

ISSN 1481-7799

Spring/Summer 2025

President's Message

May is a busy time for schools as teachers plan for the final weeks of the year, with report cards and final exams just around the corner. With summer on the horizon, I hope you all get the rejuvenating break you deserve, while also looking forward to the excitement and challenges of the next school year.

The MTA is hard at work planning an engaging and informative conference for this coming October. We're thrilled to announce that Pam Harris and Dr. Marian Small are tentatively booked as keynote speakers. Pam Harris has just released her new book, *Developing Mathematical Reasoning*, and we're excited to hear more about it. Dr. Marian Small, well-known to many Nova Scotian teachers, will also be sharing some of her latest resources.

Teachers like you are a key part of this conference and we encourage you to consider presenting at the MTA conference. You can <u>submit your proposal here</u>.

Message du président

Le mois de mai est une période bien occupée pour les écoles, alors que les enseignants préparent les dernières semaines de l'année, avec la distribution des bulletins et les examens finaux qui approchent. Avec l'été qui arrive, j'espère que vous profiterez d'une pause revigorante, tout en vous préparant pour la prochaine année scolaire.

La MTA travaille activement à organiser une conférence captivante et enrichissante pour octobre. Nous sommes heureux d'annoncer que Pam Harris et Dr. Marian Small sont provisoirement confirmées comme conférencières principales. Pam Harris vient de publier *Développer le raisonnement mathématique*, et nous avons hâte d'en savoir plus. Dr. Marian Small, bien connue des enseignants de la Nouvelle-Écosse, partagera ses dernières ressources.

Des enseignants comme vous sont essentiels à cette conférence, et nous vous encourageons à envisager de présenter lors de la MTA. Vous pouvez <u>soumettre votre proposition ici</u>.

Erick Lee, Président Mathematics Teachers Association

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Mathematics News

The Secret World of Flexagons: Fascinating Folded Paper Puzzles by Scott Sherman, Yossi Elran and Ann Schwartz — Flexa-whaaat? If you don't know what a flexagon is, you're in for a treat! This newly released book explores the wide and expanding field of flexagons—those paper puzzles that delight mathematicians, grade school students, and everyone in between. Folded into polygons, flexagons "magically" change their structure and appearance when manipulated. With a hands-on approach, the book introduces the simplest flexagons and then work up to dozens of new ones, showing readers the myriad ways to flex (manipulate) flexagons, reveal their hidden structure, and much more.

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This book is one hundred percent hands-on, with templates for every flexagon for readers to print out and fold. Starting with the simplest flexagons and flexes, it then progresses to more complex new ones. Step-by-step instructions for folding and flexing are

always provided. Color illustrations and color photos make everything as clear as possible. The idea is to make learning



about these wonderful puzzles fun.

Different parts of the book can be applied to grade school, high school, and college classes. Perhaps even post-graduate mathematics programs. Flexagons show how math can be fun, and the authors hope elementary teachers will use them to teach their students just that. For <u>more information click</u> here.

Graham Fletcher's Progression Videos — Graham Fletcher has created a series of videos that show how math concepts build and grow through the grade levels. These videos are an excellent way to clarify where students are in this progress and how to help them move along to the next stage. There are videos on topics such as the progression of early number & counting as well as the progression of fractions. You can see the entire list of Graham's progression videos on his website at <u>https://gfletchy.com/progression-videos/</u>.

Desmos Statistics— Awesome news for statistics teachers. Desmos has recently added many new statistics functions. You can now make dotplots, histograms and boxplots all within the free online Desmos calculator. You can enter a data set using a list, such as A=[3,3,5,5,6,8,8,8]. The create a plot using the expressions: *dotplot*(A), *histogram*(A) or *boxplot*(A).

Desmos also now recognizes commands such as *normaldist*(mean, std sev) and *binomialdist*(trials, success probability). Teachers of higher level statistics courses such as AP Stats can find a complete list of supported distributions <u>on</u> <u>the Desoms Help Center page</u>.

Bob Lochel, an high school stats teacher and Desmos Fellow has created a short YouTube video exploring these stats functions. Check it out at <u>https://www.youtube.com/watch?v=SQT6RuPTxGs</u>.

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MTA Conference Update — Friday, October 24th, 2025

Keynote Speaker — Pam Harris

Pam Harris is a mom, a former high school math teacher, a university lecturer and an author. She wants to change the way we view and teach mathematics. While Pam was teaching high school math, her four children grew and mathematized their world in a way she had never imagined. "I had always bought into the myth that math is a disconnected set of facts to memorize, with rules and procedures to mimic. I now call that fake math."

Pam's own kids, research, and experiences teaching Real Math have shown her what it means to mathematize and to support learners in their own journeys. Real Math is thinking mathematically, not just mimicking what a teacher does on the board. Pam helps teachers make this shift for themselves, and helps teachers teach in a way that supports students to learn Real Math.

Keynote Speaker — Dr. Marian Small

Dr. Marian Small is an internationally renowned mathematics educator, author, and professional learning consultant. Dr. Small, whose career in education has spanned more than four decades, is considered one of the most influential math educators in Canada. She has authored or co-authored more than 100 math resources and travelled to mathematics classrooms around the world to provide consultation focused on improving understanding and performance in K–12 mathematics.



NOVA SCOTIA MATHEMATICS TEACHERS ASSOCIATION PROFESSIONAL DEVELOPMENT CONFERENCE



Nova Scotia MTA Conference 2025

Friday, October 24th, 2025

#NSMTA2025

Location - The MTA would like to thank **Charles P. Allen High School** in Bedford for once again hosting our 2025 conference. The size of this school allows us to host numerous sessions simultaneously and to make space for as many participants as we have sessions for. Being in a location that is near the centre of the province makes it reasonable for as many teachers as possible to have access to. We will be using the cafetorium at CPA to host the keynote sessions. Both of these keynote presenters have amazing messages to share and we want as many people as possible to be able to participate.

Speaker Proposals for 2025!—The key factor in the success of the MTA conference is the willingness of Nova Scotian educators to share their knowledge and experience. So many amazing things are happening in our mathematics class-rooms that can inspire and encourage fellow teachers.

Please reflect on what you might have to offer and consider sharing. Educators can submit proposals for conference sessions using the following Google Form: <u>https://forms.gle/1FRo57m5fG1Lsi166</u>

MTA.NSTU.CA

Rethinking Homework: Lessons from an Immigrant Father's Story

By Matthew Little, Elementary Mathematics Coach, Halifax Regional Centre for Education (HRCE)

Alonso, an immigrant father, navigated the challenges of supporting his child Dario in elementary math learning. This journey became the focus of my Master of Education thesis. Though centered on one father's journey, the insights offer broader relevance for educators working with diverse families. In particular, the findings highlight homework as a bridge that can either support or complicate the connection between home and school, depending on how it's designed and experienced.

Homework as a Bridge Between Home and School

For many families, homework is one of the few consistent ways to engage with their child's learning. Alonso shared how homework helped him "see what Dario did at school," providing real-time insight into the math content and instructional approaches. Unlike events like family math nights—which are typically limited to the beginning of the year—homework offers ongoing, informal opportunities for families to stay connected to classroom learning. This connection is emphasized by Sheldon and Epstein (2005), who highlight its importance in helping parents remain engaged with their child's education.

Beyond simply serving as a tool for connection, homework can also spark curiosity in parents—especially in subjects like math, where it is often a source of frustration (Clarke, 2021). For Alonso, helping with homework prompted reflection on his own math education, which emphasized memorized steps over deep understanding.

Homework as a Chance for Parents to Learn, Too

Alonso's reflections revealed that homework can be more than just review or frustration—it can serve as a learning opportunity for parents. Observing how Dario approached subtraction using visual models and conceptual reasoning prompted Alonso to reconsider how he had learned the concept himself. He recalled learning subtraction as a series of memorized steps, describing it as "not logical—you don't know why you're doing it… I learned the steps."

This realization is significant. It positions Alonso not just as a reflective learner, but as a knowledgeable resource—

someone who can support and advocate for a deeper, more conceptually grounded understanding of formalized math procedures, such as the Traditional North American Subtraction Algorithm (TNASA), where numbers are stacked vertically to perform the operation.

This challenges a common narrative in educational research: that unfamiliar math strategies discourage parents from engaging (Sheldon et al., 2010). In Alonso's case, difference became a doorway to connection and growth.

Supporting Immigrant Families: Lessons from Alonso's Experience

While this study focused on one immigrant father, Alonso's experience provides a powerful reminder that immigrant parents—particularly fathers—are often underrepresented in educational research. Despite common assumptions that immigrant fathers may be less engaged in their children's education (Baker, 2018; Epstein, 2001), Alonso's experience challenges this view. By fostering communication and engagement with the school, Alonso became an active participant in his child's learning process, particularly in math.

Alonso's story emphasizes the importance of schools recognizing the unique strengths and contributions that immigrant parents can offer. Homework, when designed thoughtfully, can bridge cultural and educational gaps, creating opportunities for parents—regardless of their background—to actively engage in their child's learning. This can lead to more inclusive educational practices that encourage families to be co-educators and partners, helping to create a welcoming environment for all families, including those from immigrant backgrounds.

But Not All Homework Experiences Are Equal

It's important to recognize that not all families will share Alonso's experience. Homework can also be a source of confusion and frustration—especially when parents and children are working from different mathematical frameworks (Clarke, 2021; O'Keeffe et al, 2023). Parents may rely on traditional algorithms like the Traditional North

Rethinking Homework... continued

American Subtraction Algorithm (TNASA), while children are learning conceptually through strategies such as compensation, counting on/back, or using number lines to represent their thinking.

I've often heard students say, "My [someone at home] showed me another way," then struggle to explain what they did, how they did it, or why it worked. When parents aren't familiar with the current pedagogical best practices, they may unintentionally override them with the procedural methods they remember from their own schooling. This isn't about placing blame, but about appreciating the complexity of this work and the need for shared understanding between home and school.

In addition, families navigating time constraints, financial stress, or language barriers may find it difficult to support homework at all. Alonso had time, resources, and familiarity with school systems—advantages that not all families have. Expecting all parents to act as co-educators, particularly in mathematics, can unintentionally deepen existing inequities.

What Can Teachers Do?

To make homework more inclusive and effective:

- Design homework with accessibility in mind Use clear instructions, include visual models when possible, and keep tasks manageable.
- Invite parents in Provide short videos or explanations that model current strategies. Consider takehome math games or optional family challenges.
- Acknowledge diverse home contexts Avoid assuming all families have the same time, resources, or math background. Offer flexibility and support when needed.
- Use homework to open dialogue Create opportunities for parents to share their own math stories or ask questions.

Final Thoughts

Homework, especially in math, is often viewed as a task for students to complete. However, when approached thoughtfully, it can transform into a powerful bridgeconnecting not just school and home but also diverse cultures, experiences, and family dynamics. To unlock this potential, educators must rethink how we design homework, ensuring that it is accessible, inclusive, and meaningful for all families, regardless of background or resources.

When homework reflects diverse learning strategies and actively invites family participation, it moves beyond being a routine chore to becoming an opportunity for shared learning and growth. By embracing the unique contributions of immigrant families, like Alonso's, schools don't just improve academic outcomes; they strengthen the entire educational ecosystem, creating a more supportive environment for all.

Now is the time to reimagine homework as more than a one-size-fits-all task. It should be a collaborative process that values the diverse perspectives of every student and their family. This shift will not only empower parents to engage more deeply in their child's education but will also foster an inclusive and supportive environment where every student can thrive. Let's reimagine homework as a tool that builds bridges—not barriers—by promoting connection, collaboration, and mutual growth among students, families, and schools.

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Teachers Gain New Insights into Teaching Through Mathematical Modelling

By Dr. Evan Throop-Robinson, Dr. Marc Husband and Cheryl Carter, St. Francis Xavier University (StFX)

In the fast-paced environment of today's classrooms, time often feels scarce for teachers who juggle lesson planning, student engagement, and administrative duties. A recent inquiry project conducted through the Certificate in Elementary Mathematics Pedagogy (CEMP) program at St. Francis Xavier University (StFX) explored this challenge through mathematical modelling. Results from the modelling illuminated effective strategies teachers can adopt to alleviate some of the pressure from their demanding schedules.

Certificate in Elementary Mathematics Pedagogy

The CEMP program at StFX offers teachers opportunities to enhance their skills using innovative teaching methods and insights from current mathematics education research. This platform is ideal for Nova Scotia teachers looking to upgrade their knowledge and practice. One of the ten courses offered in the CEMP program focuses specifically on mathematical modelling at the elementary school level. To prepare for exploring mathematical modelling with young learners, teachers engaged in a mathematical modelling process that used problem-posing as a basis for inquiry. This process allowed teachers to analyze significant professional problems of practice, fostering a deeper understanding of their teaching environment.

Mathematical Modelling

The mathematical modelling process uses mathematics to represent, analyze, and predict real-world phenomena. Modelling begins with genuine connections to lived experiences and employs mathematical concepts to explore and describe them. Modelling often involves open-ended and complex problems resulting in multiple solutions. This process encourages learners to be creative and critical, engaging in discussions and decision-making. Cheryl, a grade 4 teacher and CEMP participant, designed a mathematical modelling project to explore how teachers perceive and manage time in their daily routines. She asked colleagues

to complete surveys that highlighted their experiences and challenges. Analyzing this data provided valuable insights into teachers' struggles with time and prompted further investigation into the complex issues impacting their professional lives.

Modelling Data

Cheryl noticed several issues in modelling the data regarding teachers' time in school. The data showed that most teachers feel they do not have time in their daily work schedule to meet the job demands (see Figure 1).

Do you feel you generally have enough time to meet the demands of your job?



Figure 1 Teachers' time in schools

The data also showed Cheryl that preparation time has changed from previous years. While acknowledging a wide discrepancy in preparation minutes across the faculty (i.e., 90 – 660 minutes per week), Cheryl wondered whether preparation time (and how it has changed from previous years) was equitable for faculty. Similarly, upon analysis, Cheryl recognized an inequity in student supervision time with some teachers spending 240 – 300 minutes per week and others supervising up to 90 minutes (see Figure 2).





Teachers Gain New Insights... continued

How many minutes of your week are spent supervising students?



Figure 2b Student Supervision Time

Diving deeper into the issue of preparation time, Cheryl inquired about the types of tasks accomplished during teacher preparation time. She compiled a long list from teachers that included: Communication with colleagues and families, sourcing appropriate materials, photocopying, lesson planning, creating resources from scratch, managing student transitions and behaviours, and marking. The data revealed that only a tiny percentage of what was reported was marking. Cheryl surmised that because marking is ongoing and time-consuming, teachers are left to do the majority of this outside of school hours (see Figure 3).

What are the tasks that take up most of your prep time?			
87.5% of participants:	Sourcing appropriate materials/photocopying		
75% of participants:	Lesson planning/creating resources		
62.5% of participants:	Emails/Communications with families		
25% of participants:	Managing student transitions/behaviours		
12.5% of participants:	Marking		

Figure 3 Preparation Time

Working outside of school hours then became a new inquiry focus. The data showed that the number of extra weekly hours varies among teachers (see Figure 4).

How many hours a week do you estimate your are spending out side of school hours (8:00-4:00) to complete expectations.		
12.5% : 1 hour	12.5% : 5 hours	
12.5% : 2 hours	25% : 7 hours	
12.5% : 3 hours	12.5% : 8-9 hours	
12.5% : 4 hours		

Figure 4 Time Outside of School Hours in a Typical Week

In follow-up conversations with teachers, Cheryl found that preparation time outside of school hours increased

dramatically while preparing report cards during the three reporting periods each year.

Through mathematical modelling, the data showed significant issues for teachers about the time required to do the job effectively. As a result, Cheryl wondered – what does the problem of time mean for teachers' health and wellness?

Implications for Teachers

Through the mathematical modelling process, Cheryl identified three implications to empower teachers with actionable steps toward enhancing their well-being:

- Self-Advocating: Teachers must learn to say no to tasks that extend beyond their responsibilities and impede personal growth. One participant stated, "If I am not caring for myself, there is little left to give to others." This self-advocacy is essential for balancing personal wellness and professional obligations.
- 2. Checking in on Colleagues: Building a supportive community among teachers can significantly impact morale. The findings emphasized the importance of looking out for one another—ensuring that colleagues are supported and not overwhelmed. By fostering a culture of care, teachers can create an environment where mutual assistance is valued.
- 3. Communicating: Open lines of communication with administrators are vital. Teachers must engage in direct, respectful discussions regarding the overwhelming demands they face. Such dialogues can lead to a collaborative effort in addressing the challenges in the teaching environment and the realities of limited time.

Cheryl reflected on the process: "This project became bigger than anticipated as each survey question led to more questions that were related and equally important to the overall goal." In class discussion, Cheryl commented that while addressing every challenge at once may not be feasible, initiating small, meaningful changes that pave the way for long-term improvements is essential. Completing the mathematical modelling assignment enriched Cheryl's

Teachers Gain New Insights... continued

teaching practice by equipping her with valuable strategies cators from your regional centre for education. Specificalfor mathematical modelling to bring back to her elementary classroom and inviting discussions around professional challenges that resonated with many.

Concluding Thoughts

For Nova Scotia teachers interested in experiencing similar transformative opportunities, we invite you to join the CEMP program at StFX. This professional development program offers meaningful experiences, collaboration, and professional growth alongside a cohort of dedicated edu-

ly, engaging in mathematical modelling provides an opportunity to explore current professional problems of practice with colleagues and build a deeper understanding of teaching and learning. Embrace the chance to enhance your teaching practice while addressing professional challenges mathematically!

For more information please contact: Dr. Marc Husband (mhusband@stfx.ca) and Dr. Evan Throop-Robinson (erobinso@stfx.ca)

100 Squares Challenge

By Erick Lee (@TheErickLee.bsky.social), MTA President, Mathematics Teacher/Registrar, Citadel High School (HRCE)

This semester, I am teaching Calculus 12, and we were about to begin our study of optimization problems. I had an old worksheet of practice problems, but I was looking for a way to make it more engaging. That's when I decided

ate feedback as students worked. It also ensured that I connected with every group at a meaningful point in their learning. This structure was particularly effective for students who are hesitant to ask questions in class, as it built

to use AI to suggest ways to enhance the activity. It provided a list of ideas, and one that stood out was to gamify the problems.

After some brainstorming, I developed a "100 Squares" game inspired by a fundraising activity I remembered, where participants bought squares on a 10x10 grid, and one square was randomly selected as the winner.

I adapted this concept for my class. Students worked in pairs to solve optimization problems from a handout.

Once a team solved a problem, they brought it to me to check. If their solution was correct, they got to claim a square. If it was incorrect, I provided a hint or pointed out a misconception, and they went back to try again.

I appreciated how this activity allowed me to give immedi-





by 11, 2025 at 10-43 AM 35. Everybody can reply

in multiple check-ins throughout the period.

The activity was a success. Students remained engaged throughout the class and received plenty of feedback. Teams developed creative strategies for selecting squares — one group chose jersey numbers of their favorite NHL players, while another aimed to claim a contiguous block of numbers.

From a teaching perspective, the game also provided valuable insights. I could easily identify common misconceptions and specific question

types that posed challenges for students.

The week after I did this activity I noticed a post on Bluesky from Edutopia sharing a very similar activity. Maybe this is where the AI got the idea from! The activity was originally shared nearly a year earlier.

Adventures in Logic and Reasoning

Slant (aka Gokigen Naname)

This logic puzzle is played on a square grid. The numbers in circles on the grid show how many lines extend from the point. The object of the puzzle is to draw a diagonal line **in every square of the grid** to satisfy the constraints given in the circles. One additional stipulation is that no lines can form a loop. Lines do not have to form a single connected network. Below is a solved Slant puzzle as an example and on for you to solve!

7x7 Example Puzzle

7x7 Puzzle



Strategy Tip: Start by looking for circles with 4 in the middle of the grid, 0 or 1 in the corners of the gird and 0 or 2 on the sides of the grid. Cells adjacent to these circles have only one valid way to be filled.

Problem 474. The Three Dice

Henry E. Dudeney (1857-1930) was a prolific creator of mathematical puzzles and brainteasers. The puzzle below comes from his book, 536 Puzzles and Curious Problems.

Mason and Jackson were playing with three dice. The player won whenever the numbers thrown added up to one of two numbers he selected at the beginning of the game. As a matter of fact, Mason selected seven and thirteen, and one of his winning throws is shown in the illustration.



What were his chances of winning a throw? And what two other numbers should Jackson have selected for his own throws to make his chances of winning exactly equal?

Nova Scotia Math Teachers Association Executive

Below are the current members of the NS MTA Executive. The membership and the positions of the executive change each year at the Annual General Meeting held at the MTA Provincial Conference (The MTA provincial conference is on the fourth Friday in October of each year).



Name	Position	
Erick Lee	President / Communications	
Jennifer Courish	Vice-President	
Kimberley McCarron	Treasurer	
Anne Pentecost	Secretary	
Lori Burns	Conference On-Site Chair	
Angela MacLeod	Member-at-Large Halifax	
Joe MacDonald	Member-at-Large South Shore	
Brad Pemberton	Member-at-Large Annapolis Valley	

Congratulations to both David MacFarland and Cailan Langille.

David is retiring at the end of this year. A longtime member of the MTA executive, he previously served as president and most recently as treasurer. His energy and enthusiasm will be greatly missed, and we wish him all the best in retirement.

Cailan recently concluded her term as our Member-at-Large for the Tri-County region. She has taken on a new role as the Coordinator of Assessment and Mathematics for TCRCE. We look forward to seeing how she continues to promote mathematics in this exciting new capacity.

Special Projects

The MTA strives to give back to its membership by making funding available for special projects developed by classroom teachers. If you have an innovative math education project taking place in your classroom(s), MTA may be able to offer some financial assistance to help develop the project. Information on funding can be obtained by contacting any member of the Executive.

Call for Contributions

We are better together. Mathematics Matters, the MTA newsletter, is looking for a variety of contributions from classroom teachers, math mentors and coaches, math support/intervention teachers and others who are interested in the teaching and learning of mathematics. Please consider sharing a favorite lesson or activity, a reflection or blog post, a book or technology review, or another work of interest to mathematics teachers in Nova Scotia and beyond. Sharing your ideas and reflections with other teachers is a great way to contribute to a vibrant and dynamic community of mathematics educators in our province.

If you are interested in contributing, please get in touch. We look forward to hearing from you!

The MTA Newsletter is published by the NSTU for the Mathematics Teachers Association, Erick Lee, Editor. The opinions expressed are not necessarily those of the Editor, the NSTU, or the MTA.