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## President's Message

Welcome to the annual MTA Conference at Charles P. Allen High School! I truly appreciate the opportunity to connect with colleagues from across the province during our professional development day. Each year, I feel privileged to learn from and share experiences with fellow mathematics educators.

The MTA executive has worked hard to plan an exceptional conference. We are excited to welcome our keynote speakers, Vanessa Vakharia and Graham Fletcher, who bring tremendous insight and experience in supporting mathematical thinking and teaching. If you'd like to learn more about the MTA, please join us at the AGM in the library at 12:30.

Thank you all for choosing to spend the day at the MTA conference. A special thanks as well to all of today's presenters for inspiring us and making our math community stronger together. This conference couldn't happen without your involvement.

Erick Lee, President  
Mathematics Teachers Association

## Message du président

Bienvenue à la conférence annuelle de la MTA à l'école secondaire Charles P. Allen ! J'apprécie sincèrement l'occasion de créer des liens avec des collègues des quatre coins de la province lors de notre journée pédagogique. Chaque année, je me sens privilégié d'apprendre aux côtés d'autres membres du corps enseignant en mathématiques et de partager nos expériences.

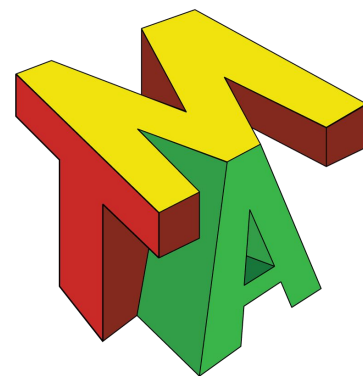
Le comité exécutif de la MTA a travaillé d'arrache-pied pour organiser une conférence exceptionnelle. Nous sommes ravis d'accueillir nos conférenciers d'honneur, Vanessa Vakharia et Graham Fletcher, qui apportent une perspective et une expérience précieuses pour soutenir la pensée et l'enseignement des mathématiques. Si vous souhaitez en savoir plus sur la MTA, joignez-vous à nous pour l'Assemblée générale annuelle (AGA) dans la bibliothèque dès 12 h 30.

Merci de votre présence. En particulier, merci à nos conférenciers qui inspirent et renforcent notre communauté. Cet événement n'aurait pas pu avoir lieu sans votre engagement!

Erick Lee, Président  
Mathematics Teachers Association

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**OpenAI Claims Millennium Math Breakthrough** - The Millennium Prize Problems are a set of seven famous unsolved mathematical problems. In 2000, the Clay Mathematics Institute offered a \$1 million prize for the first peer-reviewed solution to each problem. Recently, OpenAI announced that their artificial intelligence system had found a solution for one of these problems, the Navier-Stokes problem which describes how fluids move. OpenAI devoted a massive amount of computing resources to solve this problem and its solutions created a controversy in the mathematical community.

This controversy revolves around the friction between human research and corporate AI. NYU mathematician Tristan Buckmaster raised concerns that the system relied on his unpublished drafts fed into OpenAI's developer tools. [Mathematicians](#) are also concerned that racing to a solution without understanding shortcuts the journey which might lead to other new mathematical breakthroughs. Fields Medalist Terence Tao noted that outsourcing this work without human insight is "like having machines that can lift weights for you at the gym." For math teachers, this suggests a classroom discussion about why logical reasoning, struggle, and deep understanding still matter in an age of AI agents and automated calculations.

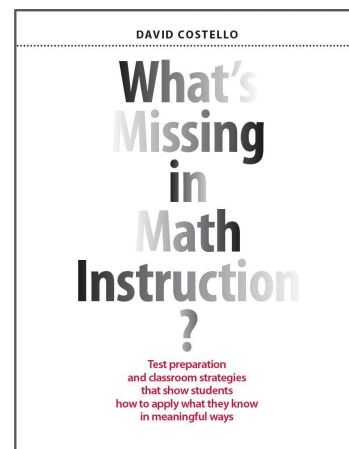
**Desmos Studio Introduces Desmos Notebook** - Desmos Notebook is a new interactive web-based workspace that integrates formatted text, inline mathematical notation, dynamic expressions, and visual representations into a single multi-column document. Notebook allows users to embed graphs, 3D visualizations, and geometric constructions side-by-side with text notes and explanations. Now, you can define a variable, slider or function in one section that automatically updates connected graphs, calculation outputs, and inline text throughout the entire document.



Teachers can construct self-contained guided notes and inquiry-based activities that walk students through complex concepts without forcing them to switch between separate tools or tabs. Students can document their problem-solving process by writing out their reasoning alongside the visual evidence as they manipulate variables and parameters.

Check out some examples of Desmos Notebooks in the [Desmos Studio Notebook Example Gallery](#).

**Book Spotlight: What's Missing in Math Instruction? by Dr. David Costello** - In *What's Missing in Math Instruction?* Dr. David Costello addresses a common problem in math education: students often learn procedures by rote, but freeze when asked to apply, retrieve, or demonstrate that knowledge on tests or in novel situations. This book describes four simple shifts in instruction that will help students demonstrate what they know on any math assessment. Each shift is supported with numerous examples targeting math concepts that students generally find challenging. Dr. Costello is a highly regarded educator, author and professional learning facilitator from Prince Edward Island and is presenting at this year's MTA conference.



## MTA Conference — Friday, October 23rd, 2026

### Keynote Speaker — Graham Fletcher

Graham Fletcher has served in education as a classroom teacher, math instructional lead, and currently, as a math specialist. He continually seeks new and innovative ways to support students and teachers in developing a conceptual understanding of elementary mathematics. He is a coauthor of Building Fact Fluency and openly shares many of his resources at [gfletchy.com](http://gfletchy.com). To learn more about Building Fact Fluency Toolkits, contact Lisa Martin.

### Keynote Speaker — Vanessa Vakharia

Vanessa Vakharia is the founder of ["The Math Guru"](https://www.themathguru.com/) and the author of Math Therapy. She is a visionary leader dedicated to dismantling the "math person" myth once and for all. A rockstar in both the classroom and on stage (as the keytar-player for the band Goodnight, Sunrise), Vanessa uses her background in feminist theory and education to help students and teachers overcome math trauma and embrace a culture where STEM is cool, accessible, and inclusive.

## News from Conseil scolaire acadien provincial

Au Conseil scolaire acadien provincial (CSAP), l'intégration des pratiques d'enseignement efficaces en numératie est une approche incontournable pour promouvoir le développement du plein potentiel de chaque élève. Dans cette voie, notre équipe de mathématiques accompagne des enseignants afin de mettre en pratique un enseignement explicite de stratégies en salle de classe.

### Pourquoi 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.

Cette année, nous poursuivons l'implantation du programme de la réponse à l'intervention (RàI) en littératie et en numératie, afin de soutenir efficacement le parcours et la réussite de tous nos élèves. Cette démarche est ancrée dans la recherche et est complémentaire à l'enseignement efficace. Ce programme à trois paliers permet un déploiement stratégique des services selon le besoin des élèves dans chaque école.

Au bas élémentaire, nous continuons un accompagnement avec la ressource Mathologie, notamment à travers l'utilisation des petits livrets. Ceux-ci appuient le plan pour la réussite en littératie à la fois l'accent sur le développement des compétences langagières et du vocabulaire pour soutenir la compréhension en numératie.

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



# Get Ready With Me: Anticipating Students' Thinking For Number Talks

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

What if planning a Number Talk began with “What might my students think?”

As part of the Certificate in Elementary Mathematics Education (CEME) at St. Francis Xavier University (StFX), teachers are creating short Get Ready With Me (GRWM) videos—quick rehearsal recordings made in anticipation of a Number Talk. In one video, Jill Martin, a Primary teacher, anticipates strategies for  $5 + 2$ . In another, Amy Parker, a grade 4/5 teacher, works through  $6 \times 40$ , thinking about possible student approaches. Though the mathematics differs, the purpose is the same: to prepare for students' thinking.

## Certificate in Elementary Mathematics Education

The CEME 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 CEME program focuses specifically on teacher as numerate learners. To prepare for exploring Number Talks with young learners, teachers engaged in a process of anticipating students' thinking and mental math strategies. This process allowed teachers to elicit students' strategies, make them visual for public discussion and respond to them in the moment.

## Anticipating ideas

A GRWM video reframes planning. Instead of scripting explanations, the teacher anticipates student thinking.

The guiding question is: *If I pose this problem, what might my students do?*

A shift from explaining to anticipating transforms the Number Talk from delivery to dialogue.

## Number Talks in Primary classrooms

In the Primary GRWM video anticipating  $5 + 2$ , Jill recorded herself solving the problem in multiple ways:

- Counting all from 1
- Counting on from 5
- Showing 5 on one hand and adding 2 more
- Visualizing a structured group of five
- Representing the problem with a quick sketch

The GRWM video (see Figure 1) helped her unpack developmental progressions. Counting all and counting on both lead to 7, yet they reflect very different understandings of number. Here, Jill prepared to *recognize* a variety of counting strategies that may emerge and to *respond* to them in the moment.

As Jill reflected:

*Preparing for a Grade Primary number talk on “ $5 + 2$ ” means trying to get inside my students' heads before we even sit down at the easel. I knew my students would be all over the map: some would subitize the 5 right away and count on, some would just know that 5 and 2 make 7, others would still need to count every single dot from 1, and a few would struggle with one-to-one matching and miscount the counters. When my colleagues watched the lesson, their feedback came from experience. They*

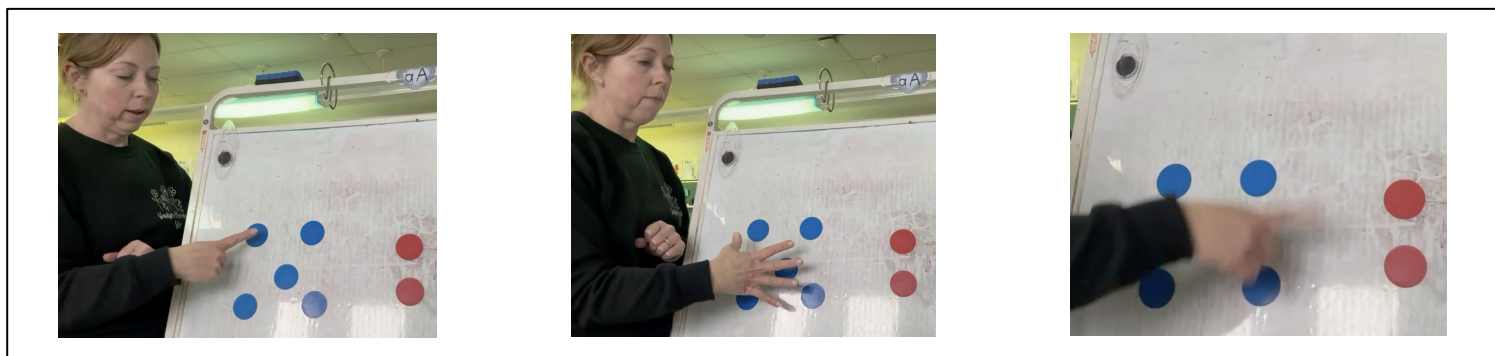


Figure 1 - Anticipating  $5 + 2$

## Get Ready With Me... continued

*pointed out that using a simple, low-tech magnetic ten-frame on the easel made everything so visual and easy to move around. Honestly, keeping the tech simple was a lifesaver—it meant I wasn't fumbling with a screen and could actually focus 100% on the kids' responses, guiding them toward the math goals of the number talk and keeping our usual routines running smoothly, like using our silent hand signals for student engagement and classroom management.*

### Grade 4/5 Number Talk

In this GRWM video (see Figure 2), Amy solved the task  $6 \times 40$  using multiple strategies:

- Standard algorithm
- Decomposition by place value
- Compensation

Instead of modelling the correct method, she prepared to orchestrate a comparison of student strategies, moving the classroom away from answer-getting and toward reasoning and connection-making.

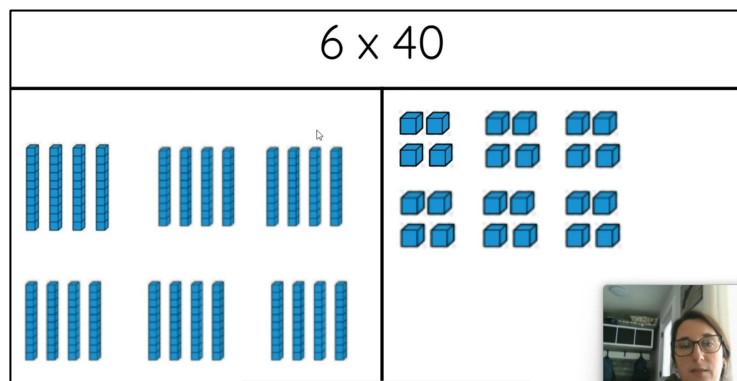


Figure 2 - Anticipating  $6 \times 40$

As Amy commented:

*While creating a GRWM video, we were asked to anticipate what students' responses might be. What I realized from this experience was how much more effective my teaching can be when I have thought through what I think the most common responses might be. I was able to be prepared on what points I wanted to highlight and the strategies that I hoped students would come away with. I feel that I was already naturally doing this*

*with my teaching, but not with as much intention as this process forced me to take. In turn, this then helped me to support my student teachers in having them more prepared for teaching their lessons, by prompting them to think about what the student responses might be, and how are you going to show those responses.*

### Imagining Possibilities

GRWM videos support classroom unpredictability. When teachers anticipate multiple solution paths, they are saying: There is more than one way this could unfold, and I am ready for that!

This readiness reduces cognitive load during the actual lesson. Instead of scrambling to interpret unexpected strategies, teachers recognize them. Instead of steering discussion back to a predetermined path, they build on what emerges.

### Valuing Students' Ideas

When teachers take time to anticipate student strategies, they also value students' ideas that they expect to surface and prepare to record them accurately. Instead of asking: "Who got it?" The teacher asks: "Who saw it differently?", "Who can build on that idea?" or "Where do you see this idea in that one?"

Students begin to experience mathematics as a collective inquiry rather than a performance task. In Primary, this means valuing fingers, gestures, and partial explanations. In grades 4/5, it means valuing unconventional approaches and making connections.

### Try it Today!

To make a GRWM video:

1. Choose your Number Talk mental math problem.
2. Anticipate at least two different ways to solve the problem.
3. Record yourself thinking through it for two minutes.
4. Name possible misconceptions.
5. Anticipate questions that build on students' thinking.

## Get Ready With Me... continued

Keep the video informal. It is for you.

During the Number Talk, notice what happens:

- Are you listening differently?
- Are you less rushed to explain?
- Are you more prepared to connect strategies?
- Are you valuing a wider range of ideas?

### Orchestrating Thinking

The goal of a Number Talk is to elicit two strategies from students, make them visible for public discussion and to compare and connect the strategies with each other.

Anticipating Number Talks with GRWM videos prepares teachers to orchestrate mental math thinking. In both the Primary and 4/5 example, the richness of student contributions depends on the teacher's readiness to notice and respond to emerging strategies. Imagining students' ideas rather than our own explanations, helps create classrooms where mathematics is something students construct together.

For Nova Scotia teachers interested in experiencing similar transformative opportunities, we invite you to join the CEME program at StFX. This professional development program offers meaningful experiences, collaboration, and professional growth alongside a cohort of dedicated educators from your regional centre for education. Specifically, engaging in Number Talks with GRWM videos 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](mailto:mhusband@stfx.ca)) and Dr. Evan Throop-Robinson ([erobinso@stfx.ca](mailto:erobinso@stfx.ca))

### Mark Your Calendar for OAME 2027

Looking for an inspiring way to expand your teaching toolkit and connect with mathematical thinkers across Canada? The Ontario Association for Mathematics Education (OAME) 2027 Annual Conference is going fully virtual from April 27–30, 2027. Centered around the engaging theme “Mathematics Through Stories: Cultivating Courage, Curiosity & Connection,” this conference will explore how narrative-driven tasks and student experiences can shape mathematical identity, encourage classroom risk-taking, and ignite a deeper wonder for the subject.

Because OAME 2027 is entirely virtual and features a schedule with many sessions running during the evening, it presents a uniquely accessible professional development opportunity for Nova Scotia educators. Teachers can participate in top-tier workshops and hear from inspiring keynote speakers right from the comfort of home after the school day wraps up. No hassle or expense of travel and accommodations. To explore the conference theme, meet the featured speakers, and check for upcoming schedule updates, visit the [OAME 2027 Homepage](#).



The Centre for Education in  
Mathematics and Computing

# 2026/2027 Contests

## NORTH AMERICA AND SOUTH AMERICA

### Beaver Computing Challenge

Monday, November 9, 2026 to  
Friday, November 20, 2026

### Canadian Senior and Intermediate Mathematics Contests

Wednesday, November 18, 2026

### Canadian Computing Competition

Wednesday, February 17, 2027

### Pascal, Cayley, Fermat Contests

Tuesday, February 23, 2027 and  
Wednesday, February 24, 2027

### Euclid Contest

Tuesday, April 6, 2027

### Fryer, Galois and Hypatia Contests

Wednesday, April 7, 2027

### Canadian Team Mathematics Contest

Tuesday, April 13, 2027 (at UWaterloo)  
Wednesday, April 14, 2027 or later (in schools)

### Gauss Contests

Monday, May 10, 2027 to  
Friday, May 21, 2027

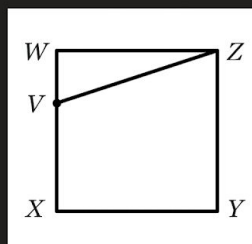
### Team Up Challenge

Tuesday, June 1, 2027 or later



### Sample Question

In the diagram, square  $WXYZ$  has a side length of 15. Point  $V$  is placed on  $WX$  so that  $VZ = 17$ . What is the area of trapezoid  $VXYZ$ ?



(A) 97.5 (B) 157 (C) 161.5 (D) 165 (E) 229



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The CENTRE for EDUCATION  
in MATHEMATICS and COMPUTING

# What AI Is Actually Good At When Marking Math — And What It Isn't

By Ash Misquith, founder of SwiftGrade, an AI marking and feedback platform for teachers

It's Sunday afternoon and there are ninety Grade 10 tests on the table. You know exactly how this goes. You mark for accuracy, because accuracy is what fits in the time you have. A few checkmarks, a circled error, a number at the top. On Monday the students flip to the number, look at it, and put the paper in their bag.

We all know feedback is where the learning happens. We also know that writing real feedback on ninety papers is not a thing a person can do every week. So we carry a quiet debt: the comments we would have written if the day had more hours in it.

I graduated from Halifax West, then taught physics and math in public and international schools around the world before moving into education technology. I still teach online. That pile is the problem I have spent the last several years working on, and it is the one place where AI marking has become genuinely useful rather than merely interesting. What follows is what the workflow looks like, where it holds up, and what to check before you put any student work into any of these tools.

## The gap is not the answer, it's the working

Mathematics teachers do not need help deciding whether a final answer is correct. The time goes into working out how the student got there.

Two students hand in the same wrong answer. One set up the problem correctly and dropped a negative sign halfway down. The other applied a rule that does not fit the problem at all. They need completely different conversations on Monday, and a single cross beside both answers records none of that difference. Finding it means reading the working, one page at a time, and that is exactly the part that does not scale.

The shift worth knowing about is that current AI systems can now read handwritten mathematical working, not just final answers. Two years ago these tools handled multiple choice and typed text, which covers very little of what we actually assign. Being able to follow a student's steps down the page is what makes everything else here possible.

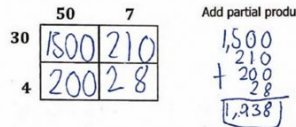
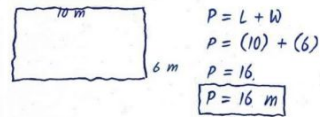
| <div>  <div> Assessment 10<br/>Total mark: 7/10 (70%) </div> <div> Luka Puckerin </div> <div> Test class </div> </div> |                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-----|
| #                                                                                                                                                                                                         | Image                                                                                                                                                                                   | Feedback                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Mark |     |
| 1                                                                                                                                                                                                         | <p>1. Multiply <math>57 \times 34</math> using the box method.</p>                                   | <p> <b>PARTIAL PRODUCTS (2/2):</b><br/>You correctly showed all four partial products for the box method.</p> <p> <b>TOTAL (1/1):</b><br/>You added the partial products correctly to get 1,938.</p>                                                                                                                                                                                                          | R C  | 2/2 |
| 2                                                                                                                                                                                                         | <p>2. Calculate the perimeter of a <math>10\text{m} \times 6\text{m}</math> rectangular garden.</p>  | <p> <b>PROCESS (0/1.5):</b><br/>You showed your work clearly, but you used <math>P = L + W</math> instead of the perimeter formula <math>P = 2L + 2W</math>. Each length and each width has to be counted twice, so the setup should be <math>P = 2(10) + 2(6)</math>.</p> <p> <b>ANSWER (0/0.5):</b><br/>Your answer of 16 m follows correctly from your setup, but the perimeter of the garden is 32 m.</p> | R C  | 0/2 |

**Figure 1** - Part of the report a student receives. The system read the handwritten working and, on the second question, identified that the student added the length and width once each rather than twice. The teacher reviews and can change anything before the student sees it.

# What AI Is Actually Good At... continued

## What a first pass looks like

The workflow starts with materials you already have: the assessment, your answer key or rubric, and the students' completed papers. You scan the set into a PDF and upload it. The system reads each response, proposes a mark, and drafts feedback tied to what that student actually wrote. You then review, change whatever is wrong, and approve.

Take the bracket error every one of us has seen a hundred times. A student solving a linear equation multiplies the number outside the bracket onto the first term inside and forgets the second one, then carries on and isolates the variable perfectly from there.

The answer is wrong, but the page is informative. That student understands what they are trying to do and can execute the rest of the method cleanly. They have one specific gap. A first pass that says exactly that, in one sentence, on that student's paper, is worth considerably more than a cross and a zero. It is also worth more than my writing the same sentence twenty times by hand at nine o'clock at night.

The point is not that the machine has produced an unquestionable judgment. It is that it has located the likely misconception and put something concrete in front of you to check. Editing a draft comment is quick. Writing one from a blank page, ninety times, is not. That gap is where the time actually comes from.

## Then look across the class, not just down it

Reviewing one student at a time improves feedback. Reading across the whole set improves teaching.

If eleven of your twenty-eight students made that same bracket error, it is no longer eleven separate mistakes. It is a clear signal that distribution needs revisiting before the class moves on. You would probably have sensed it somewhere around paper forty. Having it laid out by question, with the actual student responses sitting behind each number, means you have it before you plan Monday rather than during it.

The analysis does not plan the lesson for you. It finds the evidence you would need to plan it, which is the part that normally gets lost in a stack of scores.

## Question difficulty

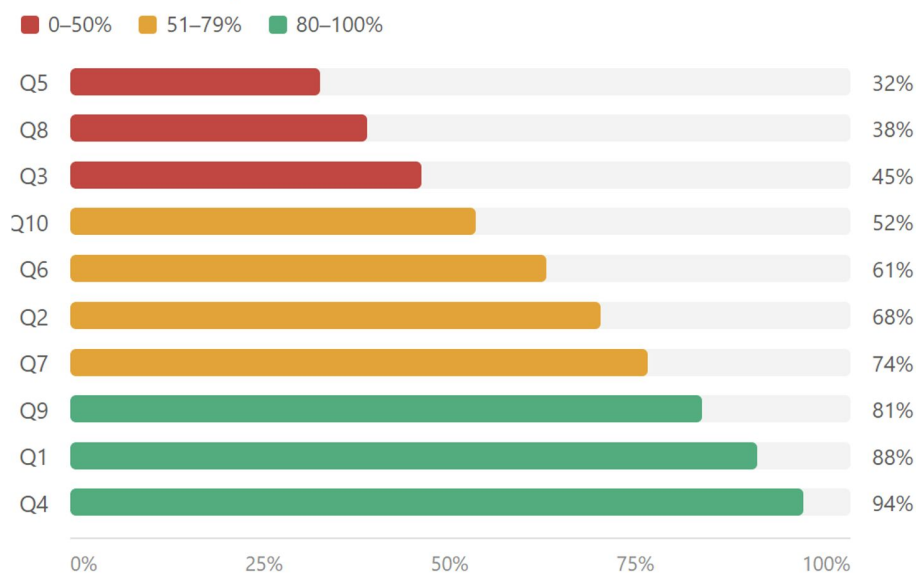


**Figure 2** - Class performance by question. Questions 5, 8 and 3 are where the class struggled, which is information you have before you plan Monday rather than after.

## Why the general chatbot route falls apart

Plenty of teachers have already tried this by pasting student work into a general AI chatbot. It works impressively for one paper and then breaks the moment you have thirty.

You end up with a single long conversation containing feedback for an entire class scrolling past in a wall of text. You cannot see the student's page beside the comment to judge whether the comment is fair. There is no record per student, nothing you can hand back, and

# What AI Is Actually Good At... continued

no way to look at question four across the whole class. By paper fifteen the thread has lost the thread of your marking scheme. Sorting the output into something usable takes roughly as long as marking would have.

Then there is the part that matters more. General consumer chatbots have not been approved by your board for student information, their servers are typically in the United States, and student names are on those papers.

The tool I built, SwiftGrade, is designed around exactly these gaps: each student's paper sits beside the proposed mark and feedback for review, results can be inspected question by question across the whole class, and student data is stored on Canadian servers. I am obviously not a neutral party on that, which is why I would rather you use the questions below to judge any tool, including mine.

## What to watch for

***It does not tell you when it is unsure.*** These systems sound equally confident whether they are right or wrong. That single fact is why the review step exists and is not optional. Nothing should reach a student that you have not looked at.

***Diagrams and graphs are more variable than algebra.*** Reading lines of working is now reliable. Reading a hand-drawn graph, a labelled construction, or a sketched diagram works, but it is more hit and miss, and it is where an error is most likely to slip past you. If your assessment leans on diagrams, review those questions more closely.

***Scan quality does more work than people expect.*** Dark pen or firm pencil, a flat page, decent light. A crisp phone scan reads well. A faint, folded photocopy is hard for anyone to read, including you.

***Your answer key sets the ceiling.*** This is the one most people miss. A key with only final answers gives the system very little to go on when awarding partial credit, and partial credit is most of what we do.

You do not have to write anything elaborate.

Three levels, any of which help:

- **Best:** a key that shows the worked steps, notes which reasoning earns marks, and lists alternative methods you would accept.
- **Good:** a short breakdown of how the marks are distributed across the steps of each question.
- **Still useful:** a single line saying process is worth this much and the final answer is worth this much.

That last one takes about thirty seconds per question and noticeably improves the consistency of the first pass. It is the same discipline as writing a decent rubric, and it pays off the same way.

## Before you upload anything

Student work is student data, and names are on the papers. Four questions are fair to ask any vendor, and you should expect plain answers:

Where is student data processed and stored, and is it in Canada? Is student work used to train their models? How long is it kept, and can you delete it? What happens to it if the company is sold or shuts down?

Then check with your school and board before you start rather than after. Several Canadian districts have a privacy review process for exactly this. It is less painful than it sounds, and it protects you far more than it inconveniences you.

## Trying it without committing your week

1. ***Use an assessment you have already given.*** There is no need to redesign anything.
2. ***Start with five papers, not the whole set.*** Ideally ones you have already marked.
3. ***Give it a marking breakdown,*** even a rough one, rather than only the final answers.
4. ***Compare its marks to yours.*** Look hardest at partial credit and at any question with a diagram.
5. ***Then open the class view*** and see whether it tells you something about question four that you did not already know.

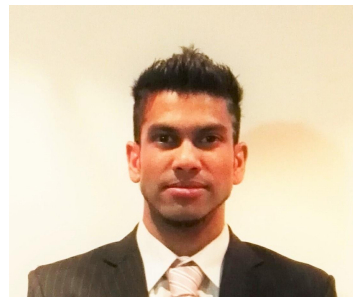
## What AI Is Actually Good At... continued

Twenty minutes of that will tell you more about whether this fits your teaching than any article will, including this one. You will probably find it does something genuinely useful and something genuinely annoying, which is the correct outcome.

The marking pile is not going anywhere. But the part of it we have all quietly filed under impossible, giving every student real feedback on every question every time, is closer to possible than it has ever been. That seems worth a Sunday afternoon of investigation.

Ash Misquith is a graduate of Halifax West High School. He taught mathematics and physics for twelve years in public and international schools and still teaches online.

He is the founder of SwiftGrade, an AI marking and feedback platform for teachers, which he pitched on CBC's Dragons' Den in 2020. He can be reached at [ash@goswiftgrade.com](mailto:ash@goswiftgrade.com) or at [goswiftgrade.com](https://goswiftgrade.com).



### Esti-Mystery Lab - Can you solve the clues to reveal the total?

#### How many buttons are in this cup?

Make an estimate. Then use the clues to narrow down your guess. After all four clues are solved, you can use the final formula to confirm the exact amount!



**Clue #1**  $3A + 8 = 20$

The total number of buttons is between  $100A$  and  $120A$ .

**Clue #2**  $3B - 2A = 10$

The tens digit of the total number is equal to  $B$

**Clue #3**  $4C + B = 14$

When the number of buttons is divided by 5, the remainder is  $C$ .

**Clue #4**  $2D - 5C = 24$

The sum of the digits in the total number of buttons is equal to  $D$ .

Total Number of Buttons =  
 $100A + 8B + C + D$

# Adventures in Logic and Reasoning

## Wordle is a Math Game! Solving Wordle Using Information Theory

A team of students at Binghamton University in New York have developed a mathematical strategy for the popular online game Wordle. In the standard six guesses, their method finds the correct word 99% of the time. Traditional tactics often rely on guessing the most common letters (such as A, E, and R) or trying to guess the hidden word directly. This method yields significantly better results than standard letter-frequency strategies, which peak at around 90% success. Led by Assistant Professor Congyu "Peter" Wu, student researchers from the School of Systems Science and Industrial Engineering created this method as a project designed to demonstrate the skills learned throughout their course.

The strategy relies on **Shannon entropy**, a fundamental concept in information theory that measures uncertainty. Instead of choosing a word based on the likelihood of it being the final answer, the algorithm selects words based on how much uncertainty they eliminate. Counterintuitively, the optimal guess is frequently a word that has almost zero chance of being the target word. However, because its letter combinations partition the pool of remaining candidates into much smaller subsets, the resulting color feedback (grey, yellow, and green) yields maximum information gain to rapidly narrow down the possibilities.

To execute the strategy, a player starts with an initial five letter word such as TARES and then inputs Wordle's color feedback into a computer script. The program then determines which guess will yield the greatest reduction in uncertainty. The player then repeats this process with the new guess. The student team, with the support and guidance of their professor, published their research in a recent issue of the [Northeast Journal of Complex Systems](https://www.binghamton.edu/news/story/6327/s-m-a-r-t-these-researchers-used-math-to-crack-wordle). The ability to take classroom project and turn it into a peer-reviewed journal showcases these students' deep understanding of their sometimes abstract classroom concepts.

Read more at:

<https://www.binghamton.edu/news/story/6327/s-m-a-r-t-these-researchers-used-math-to-crack-wordle>

### Questions to Ponder

1. What key characteristics distinguish a strong opening word from a weak one in Wordle?

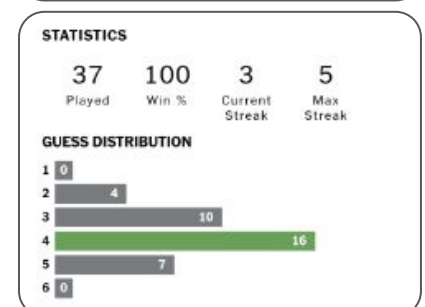
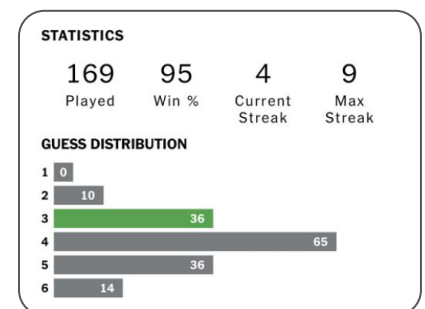
Which of the following starting words would you choose for today's Wordle, and why?

- ADIEU
- CRANE
- TRAIN
- SALET

2. Based on the feedback, what word would you select next? Explain your reasoning.



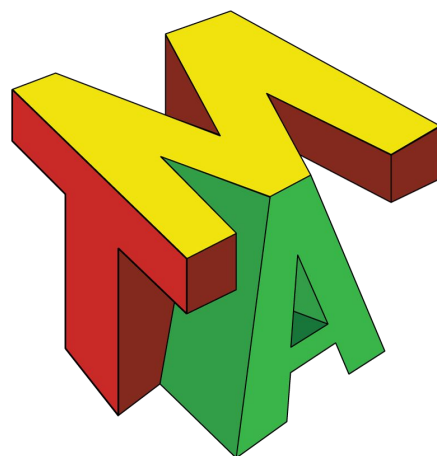
3. Based on their statistics, which player is better?



## 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       |
| Anne Pentecost     | Vice-President                   |
| Kimberley McCarron | Treasurer                        |
| Jennifer Courish   | 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 |
| Kelly Legere       | Member-at-Large Tri-County       |



## Special Projects

The Nova Scotia Math Teachers Association is excited to announce funding opportunities for innovative classroom math projects for the upcoming year. We invite all math teachers to submit proposals for projects that inspire students, promote critical thinking, and bring mathematical concepts to life in creative ways. Whether you want to introduce specialized hands-on manipulatives, launch a data science experiment, integrate math-art fusion projects, or build a classroom stock market simulation, we want to help fund your vision. Proposals will be evaluated and selected based on originality and mathematical merit. Up to 4 project grants a year will awarded, each valued up to a maximum of \$300 each. Project Proposal Form link: [MTA Special Project Proposal](#)

## Call for Contributions

We are better together. Mathematics Matters, the MTA newsletter, is open to contributions from everyone interested in the teaching and learning of mathematics. Please consider sharing your ideas and reflections with other teachers. This 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.