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Fall/Winter 2022

President's Message

Welcome to the 2022 NSMTA Conference - our first "in-person" professional development day in two years. Thank you for joining us and your colleagues from across the province.

Today, approximately 700 Nova Scotia teachers will take part in more than 50 workshops designed to help them help their students benefit from the latest pedagogical advances.

The conference keynote speaker is Peter Liljedahl, author of *Building Thinking Classrooms in Mathematics* and a Professor of Mathematics Education in the Faculty of Education at Simon Fraser University, Vancouver. Peter is a former high school mathematics teacher whose research interests and activities have remained focus on the classroom. He is a regular presenter at major conferences in mathematics education and we are very pleased to have him with us this year.

The conference's workshop presenters are the cornerstone of ensuring that the time you invest here is meaningful and rewarding for you and, ultimately, your students. A very big thank you to them for giving of their time and expertise to help us ensure that happens.

Message du président

Bienvenue à la conférence NSMTA 2022 - notre première journée de développement professionnel « en personne » depuis deux ans. Merci de vous joindre à nous et à vos collègues de partout dans la province.

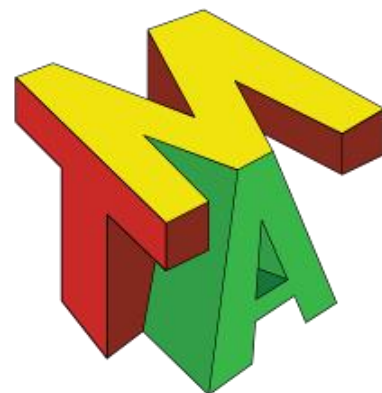
Aujourd'hui, environ 700 enseignants de la Nouvelle-Écosse participeront à plus de 50 ateliers conçus pour les aider à faire profiter leurs élèves des dernières avancées pédagogiques.

Le conférencier principal de la conférence est Peter Liljedahl, auteur de *Building Thinking Classrooms in Mathematics* et professeur d'enseignement des mathématiques à la faculté d'éducation de l'Université Simon Fraser à Vancouver. Peter est un ancien professeur de mathématiques au secondaire dont les champs d'intérêt de recherche et les activités sont restés axés sur la salle de classe. Il est un conférencier habituel lors de grandes conférences en didactique des mathématiques et nous sommes très heureux de l'avoir avec nous cette année.

Les présentateurs d'ateliers de la conférence sont la pierre angulaire pour s'assurer que le temps que vous investissez ici est significatif et enrichissant pour vous et, en fin de compte, pour vos étudiants. Un très grand mer-

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President's Message

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Thank you to the staff and administration of Charles P. Allen High School for, once again, offering their exceptional facility as a host school and accommodating our venue needs. Special thanks to Lori Burns, who is a Mathematics and French Teacher at CPA and serves as on-site chair.

Thank you to members of the NSMTA Executive for their tireless efforts in planning and implementing another first-class professional development event. They are a dedicated group of Nova Scotia educators, who work year-round on your behalf to promote and advance mathematics education and professional development.

Of course, planning for the 2023 conference begins at the completion of today's conference. To ensure that it is successful, please provide us with your feedback on today's conference elements that were particularly relevant for you and your recommendations for making future workshops more meaningful. If you would like to present at a future conference, please contact any member of the NSMTA Executive.

Enjoy today's conference and thank you for your support.

Zeno MacDonald, President
Mathematics Teachers Association

ci à eux d'avoir donné de leur temps et de leur expertise pour nous aider à assurer une journée enrichissante pour tous.

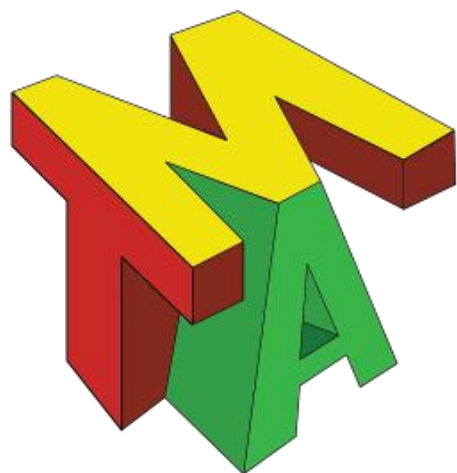
Merci au personnel et à l'administration de l'école secondaire Charles P. Allen pour, une fois de plus, offrir leurs installations exceptionnelles en tant qu'école hôte et répondre à nos besoins en matière de lieu. Remerciements particuliers à Lori Burns, qui est professeure de mathématiques et de français à la CPA et agit à titre de présidente sur place.

Merci aux membres de l'exécutif de la NSMTA pour leurs efforts inlassables dans la planification et la mise en œuvre d'un autre événement de développement professionnel de première classe. Il s'agit d'un groupe dévoué d'éducateurs de la Nouvelle-Écosse qui travaillent toute l'année en votre nom pour promouvoir et faire progresser l'enseignement des mathématiques et le développement professionnel.

Bien sûr, la planification de la conférence de 2023 commence à la fin de la conférence d'aujourd'hui. Pour assurer son succès, veuillez nous faire part de vos commentaires sur les éléments de la conférence d'aujourd'hui qui étaient particulièrement pertinents pour vous et de vos recommandations pour rendre les prochains ateliers plus significatifs. Si vous souhaitez faire une présentation lors d'une future conférence, veuillez contacter n'importe quel membre de l'exécutif de la NSMTA.

Bonne conférence d'aujourd'hui et merci pour votre soutien.

Zeno MacDonald, Président
Mathematics Teachers Association

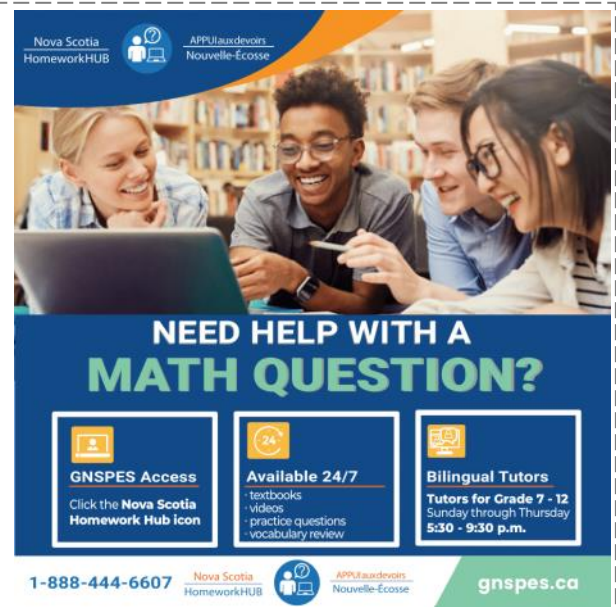


NOVA SCOTIA MATHEMATICS TEACHER ASSOCIATION

Math in the News and Around the Web

Nova Scotia Homework Hub — The homework hub is a place where students from grades 4 through 12 can get free one-on-one live virtual tutoring from licensed Nova Scotia educators. Live tutoring is available for grades 7 through 12 from Sunday to Thursday between 5:30pm and 9:30pm. For grades 4 through 6 tutoring is available from Monday to Wednesday between 5:30pm and 6:30pm.

In addition to live tutoring, students can also access a variety of helpful resources including videos, practice questions and e-texts. Students and teachers can access the Homework Hub by looking for the Homework Hub icon on their gnspe.ca landing page.

A promotional banner for the Nova Scotia Homework Hub. The top half features a photograph of four diverse students (three girls and one boy) smiling and looking at a laptop screen. Above them, the text 'Nova Scotia HomeworkHUB' and 'APPU/Assistance Nouvelle-Écosse' is displayed. Below the photo, a blue banner reads 'NEED HELP WITH A MATH QUESTION?'. Underneath this are three white boxes with blue borders: 'GNSPES Access' (Click the Nova Scotia Homework Hub icon), 'Available 24/7' (textbooks, videos, practice questions, vocabulary review), and 'Bilingual Tutors' (Tutors for Grade 7 - 12, Sunday through Thursday 5:30 - 9:30 p.m.). The bottom of the banner includes the phone number '1-888-444-6607', the 'Nova Scotia HomeworkHUB' logo, the 'APPU/Assistance Nouvelle-Écosse' logo, and the website 'gnspe.ca'.

MathMatize — MathMatize offers gamified learning materials for students and instructional tools with a specific focus towards math instruction. The calculus learning materials are freely available here: <http://mathmatize.com/c>. The system will track students' performance and provide targeted support for areas of weakness. All contents in the courses above can be customized and put into personal classrooms. For instructors, MathMatize has a community catalog with over 10K exercises that are ready to be used/modified. The catalog is rapidly growing. The content editor is built specifically for math instruction, allowing teachers to create scaffolded and numeric/symbolic exercises. These exercises can be put into live polls and online assessments. Instructors can choose from a variety of settings with the polling/assessment tools to support a variety of use cases. To access the instructor tools, please reach out to questions@mathmatize.com.

Bridges Math Art 2023 in Halifax — The Bridges conference will be held at Dalhousie University on 27–31 July, 2023 (check out <https://www.bridgesmathart.org/b2023/>). The goal of the Bridges Organization is to foster interest in mathematical connections to art, music, architecture, and culture.

The annual Bridges conference brings together a wide range of people with a variety of backgrounds interested in the intersection of mathematics, science, art and culture.

There are opportunities for teachers and students to create and share their mathematically inspired art at this conference. Works of art can be submitted between 15 February 15th and March 15th, 2023. Art that has been submitted in previous conferences can be viewed at the Bridges website at: <http://gallery.bridgesmathart.org/>



Math in the News and Around the Web

NS Math Circles — [NS Math Circles](https://www.nsmathcircles.com) is dedicated to providing meaningful and fun math experiences for students across Nova Scotia. We have two more evening events planned this year. Our May event explores cryptography and related topics, leaving you to decide whether a legendary treasure is real or a hoax. Our June event focuses on the math-



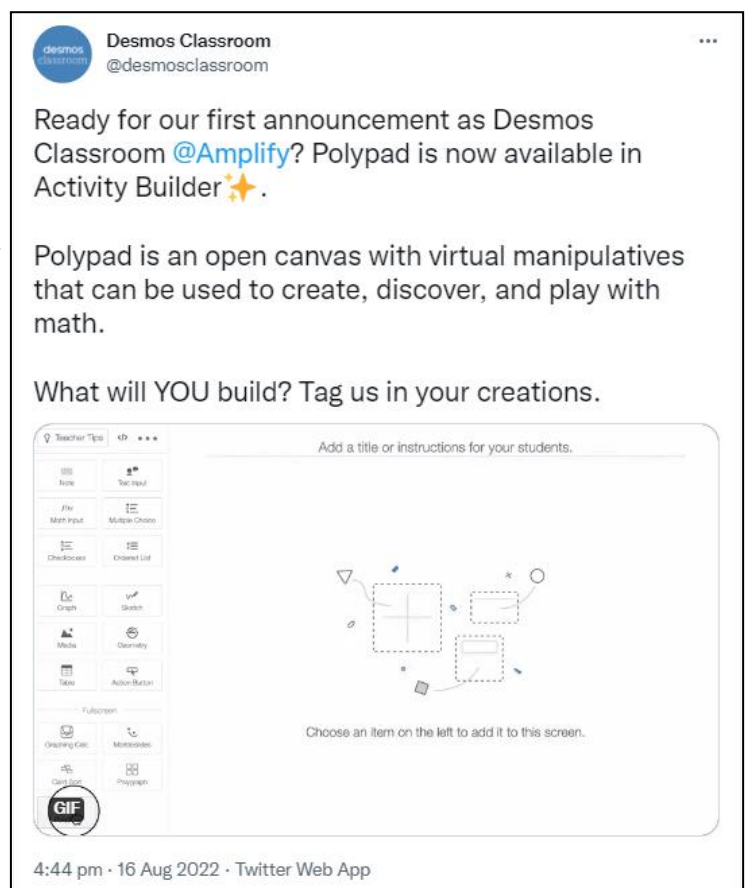
ematics of DNA, and how it is used in criminology and elsewhere. NS Math Circles is also very active visiting schools in and around HRM, with activities that cover a wide range of mathematics. Our Pascal's Triangle presentation, for example, explores some interesting interpretations and properties of the triangle, and ends with an open problem, illustrating that math still holds amazing mysteries and opportunities for discovery.

Desmos and Mathigon Polypad! -- There have been lots of changes recently at Desmos and Mathigon. Both of these tools are now part of Amplify. Mathigon was acquired by Amplify in Oct. 2021 and Desmos in May 2022. Amplify has stated that these resources will continue to be freely available. One benefit of this partnership is that Polypad canvases can now be imported into a Desmos activity. Now, all of the virtual manipulatives that are available in Mathigon Polypad can be used in a Desmos activity.

Want to check out what this might look like? Here is an example of a Desmos activity using algebra tiles to practice factoring quadratics and multiplying polynomials: <https://bit.ly/3CFBwpw> (remember a bit.ly link is case sensitive).

What else is new at Desmos? Teachers can now create their own "Challenge Creator" screens in Desmos activities. With Challenge Creator, students create challenges for each other and ask each other questions. You can check out a Desmos activity with a challenge creator screen at <https://bit.ly/3fzkP5U>

If you're on twitter, don't forget to follow [@desmosclassroom](https://twitter.com/desmosclassroom) for the latest information on Desmos activities. Follow [@MathigonOrg](https://twitter.com/MathigonOrg) for information about Polypad.



News from Conseil scolaire acadien provincial

Au Conseil scolaire acadien provincial (CSAP), l'intégration des pratiques d'enseignement gagnantes, spécifiques et harmonisées en numératie est une approche incontournable pour que les élèves développent leur plein potentiel. La participation active des enseignants et des élèves est au cœur des réussites. Le développement professionnel et l'accompagnement des enseignants sont primordiaux afin d'appuyer la croissance des habiletés liées à la numératie.

L'équipe mathématique du CSAP traite avec soin et attention les demandes des enseignants en quête de ressources et d'outils numériques pour mieux appuyer les élèves. Même s'il existe un très grand nombre de ressources et d'outils, le défi est souvent de savoir comment s'en servir efficacement afin d'améliorer l'apprentissage des élèves. Deux de ces outils sont [Knowledgehook](#) et [Matific](#). La plateforme Knowledgehook est disponible à tous les enseignants depuis septembre 2021. Cette année, l'équipe mathématique travaille avec quelques écoles pour explorer la plateforme Matific, recueillir des rétroactions et elle poursuit l'appui auprès de celles qui l'utilisent couramment.

De plus, l'équipe continue d'ajouter des éléments au [site web de numératie](#) pour faciliter l'accès et le partage de ressources pour appuyer l'enseignement. Les thèmes suivants sont exploités :

- les programmes d'études (priorité et progression des RAS);
- les bonnes pratiques pédagogiques;
- des documents d'appui à l'enseignement et à la planification en fonction des RAS;
- le développement professionnel;
- l'utilisation du matériel de manipulation;
- des exemples d'activités d'apprentissage intéressantes.



Conseil scolaire acadien provincial

En mathématiques, il est important de miser sur la communication et l'apprentissage, un lien indissociable. Afin de développer les bonnes pratiques pédagogiques et les compétences en communication orale auprès des élèves, un lien vers le [site de la communication orale du CSAP](#) et un document qui regroupe le langage mathématique de la maternelle à la 9e année sont utilisés et promus. La communication orale permet aux élèves de partager les processus qu'ils entreprennent en mathématiques tout en permettant aux enseignants de vérifier la compréhension de leurs élèves et de leur offrir des rétroactions efficaces. Pour accéder directement à cette page, veuillez s'il vous plaît [cliquer ici](https://sites.google.com/sepne.ca/numeration/communication-en-num%C3%A9ratie?pli=1) (<https://sites.google.com/sepne.ca/numeration/communication-en-num%C3%A9ratie?pli=1>).

Nous voulons prendre cette occasion pour féliciter tous les élèves et tous les enseignants pour leur dévouement, engagement en lien avec la mise en œuvre d'une éducation inclusive de première qualité!



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Hinge Questions

By Dylan Kane (@dylanpkane) a math teacher from Leadville, Colorado. Dylan is a National Board–certified math teacher who shares his reflections on teaching practice and math education on his blog **Five Twelve Thirteen**. This article is reprinted with permission from <https://fivetwelvethirteen.wordpress.com/2022/10/06/hinge-questions/>

I’ve loved the idea of hinge questions for a while. The idea: I design a question that elicits evidence of whether students understand the day’s lesson. I get answers from everyone in the class, and I use those answers to inform what I do next. (I use finger voting to see student answers, but lots of other strategies work as well.)

But whenever I’ve tried to pull this off it felt hollow. I usually don’t get to the hinge question until the lesson was almost over. At that point there’s not much I can do to adjust my teaching beyond informing my next day’s lesson. Also, I often see students nail the hinge question but clueless later in the week about what we learned.

So this year I’m trying something new. I’m saving the hinge question for the next day, and asking it after the warmup and before we launch into the day’s lesson. This has three big advantages:

First, this assesses whether students can recall and remember something, not whether they can do what we were doing together a few minutes before. When I tried hinge questions before I got lots of “false positives,” where students seemed to understand in the moment but couldn’t recall the concept later. Delay-

ing the question reduces false positives so I get a more accurate sense of what students know. Second, this can do more to inform my teaching. If I learn students struggled with the previous day’s topic, I know to slow down and maybe provide an extra problem or two of practice anywhere that idea comes up in the current lesson, or add more scaffolding for

What are Hinge Questions? — A teacher asks a “hinge question” as a check for understanding. It allows the teacher to know if the class understands enough to move on. If not, the question will provide evidence for the teach on how to guide next steps. These questions often happen at critical “hinge” points in the lesson.

that concept, or even do an impromptu mini-lesson on scratch paper before jumping in. Third, it serves as a reminder of what we recently learned. We typically do a brief turn-and-talk explaining why the answer to the hinge question is what it is, or debating between two common answers. That can refresh students’ memories and remind them of something they might otherwise not be able to retrieve that day, setting them up for success in the day’s lesson.

I’m two months into the school year and I’m still forgetting to do these sometimes, but I’m a fan. I love the idea of hinge questions, but in the past they just didn’t feel actionable enough. Asking a hinge question at the start of the next class has made a huge difference in making that information actionable.

Mathematics Teachers Association

Calendar

Webmail

**NSTU**
Nova Scotia Teachers Union

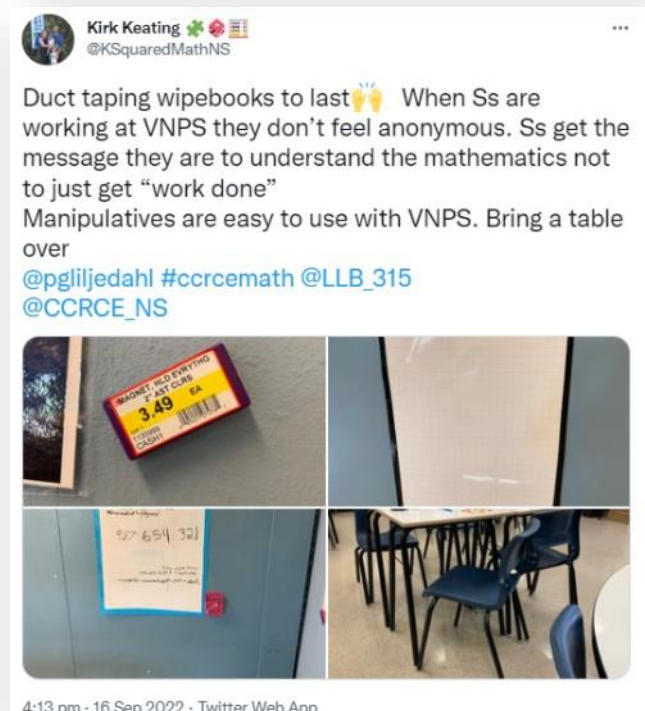
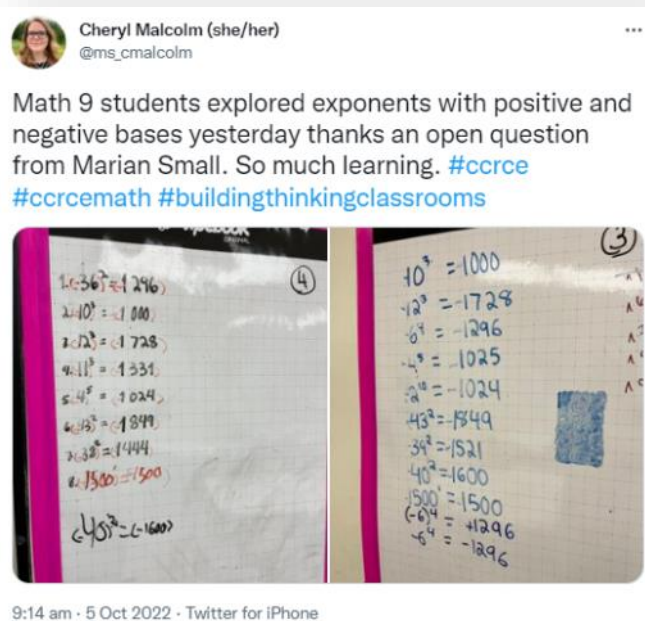
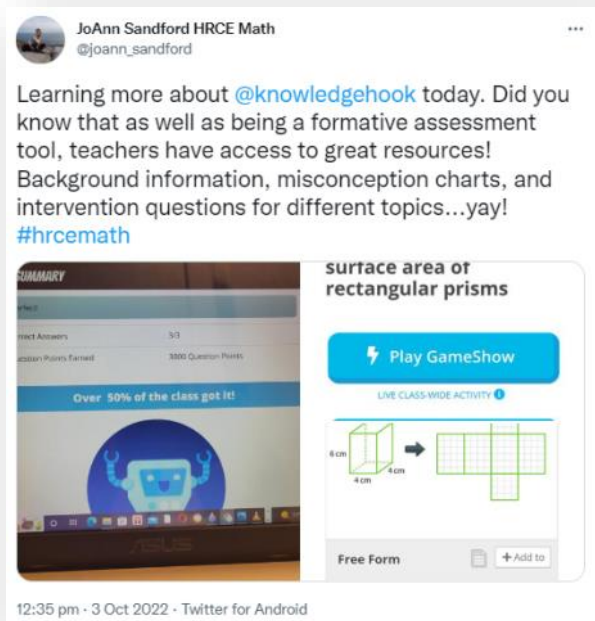
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Nova Scotia Mathematics Teachers Association Website

Have you visited the NS MTA website recently? This is your source for information on the NS MTA conference, NCTM conferences and resources including math websites, enrichment, math contests and past issues of this newsletter. Check it out at <http://mta.nstu.ca/>

Nova Scotia Mathematics Highlights from Twitter

Inspiring mathematics is just a click away. Check out some of the ideas and resources shared on Twitter by Nova Scotian mathematics educators. Find other great tweets using hashtags like , #CCRCEmath #HRCEmath, #ITeachMath, #ThinkingClassroom and #Mathtalk .



The MTA is on Twitter! Follow @MTA_NS to join the conversation.

Rosenthal Prize Math Lessons

By Erick Lee ([@TheErickLee](#)), 7-12 Mathematics Consultant, Halifax Regional Centre for Education (HRCE)

The National Museum of Mathematics (<https://momath.org/>), commonly called MoMath, is located in New York City. It is a place where the beauty and wonder of mathematics can be experienced by visitors of any age or academic background. This year the museum is celebrating its 10th year. The history of the museum actually pre-dates its existence in its current form. It began as a travelling exhibit that was displayed at science museums and STEM festivals across the US.

The Rosenthal Prize

In an effort to recognize and promote excellence in math teaching in upper elementary and middle school classrooms, MoMath organized the Rosenthal Prize. This is an annual opportunity for classroom teachers to submit their favourite lesson for a chance to win a \$25,000 first prize. The prize is named after its sponsor, Saul Rosenthal. Prize winning lessons are often hands-on and interactive lessons that are easily to implement with common classroom materials. The



The Museum Exhibits

The exhibits and programs from the museum are intended to “stimulate inquiry, spark curiosity, and reveal the wonders of mathematics.” One of the hall-mark exhibits at the museum is a tricycle with square tires that rolls along a special arched track. There is an incredible amount of mathematics that went into creating and fine tuning this exhibit. The exhibit, like others at the museum, are instantly approachable but can be appreciated on many different levels of mathematical sophistication.

If you're interested in more of the background of the museum, check out episode #229 of the STEM Everyday podcast featuring an interview with MoMath's Executive Director and CEO Cindy Lawrence (<https://dailystem.com/2022/07/29/stem-everyday-229-the-museum-of-math-feat-cindy-lawrence/>)

application period each year typically runs from February to May and information can be found on the MoMath website at <https://momath.org/rosenthal-prize/>.

This prize has been running since 2012 and all of the prize winning lessons are freely available to download and use. They can be found at the page linked above. A number of these lessons align closely to Nova Scotia Mathematics curriculum outcomes. Some of my favourites from this collection include the following:

- [Dice Auction](#) - Probability with a pair of dice.
- [Tooti Tooti](#) - Geometric Transformations - Create a tessellation from an ordinary envelope.
- [Sphere Dressing](#) - Nets and Surface Area - Design a "hat" to cover half of a sphere.

Adventures in Logic and Reasoning

“Heterosquare”

A magic square is a square array of numbers consisting of the positive integers 1, 2, ..., arranged such that the sum of the numbers in any horizontal, vertical, or main diagonal line is always the same number, known as the magic constant .

A heterosquare was defined in *Mathematics Magazine*, 1951, as an n by n array of integers from 1 to n^2 such that all rows, columns and main diagonals have different sums. In the heterosquare below, the sum of each column, row and diagonal is a distinct number from 10 to 18. Can you complete this heterosquare by placing the remaining digits from 1-8?

9		

For more information on heterosquares and anti-magic squares see http://recmath.org/Magic%20Squares/anti_ms.htm#Antimagic%20Squares

For more logic puzzles like this, as well as articles and activities relating to mathematics, you might be interested in the Grange Academy Mathematics Department newsletter. Grange Academy is a secondary school located in Kilmarnock, Scotland. You can subscribe to this free weekly newsletter by emailing Chris Smith at aap03102@gmail.com.

The Railway Station Clock

A clock hangs on the wall of a railway station, 71 ft. 9 in. long and 10 ft. 4 in. high. Those are the dimensions of the wall, not of the clock!

While waiting for a train we noticed that the hands of the clock were pointing in opposite directions, and were parallel to one of the diagonals of the wall. What was the exact time?

This puzzle is from *Amusements in Mathematics* by Henry Ernest Dudeney and can be found online at Project Gutenberg (<https://www.gutenberg.org/files/16713/16713-h/16713-h.htm>)



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	Contact
Zeno MacDonald	President	zgmcdonald@nstu.ca
Erick Lee	Vice-President/Communications	eplee@nstu.ca
Joe MacDonald	Past President	jamacdonald@nstu.ca
David MacFarlane	Treasurer	sdmacfarlane@nstu.ca
Anne Pentecost	Secretary	adgrenier@nstu.ca
Jennifer Courish	Member-at-Large Chignecto	courishjl@nstu.ca
Kimberley McCarron	Member-at-Large Cape Breton	kamccarron@nstu.ca
Jocelyn Procopio	Member-at-Large Halifax	jprocopio@nstu.ca
Cailen Langille	Member-at-Large Tri-County	cailen@nstu.ca

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 contact me at eplee@nstu.ca. 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.