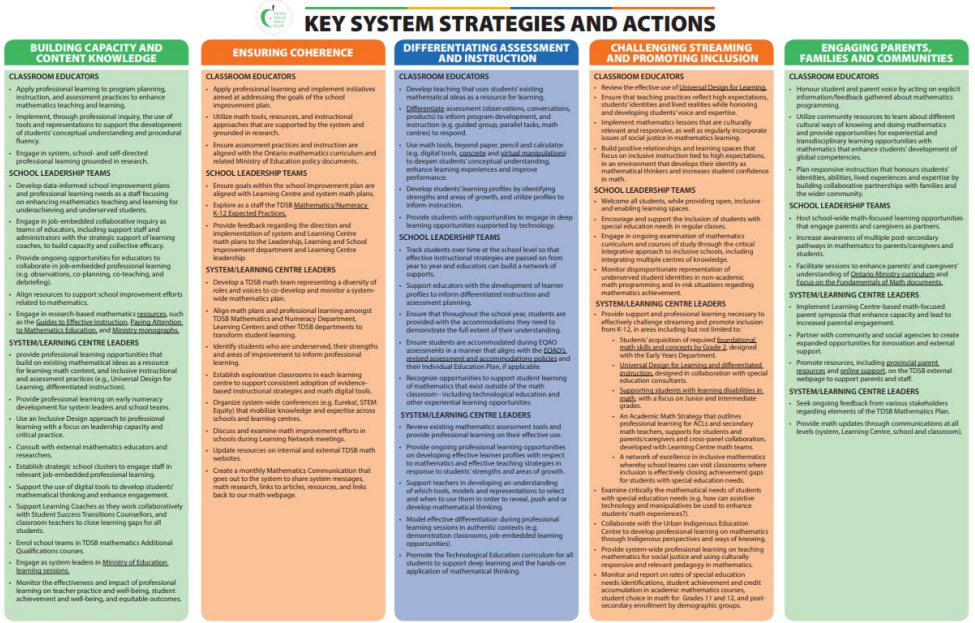
Secondary School Mathematics Student Outcome Data





TDSB Mathematics Action Plan

- Building Capacity and Content Knowledge
- Ensuring Coherence
- Differentiating Assessment and Instruction
- Challenging Streaming and Promoting Inclusion
- Engaging Parents, Families, and Communities



KEY SYSTEM STRATEGIES AND ACTIONS

BUILDING CAPACITY AND CONTENT KNOWLEDGE

CLASSROOM EDUCATORS

- Apply professional learning to program planning, instruction, and assessment practices to enhance mathematics teaching and learning.
- Implement, through professional inquiry, the use of tools and representations to support the development of students' conceptual understanding and procedural fluency.
- Engage in system, school- and self-directed professional learning grounded in research.

SCHOOL LEADERSHIP TEAMS

- Develop data-informed school improvement plans and professional learning needs as a staff focusing on enhancing mathematics teaching and learning for underachieving and underserved students.
- Engage in job-embedded collaborative inquiry as teams of educators, including support staff and administrators with the strategic support of learning coaches, to build capacity and collective efficacy.
- Provide ongoing opportunities for educators to collaborate in job-embedded professional learning (e.g. observations, co-planning, co-teaching, and debriefing).
- Align resources to support school improvement efforts related to mathematics.
- Engage in research-based mathematics resources, such as the Guides to Effective Instruction, Paying Attention to Mathematics Education, and Ministry monographs.

SYSTEM/LEARNING CENTRE LEADERS

- provide professional learning opportunities that build on existing mathematical ideas as a resource for learning math content, and inclusive instructional and assessment practices (e.g., Universal Design for Learning, differentiated instruction).
- Provide professional learning on early numeracy development for system leaders and school teams.
- Use an Inclusive Design approach to professional learning with a focus on leadership capacity and critical practice.
- Consult with external mathematics educators and researchers.
- Establish strategic school clusters to engage staff in relevant job-embedded professional learning.
- Support the use of digital tools to develop students' mathematical thinking and enhance engagement.
- Support Learning Coaches as they work collaboratively with Student Success Transitions Counsellors, and classroom teachers to close learning gaps for all students.
- Enrol school teams in TDSB mathematics Additional Qualifications courses.
- Engage as system leaders in Ministry of Education learning sessions.
- Monitor the effectiveness and impact of professional learning on teacher practice and well-being, student achievement and well-being, and equitable outcomes.

ENSURING COHERENCE

CLASSROOM EDUCATORS

- Apply professional learning and implement initiatives aimed at addressing the goals of the school improvement plan.
- Utilize math tools, resources, and instructional approaches that are supported by the system and grounded in research.
- Ensure assessment practices and instruction are aligned with the Ontario mathematics curriculum and related Ministry of Education policy documents.

SCHOOL LEADERSHIP TEAMS

- Ensure goals within the school improvement plan are aligned with Learning Centre and system math plans.
- Explore as a staff the TDSB Mathematics/Numeracy K-12 Expected Practices.
- Provide feedback regarding the direction and implementation of system and Learning Centre math plans to the Leadership, Learning and School Improvement department and Learning Centre leadership.

SYSTEM/LEARNING CENTRE LEADERS

- Develop a TDSB math team representing a diversity of roles and voices to co-develop and monitor a system-wide mathematics plan.
- Align math plans and professional learning amongst TDSB Mathematics and Numeracy Department, Learning Centers and other TDSB departments to transform student learning.
- Identify students who are underserved, their strengths and areas of improvement to inform professional learning.
- Establish exploration classrooms in each learning centre to support consistent adoption of evidence-based instructional strategies and math digital tools.
- Organize system-wide conferences (e.g. Eureka!, STEM Equity) that mobilize knowledge and expertise across schools and learning centres.
- Discuss and examine math improvement efforts in schools during Learning Network meetings.
- Update resources on internal and external TDSB math websites.
- Create a monthly Mathematics Communication that goes out to the system to share system messages, math research, links to articles, resources, and links back to our math webpage.

DIFFERENTIATING ASSESSMENT AND INSTRUCTION

CLASSROOM EDUCATORS

- Develop teaching that uses students' existing mathematical ideas as a resource for learning.
- Differentiate assessment (observations, conversations, products) to inform program development, and instruction (e.g. guided group, parallel tasks, math centres) to respond.
- Use math tools, beyond paper, pencil and calculator (e.g. digital tools, concrete and virtual manipulatives) to deepen students' conceptual understanding, enhance learning experiences and improve performance.
- Develop students' learning profiles by identifying strengths and areas of growth, and utilize profiles to inform instruction.
- Provide students with opportunities to engage in deep learning opportunities supported by technology.

SCHOOL LEADERSHIP TEAMS

- Track students over time at the school level so that effective instructional strategies are passed on from year to year and educators can build a network of supports.
- Support educators with the development of learner profiles to inform differentiated instruction and assessment planning.
- Ensure that throughout the school year, students are provided with the accommodations they need to demonstrate the full extent of their understanding.
- Ensure students are accommodated during EQAO assessments in a manner that aligns with the EQAO's revised assessment and accommodations policies and their Individual Education Plan, if applicable.
- Recognize opportunities to support student learning of mathematics that exist outside of the math classroom - including technological education and other experiential learning opportunities

SYSTEM/LEARNING CENTRE LEADERS

- Review existing mathematics assessment tools and provide professional learning on their effective use.
- Provide ongoing professional learning opportunities on developing effective learner profiles with respect to mathematics and effective teaching strategies in response to students' strengths and areas of growth.
- Support teachers in developing an understanding of which tools, models and representations to select and when to use them in order to reveal, push and or develop mathematical thinking.
- Model effective differentiation during professional learning sessions in authentic contexts (e.g. demonstration classrooms, job-embedded learning opportunities).
- Promote the Technological Education curriculum for all students to support deep learning and the hands-on application of mathematical thinking.

CHALLENGING STREAMING AND PROMOTING INCLUSION

CLASSROOM EDUCATORS

- Review the effective use of Universal Design for Learning.
- Ensure that teaching practices reflect high expectations, students' identities and lived realities while honoring and developing students' voice and expertise.
- Implement mathematics lessons that are culturally relevant and responsive, as well as regularly incorporate issues of social justice in mathematics learning.
- Build positive relationships and learning spaces that focus on inclusive instruction tied to high expectations, in an environment that develops their identity as mathematical thinkers and increases student confidence in math.

SCHOOL LEADERSHIP TEAMS

- Welcome all students, while providing open, inclusive and enabling learning spaces.
- Encourage and support the inclusion of students with special education needs in regular classes.
- Engage in ongoing examination of mathematics curriculum and courses of study through the critical integrative approach to inclusive schools, including integrating multiple centres of knowledge.
- Monitor disproportionate representation of underserved student identities in non-academic math programming and in-risk situations regarding mathematics achievement.

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- Provide support and professional learning necessary to effectively challenge streaming and promote inclusion from K-12, in areas including but not limited to:
  - Students' acquisition of required foundational math skills and concepts by Grade 2 designed with the Early Years Department.
  - Universal Design for Learning and differentiated instruction, designed in collaboration with special education consultants.
  - Supporting students with learning disabilities in math, with a focus on Junior and Intermediate grades.
  - An Academic Math Strategy that outlines professional learning for ACLs and secondary math teachers, supports for students and parents/caregivers and cross-panel collaboration, developed with Learning Centre math teams.
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- Examine critically the mathematical needs of students with special education needs (e.g. how can assistive technology and manipulatives be used to enhance students' math experiences?).
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- Provide system-wide professional learning on teaching mathematics for social justice and using culturally responsive and relevant pedagogy in mathematics.
- Monitor and report on rates of special education needs identifications, student achievement and credit accumulation in academic mathematics courses, student choice in math for Grades 11 and 12, and post-secondary enrollment by demographic groups.

ENGAGING PARENTS, FAMILIES AND COMMUNITIES

CLASSROOM EDUCATORS

- Honour student and parent voice by acting on explicit information/feedback gathered about mathematics programming.
- Utilize community resources to learn about different cultural ways of knowing and doing mathematics and provide opportunities for experiential and transdisciplinary learning opportunities with mathematics that enhance students' development of global competencies.
- Plan responsive instruction that honours students' identities, abilities, lived experiences and expertise by building collaborative partnerships with families and the wider community.

SCHOOL LEADERSHIP TEAMS

- Host school-wide math-focused learning opportunities that engage parents and caregivers as partners.
- Increase awareness of multiple post-secondary pathways in mathematics to parents/caregivers and students.
- Facilitate sessions to enhance parents' and caregivers' understanding of Ontario Ministry curriculum and Focus on the Fundamentals of Math documents.

SYSTEM/LEARNING CENTRE LEADERS

- Implement Learning Centre-based math-focused parent symposia that enhance capacity and lead to increased parental engagement.
- Partner with community and social agencies to create expanded opportunities for innovation and external support.
- Promote resources, including provincial parent resources and online support, on the TDSB external webpage to support parents and staff.

SYSTEM/LEARNING CENTRE LEADERS

- Seek ongoing feedback from various stakeholders regarding elements of the TDSB Mathematics Plan.
- Provide math updates through communications at all levels (system, Learning Centre, school and classroom).

Building Capacity and Content Knowledge

- Pandemic impact on capacity building
- Innovative professional learning opportunities
- Resource development to support student success, well-being, and engagement
- Use of evidence-based practices through professional learning to improve academic outcomes in mathematics for students from historically marginalized populations, including Indigenous and Black students
- TDSB math additional qualification (AQ) course

Ensuring Coherence

- TDSB Mathematics Action Plan
- Aligning human resources
- Instructional and assessment best practices
- System-wide professional learning
- Digital and non-digital resources and tools
- Communications (websites, newsletters, system messaging)

Differentiating Assessment and Instruction

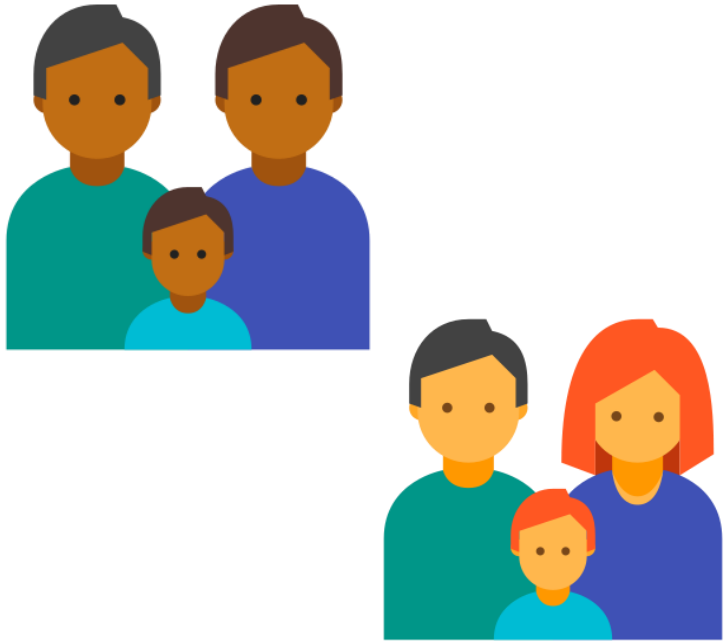
- Knowing your students
- Differentiating instruction and assessment practices
- Strategies to support students with Special Education needs and English Language Learners
- Leveraging professional learning resources

Challenging Streaming and Promoting Inclusion

- System direction on supporting inclusion through IEPs in math classes to promote grade-level learning
- Equity-focused provincial math conference
- Professional learning opportunities on inclusive and culturally responsive pedagogy
- Resources developed specifically to implement Grades 1-8 and Grade 9 math curricula

Engaging Parents, Families and Communities

- Partnerships between home and school
- Sessions at *Parents and Caregivers as Partners Conference*
- Student broadcast experiences in STEM with the Center of Excellence for Black Student Achievement
- TDSB Mathematics for Families & Caregivers website



Next Steps

- Ongoing analysis of achievement data and other system indicators to support improvement efforts and focus of professional learning.
- Continued system implementation of Grades 1-8 and Grade 9 math curricula and the new Grade 10 Principles of Mathematics addendum.
- Ongoing professional learning for teachers and administrators to meet the goal set out in the MYSP to build teacher and leader capacity in mathematics.
- Sharing effective practices and working collaboratively with Learning Centres and centrally assigned staff to continue to challenge streaming and close gaps in student learning in mathematics.
- Development of a toolkit for school leaders and educators that highlights best practices in mathematics across the TDSB. This may be used to facilitate local professional learning through an inquiry lens.
- Monitor student learning and achievement in mathematics through the School Improvement Process.
- Use research partnerships with scholarship to evolve and adapt Math and STEM strategy with cutting edge knowledge in relation to K-12 pedagogic approaches to mathematics teaching and learning.