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President's Message

Welcome to the annual MTA Conference at Charles P. Allen High School! It's always a highlight of the year to gather with mathematics teachers from across Nova Scotia to share ideas, explore new approaches, and re-connect as a professional community.

Thanks to all of today's presenters for contributing your knowledge and enthusiasm. This event is stronger because of your involvement.

I also want to acknowledge the MTA executive team for their work in planning and organizing today's event. If you'd like learn more about the MTA, please join us at the AGM in the library at 12:30.

This year we are especially excited to welcome our key-note speakers, Pam Harris and Dr. Marian Small. Both bring tremendous insight and experience in supporting mathematical thinking and teaching.

Erick Lee, President
Mathematics Teachers Association

Message du président

Bienvenue à la conférence annuelle de la MTA à l'école Charles P. Allen! C'est toujours un moment fort de l'année de se retrouver avec les enseignants et enseignantes de mathématiques de toute la Nouvelle-Écosse pour partager des idées, explorer de nouvelles approches et renforcer notre communauté professionnelle.

Merci à tous les présentateurs et présentatrices pour vos connaissances et votre enthousiasme. Votre contribution rend cet événement encore plus riche.

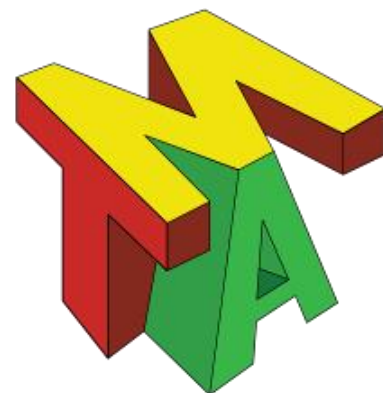
Je tiens aussi à remercier le comité exécutif de la MTA pour son travail dans l'organisation de la journée. Pour en savoir plus sur la MTA, joignez-vous à nous à l'AGA à la bibliothèque à 12 h 30.

Cette année, nous sommes particulièrement heureux d'accueillir nos conférencières principales, Pam Harris et Dre Marian Small, qui apportent une expérience et un savoir-faire exceptionnels en enseignement et en pensée mathématique.

Erick Lee, Président
Mathematics Teachers Association

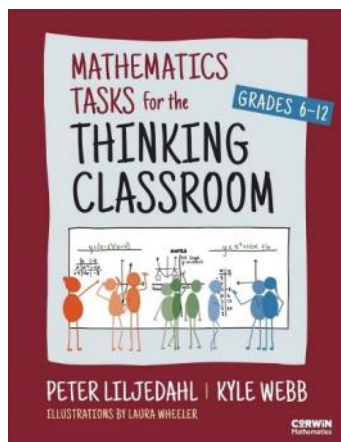
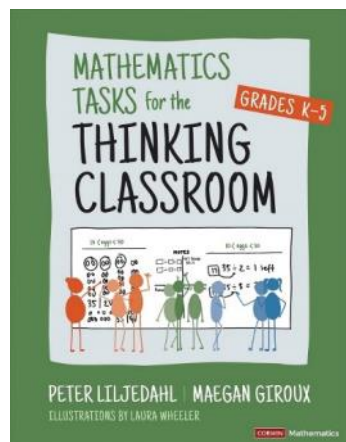
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Mathematics News

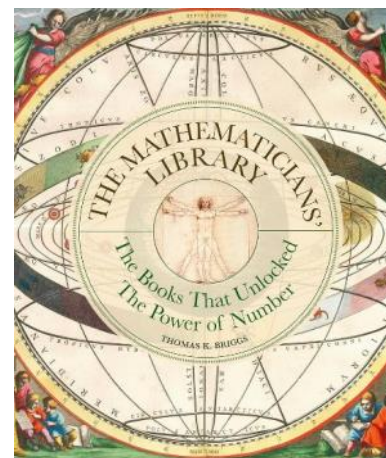
Mathematics Tasks for the Thinking Classroom — Following the success of *Mathematics Tasks for the Thinking Classroom, Grades K–5*, Peter Liljedahl has now teamed up with Kyle Webb to release [*Mathematics Tasks for the Thinking Classroom, Grades 6–12*](#). Building on the widely adopted Building Thinking Classrooms in Mathematics framework, this new book offers both a collection of engaging tasks and a deeper look at how to implement the 14 BTC practices in secondary mathematics classrooms.



The book features 50 model tasks—20 non-curricular and 30 curricular—designed to promote student reasoning and collaboration while meeting specific learning outcomes. Each task includes guidance for launching, facilitating, and consolidating student thinking, along with possible solution paths, teacher notes, and differentiated “check-your-understanding” questions. With reflections from the authors, ready-to-use templates, and access to companion online resources, *Mathematics Tasks for the Thinking Classroom, Grades 6–12* provides practical support for teachers who want to transform their math classrooms into spaces where all students think deeply and learn meaningfully.

The Mathematicians’ Library — One of the joys of following mathematics educators from around the world on social media is discovering new ideas and resources that might otherwise go unnoticed. This summer, I came across [Thomas K. Briggs on BlueSky](#) and his newly published book, *The Mathematicians’ Library*. Briggs, a mathematics teacher, museum educator, and lifelong math enthusiast, offers a fascinating journey through the history of mathematical thought as told through the books that shaped it.

Organized in six sections that span from prehistoric counting to the modern day, the book highlights mathematical texts from across diverse cultures. With its beautifully designed pages, thoughtful illustrations, and light, conversational tone, *The Mathematicians’ Library* invites readers to explore the evolution of mathematical ideas with curiosity and delight. This book offers an engaging and inspiring read for math educators and enthusiasts alike.



Desmos is Now Amplify — In 2022, Amplify Education acquired the Desmos curriculum and classroom resources. This summer Amplify overhauled and rebranded Desmos Classroom to be Amplify Classroom. The site has a new look and feel as well as a new URL <https://classroom.amplify.com/discover>. Amplify’s core mission however remains the same: to provide accessible, high-quality digital math tools. While the platform’s appearance and structure have evolved, Amplify continues to offer Desmos Activities for free, ensuring that teachers and students still have access to powerful, interactive resources to enhance learning.

desmos → Amplify.

Mathematics News

The Mathematician Mosaic — The Mathematician Mosaic is an initiative of the Centre for Education in Mathematics and Computing (CEMC). This project seeks to celebrate the contributions of a diverse range of mathematicians.



The CENTRE for EDUCATION in MATHEMATICS and COMPUTING

Students from all grades are encouraged to research and create biographical posters about a person in the mathematical sciences, particularly those from underrepresented backgrounds. Whether as individuals, small groups, or whole classes, students will delve into the lives and careers to share their inspiring stories. Selected posters will be featured on the CEMC Mosaic website.

Posters should highlight mathematicians who:

- are members of marginalized groups (e.g. race, gender, country of origin, age, ability)**, and/or
- have pursued diverse career paths, and/or
- are in diverse specializations, and/or
- come from diverse educational backgrounds.

Each poster must contain the following categories, with a maximum of 5 sentences per category:

- Early Life
- Education
- Contributions to their field
- Unique circumstances/adversity (e.g. first generation college student, inequitable treatment)
- (Optional) Miscellaneous/fun facts

Posters must cite sources. All received posters will be proofread by CEMC personnel for accuracy. Each poster will display a credit along the lines of “Students from Ms. Punetha’s Grade 6 class at Northridge Public School, Waterloo, Canada.”

It is preferable that each poster includes a headshot of the mathematician featured, and that this headshot is submitted alongside the poster on the submission form.

Editable, digital posters (Google Docs, Canva) are preferred; however, pdfs will also be accepted.

Posters will be accepted up to Friday, January 30, 2026.

Visit the CEMC webpage to see the [2024-25 Mathematician Mosaic Gallery](#). 18 posters were selected out of 80 submissions from around the world.

Sample Poster



ANNIE EASLEY (USA, 1933-2011)

EARLY LIFE
Originally considered nursing because it was the “safe” choice for Black women, but her mom encouraged her to work hard to be anything she wanted to be.
She came across a newspaper article about human computers at NASA and gained an interest in Math and Computer Science.

CONTRIBUTIONS
Began as a human computer at NASA, then learned to code in order to be a programmer. Her pivotal work was coding for the Centaur rocket stage.
Conducted outreach to encourage students from minority backgrounds to consider careers in STEM.
Also advocated for equality in the workplace as an Equal Employment Opportunity counselor.

**EDUCATION**
Started out in pharmacy school, but had to discontinue due to personal reasons.
When she returned to school, she pursued a BSc in Mathematics (1977, Cleveland State University) while still working full time at NASA.

OVERCOMING ADVERSITY
She faced racism at work for example, as one of the only Black people at work, she was cut out of promotional photos.
At the time, Black people had to pass literacy tests and pay a poll tax in order to vote. She helped train people to pass these requirements.
When she enrolled in her math degree, she was denied funding other employees had received.


**FUN FACTS**

- In 2021, the International Astronomical Union named a crater on the moon after Easley.
- She made a pact with her supervisor one day to wear pants together in order to normalize wearing pants for women.
- She was a founding member and the first president of NASA Ski Club.

MTA Conference — 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.



News from Conseil scolaire acadien provincial

Au Conseil scolaire acadien provincial (CSAP), l'intégration des pratiques d'enseignement efficaces, spécifiques et harmonisées en numératie est une approche incontournable pour que les élèves développent leur plein potentiel.

L'équipe de mathématiques au CSAP poursuit avec enthousiasme son plan d'action entamé en 2024-2025, visant à accompagner les enseignants dans la mise en œuvre des pratiques pédagogiques suivantes :

- **l'enseignement explicite**, parce que chaque élève mérite un enseignement clair, structuré et intentionnel, où les stratégies et les raisonnements mathématiques sont modélisés et rendus visibles;
- **la classe collabo-réflexive**, parce que l'apprentissage se renforce lorsque les élèves réfléchissent ensemble, expliquent leurs idées et s'appuient sur les démarches des autres pour construire leur compréhension.

À l'élémentaire, on continue des accompagnements avec les ressources appropriées pour mettre en place des centres d'apprentissage en mathématiques. Ils sont un excellent moyen de donner vie à un concept mathématique. Ils permettent aux élèves d'explorer, de pratiquer et de réfléchir à leur rythme, tout en collaborant avec leurs pairs. Ces espaces soutiennent la différenciation, la consolidation des apprentissages et l'autonomie des élèves, tout en maintenant un haut niveau d'engagement et de réflexion.

Merci pour votre passion, votre curiosité et votre dévouement à nourrir la pensée mathématique de nos élèves — une leçon, une discussion, une découverte à la fois.

Équipe de maths

Conseil scolaire acadien provincial, CSAP



Navigating Purpose and Possibility in Math Tasks

By Nat Banting, multiple award-winning mathematics teacher from Saskatoon, Saskatchewan and 2023 MTA Keynote Speaker. You can find a collection of Nat's resources and reflections at <https://natbanting.com/>.

Great teaching resources push ambitious teaching forward. As my career has gone along, names for these sorts of things have oscillated in and out of vogue, but lesson (and unit) preparation still begins with finding (or building) a task about the topic at hand.

There is, however, a tension between

A) granting students the freedom to make sense while working with a task, and

B) preordaining what that specific task is to be about.

Stated differently: Any space that encourages student sensemaking pressures the relationship between the teacher's purpose for posing the activity and the generative possibility of student actions with the activity.

To illustrate that tension, [here is a task](#), along with very brief recreations of some recent thinking that my students did with it.

This is a task about equations.

Many students bring forth the notion of a "tie" as an equality. Perfect. These equations emerge all along the continuum of abstraction—some draw pictures of farm animals, some use geometric shapes like squares and circles, and others use letters as variables. (After these notations emerge, it is a nice time to talk about where variables come from and what notation is useful for).

The dust typically settles at something like:

$$3p = 2g$$

$$3c = 4g$$

I've seen two common courses of action from here:

First, groups, possibly triggered by the "friendly" number of goats in each equation, make the claim that if $3p = 2g$ then $6p = 4g$. I might call the problem they are solving the

"make the goats match" problem. They recognize that having an animal in both tug-of-wars is a powerful moment of connection. (This recognition can later be formalized into work with simultaneous equations). From there, $3c = 6p$ and then you can divide each team of animals into thirds in the same vein that you doubled the original numbers in the first equation.

Second, groups, possibly triggered by the goats being in both matches, use the $3p = 2g$ equation to determine that goats are stronger than pigs, actually they are one-and-a-half times as strong. (Often, this understanding doesn't come from "dividing both sides by 2," but it is a cool moment to show how

the equations tell the story.) I might call the problem they are solving the "how strong is a single goat?" problem. Because each single goat is one-and-a-half times as strong as a pig, the 4 goats in the second equation

are exactly as strong as 6 pigs, and this fact is substituted to create a new equation: $3c = 6p$.

This is a task about proportions.

Many students comment that they need 3 pigs for every two goats and 3 cows for every 4 goats. Perfect. The first ratio is twice as big as the second—it takes twice as many goats to tie the cows, therefore the cows are twice as strong as the pigs. I might call the problem they are solving the "how strong is a herd of three?" problem. They don't key on making the number of goats equal (multiplying it from 2 to 4) or on determining the strength of a single goat; they key on the idea that both pigs and cows have three individuals, so the number of opponents creates a ratio of their strength. This problem is powered by proportional reasoning.

This is a task.

I'm not convinced that this particular task is a task about any specific mathematical topic, but I do know

Farm animals are playing tug of war.

3 pigs vs. 2 goats is a tie

3 cows vs. 4 goats is a tie

What happens if 5 pigs square off against 2 cows?
How do you know?

Navigating Purpose and Possibility in Math Tasks

Continued from page 5...

that if students are given the space to act mathematically with it, they often use equations to make and maintain sense. (and less frequently use the ideas of proportional reasoning). This rephrasing may feel like splitting hairs, but taking it seriously has been one of the most important exercises of my near two decades of activity in the math education world.

Every task contains certain possibilities—like landscapes encouraging certain types of actions in order to maintain sense. These potentials (alongside with our histories of interactions with mathematics) push solvers in specific directions. But, naturally, learners of math (with a less robust history with the discipline as formally conceived) are much less predictable. This is both a curse and a blessing. A curse to the teacher looking for a tidy entrance into, and a streamlined journey through, the topic or idea; a blessing to the teacher looking for access to the students' current understanding. A student will show what they know through the mathematical activity they feel is relevant to resolving their current context.

Episodes like the thinking detailed here consistently remind me of two things:

1. Problems don't exist separate from solvers (Proulx & Simmt, 2016); they are posed (and re-posed (Banting, 2017)) by solvers as they act with the context provided to them. This might initially feel like this leaves us with absolutely no way to predict what students might do, and,

therefore, no real way to plan lessons that ask our students to act earnestly in a mathematical environment. Prompts do, however, contain specific opportunities to act, ones that become more predictable as the amount of shared history between learner, teacher, and mathematical context increases. Paying attention to these places where students might make mathematical decisions is a key piece of preparing to teach in spaces that grant students increased freedom.

2. Teaching needs to be sensitive to the problems that emerge from student activity (Banting & Simmt, 2017). Before rushing to have an interaction about the problem you anticipate to be at the heart of their activity, take the time to observe what problem is truly driving their work, a stance described by Davis (1996) as one of "imaginative participation" (p. 53). What the task is *about* becomes, first, an act of observation and, second, an act of influence on the part of the teacher. Sometimes this means the teacher's interactions provide a subtle gradient in the landscape toward a desired topic, and other times the teacher must stand as a mountain, blocking specific pathways of activity and orienting attention toward new tributaries. Your teaching moves (Towers & Proulx, 2013) are always subject to your judgements in these unfolding moments, and good teaching becomes less about being perfect than it is about being appropriate.

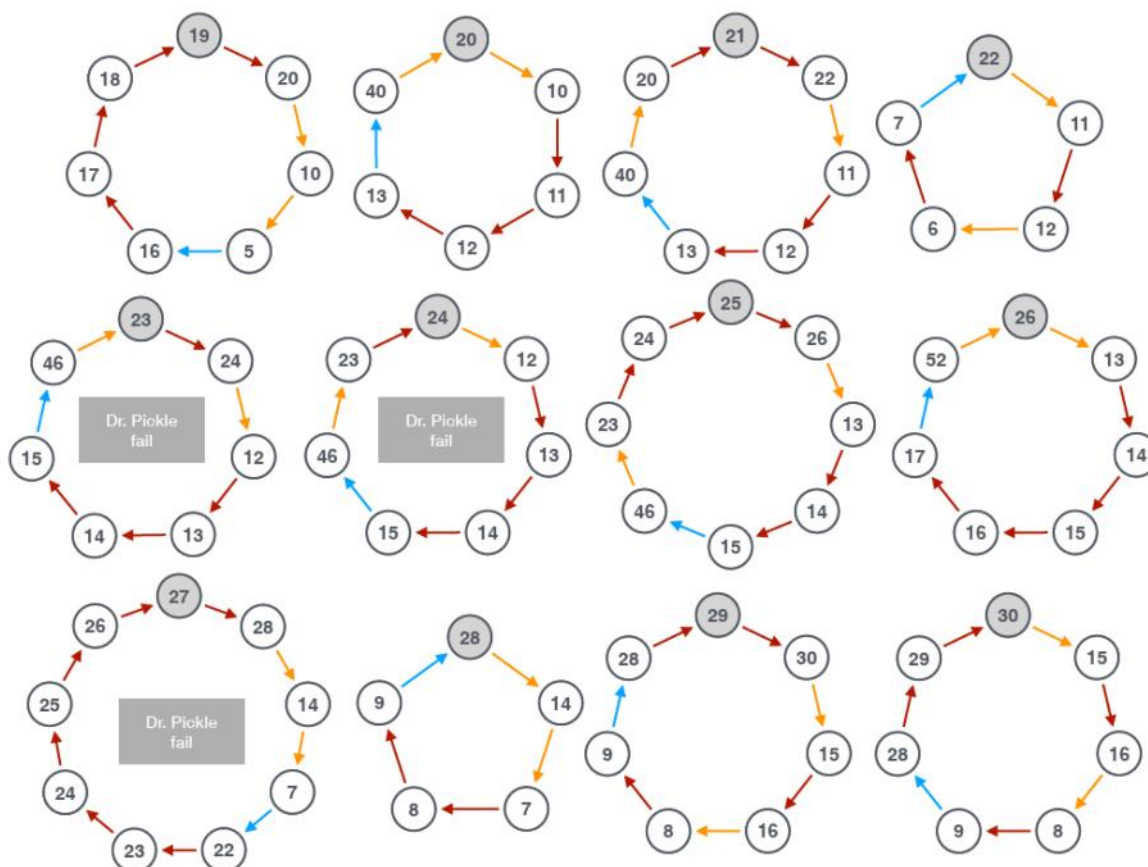
2025-26 Mathematics Contests and Competitions

- **CEMC Contests** —CEMC hosts a variety of multiple choice and open response question contests. These contests are internationally recognized and highly regarded. See [a list of contests and dates here](#).
- **CMS Contests** —Canada Lynx (grades 7-12), Canada Jay (grades 5-8) and Canadian Open (grades 8-12) math competitions are held early in the school year. There is still time to register for the Canada Jay (registration deadline Nov. 13th).
- **Purple Comet! Math Meet** — April 14 through April 23, 2026—Free online competition for a team of up to 6 students. There is a ten-day window during which teams may compete choosing a start time most convenient for them. There are both a middle school and a high school competition.

Minimal Trips around the Collatz Galaxy

By Gord Hamilton (aka Dr. Pickle), [Dalhousie University Nova Scotia Math Circles](#) Program Director and founder of [MathPickle](#)

Here's a fun idea: start a lesson without a single explanation. Just throw some examples on the board and let them figure out what on earth is going on. The goal? Invite students to hypothesize, test and revise their ideas—just like professional mathematicians. Here is an example puzzle from a grade 4 classroom ([downloadable pdf](#)):



Students figured out that red arrows added one, yellow arrows divided by two. It took a little longer to figure out what the blue arrows did. Along the way several wrong hypotheses for blue arrows were thrown out. These all must be celebrated even more than the right solutions. How do you celebrate a wrong hypothesis? It's not obvious. Heaping praise on a student for an incorrect idea can sound false. Experiment with the opposite. Suggest that the fail is an "EPIC FAIL!!!" This sounds much cooler to a classroom of students than a mild "incorrect answer." We remove the stigma of failure in the classroom with humour like this. Children become more open about sharing their ideas because they know whether the ideas work or don't work that it's ok. We're all exploring this for fun. The blue arrows multiply by three and add one. Students still did not understand why I failed at 23, 24 and 27. This isn't obvious to mathematicians either, so the grade 4 students are in good company. ;-)

What was I trying to do? In the top left puzzle, I started at 19 and tried to use as few red, yellow and blue arrows as possible to return to 19. I did it with seven arrows. Next, I tried it with 20. I only needed six arrows. **Challenge:** For each integer, what are the fewest number of red (+1), yellow ($\div 2$), and blue ($\times 3 + 1$) arrows needed to make a cycle? I published this six months ago. The next day an irritating computer scientist pointed out that I had failed to find the smallest cycle for 23, 24, and 27. Lol. Epic Fail!!!

Keep your epic fails. They often make for good pedagogy. For more intriguing math puzzles, visit <https://mathpickle.com/>.

The MEaSURE Project: Measuring the Earth Together

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

The MEaSURE Project (Measuring Earth's Size Using a Revision of Eratosthenes) invites students across the globe to join a collaborative effort to measure Earth's circumference each equinox. Using modern tools and mathematics, classrooms recreate a famous historical experiment.

Over two thousand years ago, Eratosthenes estimated the Earth's circumference by comparing the angle of the sun's rays at two cities in Egypt. With some clever geometry and knowledge of the distance between the cities, he came remarkably close to the actual size of the Earth. His experiment was ingenious, but it depended on specific circumstances: a pair of cities on the same meridian (and one on the Tropic of Cancer) and measurements made on the summer solstice.

The MEaSURE Project adapts this classic idea so that anyone, anywhere in the world, can participate. Instead of relying on the summer solstice, when students are usually on vacation, participants take measurements on the equinox, when the sun is directly above the equator. On this day, students may notice that the angle of the sun's shadow closely matches their latitude. These measurements can then be pooled together to create a calculation of the Earth's circumference.

This project is the brainchild of Will Estes, a math and science teacher from Pennsylvania. He was inspired to start this project when a student moved several hundred miles away but remained in class remotely. This presented a unique opportunity to recreate Eratosthenes' famous experiment. On a sunny day they measured the angle of the sun at their school and at the student's now distant new home. While the measurements were imprecise, the sense of accomplishment was rewarding.

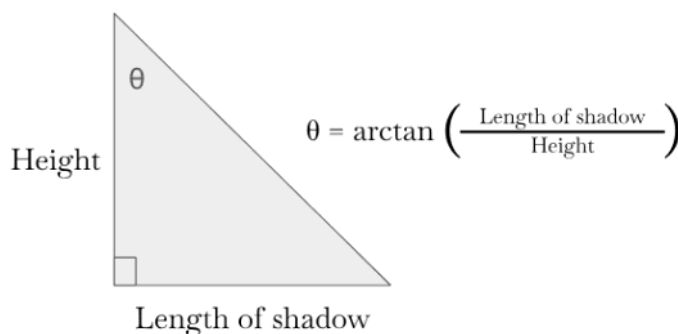
How to Participate

Each participating group needs to gather two key measurements, ideally on the equinox (though a day or two before or after is acceptable if weather interferes):

1. **The precise time of solar noon (UTC)** – This is when the sun is at its highest point in the sky, not necessarily

12:00 PM. A shadow cast from a vertical pole at this time will point exactly North (or South depending on your latitude).

2. **The solar zenith angle at solar noon** – This is the angle between the sun and a vertical line, measured using the shadow cast by a metre stick or other object. You might have students suggest ways in which the angle of this shadow could be measured as accurately as possible.



In addition, groups need to record their exact location using GPS coordinates (degrees and minutes of latitude and longitude). You can find this using an online map. This is used to find the precise distance between pairs of observers. With this shared data, submitted on the MEaSURE Project website, classrooms across the globe can contribute to the calculation of the Earth's circumference. The more participants there are, the stronger the results are likely to be.

Students can use their own information to make a rough estimate with the following equation (for the equinox):

Earth's Circumference = 360 x distance between your city and the equator / angle of shadow that you measured

Teachers who would like to get involved can find instructions and resources at the MEaSURE Project website (<https://sites.google.com/view/themeasureproject/home>). It is an engaging way for students to learn more about mathematics and astronomy while connecting with a global network of peers.

Adventures in Logic and Reasoning

Nonograms (aka Picross)

Nonograms are a logic puzzle game where you use numerical clues to uncover a hidden picture. cells in a grid must be colored or left blank according to numbers at the edges of the grid to reveal a hidden picture. The name “nonogram” is a mashup of the creators name, Non Ishida, and “gram” from the word “diagram”.

How to Play

Colour the grid with black and white squares.

Beside each row is listed the lengths of the runs of black squares on that row. Above each column is the same information.

If you see two or more numbers, there are that many runs with one or more white squares in between each.

5x5 Example Puzzle

					1
	3	2	2	4	1
2					
1					
1 2					
4					
3					

5x5 Puzzle

	2	1	3	3	4
1					
2					
3					
1 3					
3					

10x10 Puzzle

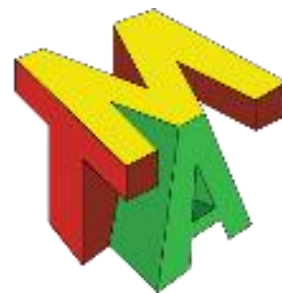
						3				
		2	2	3	2	1	2			
	7	7	3	3	2	2	2	1	4	4
1 2										
1 2										
1 1										
4										
6										
2 1 1										
2 5										
4 1 2										
5 2										
5 2										

Did you know there are a total of **24,976,511** 5x5 solvable (no guessing required) nonograms? About 5 months ago, a collaborative game was launched as an app with the goal of having users find solutions to every one of these 5x5 puzzles.

Just fourteen hours after launching the app, and advertising it on reddit, 1% of the possible puzzles had been completed (251,515 out of 24,976,511). Finding all of the solutions using a computer algorithm would have been easier and faster but there is something satisfying and fun about crowdsourcing the solutions with real live puzzle enthusiasts.

Just recently, this mammoth task was completed. Nearly 25 million puzzles completed in just over 4 months by participants all over the world.

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

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.