TESTIMONY IN SUPPORT OF SENATE BILL 19
Submitted to the Ohio Senate Education Committee
By Marcy Raymond, Chief Strategy Officer, PAST Foundation
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Chairman, Vice Chair, Ranking Member, and members of the committee:

Thank you for the opportunity to provide testimony in strong support of Senate Bill 19, which represents a critical turning point for mathematics education in Ohio.

I come before you today not only as the Strategy Officer at the PAST Foundation but as a 36-year veteran science and mathematics educator. I began my career in the classroom, teaching students to see the world through the lens of inquiry—using mathematics not as an end in itself, but as a powerful tool for problem-solving, analysis, and understanding the systems that shape our world. Over the decades, I have witnessed both the untapped potential of our students and the unfortunate consequences of a rigid, outdated mathematics system that too often limits rather than liberates.

The Reality: Math Performance is Not Keeping Pace with Workforce Needs
Let me begin with the facts. According to the Spring 2025 Ohio State Tests, only:
- 48% of 8th-grade students scored proficient or higher in mathematics.
- A staggering 39% of 8th graders fell into the "Limited" category—the lowest performance tier.
- 41% of students were below proficiency in Modeling & Reasoning, one of the most critical strands for real-world and workforce application.
- In Geometry, another workforce-relevant strand, nearly 4 in 10 eighth graders fell below proficiency.

By contrast, 70% of 4th graders were proficient or higher in math—illustrating that as content becomes more abstract and disconnected from relevance, performance drops sharply (Ohio Department of Education and Workforce [ODEW], 2025a).

Why We Need a Paradigm Shift
Senate Bill 19 invites us to rethink the purpose of mathematics education in Ohio. It calls for a transition from "mathematics for mathematics' sake" to mathematics as a tool for workforce readiness, civic engagement, and lifelong opportunity.
- By allowing pathways such as Data Science, Statistics, and Quantitative Reasoning to count toward graduation, ***SB 19 acknowledges that different futures require different kinds of mathematical thinking***.
- It ***eliminates the outdated requirement that all students must pass Algebra II to graduate***—a course that, while important for some, functions as a gatekeeper for many, disproportionately affecting students of color, first-generation learners, and those pursuing technical careers (National Council of Teachers of Mathematics [NCTM], 2018).
  - In 1997, as a teacher in Reynoldsburg, I knew that Algebra II as a stand-alone course was failing students. We created what the kids called "Calgebra" to integrate Chemistry and Algebra II, and work with Abbott Labs scientists to

help to integrate the relevance that the kids needed to seek understanding of mathematics. Students today still need it!
- o In 2006, as a school designer and principal, we partnered with Battelle and The Ohio State University to start Metro Early College STEM High School to ensure that the integration with the STEM workforce led to real and relevant integrations across all mathematics courses. Students still need the rigor and the relevance, but pockets of excellence are not enough.
- And critically, SB 19 *aligns K–12 math with the demands of Ohio's economy,* including STEM careers, advanced manufacturing, logistics, healthcare, and cybersecurity—fields that require agile, analytical thinkers fluent in numbers and logic, not just formulas and equations (Jobs for the Future [JFF], 2022).

Opportunity Spaces in STEM Demand Mathematical Fluency
Let's be clear: Mathematical fluency in the workplace means far more than being able to solve algebraic equations. It means being able to:
- Read and interpret data visualizations, dashboards, and reports
- Model complex systems using spreadsheets, simulations, or design tools
- Reason logically and communicate mathematical ideas clearly to others
- Apply quantitative thinking to solve real-world problems, from budgeting to blueprinting to bioinformatics
- Understand uncertainty, risk, and variation in complex decision-making environments

These are the foundational skills our employers are asking for. In fact, through our work at the PAST Foundation, in collaboration with industry leaders like Honda, Deloitte, and ADS, and regional workforce boards, we hear consistently that quantitative reasoning and data literacy are the baseline for success—whether the job is in CNC machining or cloud computing (Raymond, 2023).

Ohio's STEM and advanced manufacturing sectors are projected to grow faster than the national average (Ohio Department of Job and Family Services [ODJFS], 2024). But those jobs—many of them high-wage and high-demand—require workers who can think mathematically, not just follow a script.

Let me give you a few tangible examples—and more importantly, what happens when we get the math wrong:
- A precision welder must understand tolerances and spatial geometry.
  - o If miscalculated, it can lead to structural failures, equipment damage, or even workplace injuries.
- A lab technician must accurately calculate dilutions and understand statistical significance.
  - o If saline solution is prepared at the wrong concentration—too weak or too strong—a patient's life could be at risk due to fluid imbalance, organ stress, or ineffective treatment (National Academies of Sciences, Engineering, and Medicine [NASEM], 2022).
- A logistics coordinator must optimize routing and inventory using models and projections.
  - o If inventory isn't calculated correctly, supply chains break, leading to production delays or revenue loss.

- A cybersecurity analyst must reason through conditional logic and analyze patterns in real-time data flows.
  - If errors go undetected in data streams or algorithms, threats may be missed, risking data breaches or infrastructure vulnerabilities.
- A construction project manager uses unit conversions, geometry, and estimation daily.
  - A miscalculated load-bearing angle or volume of concrete isn't just expensive—it's catastrophic.

And while advances in artificial intelligence are beginning to assist with many of these tasks, from predictive analytics to automated calculations, AI is not a substitute for human understanding. If a student cannot understand the problem behind the equation, they cannot verify whether the machine got it right. In high-stakes environments—healthcare, aviation, manufacturing, national security—a misplaced decimal, a misunderstood data trend, or blind trust in an AI-generated output can lead to irreversible consequences (Brynjolfsson & McAfee, 2017).

AI can be a powerful partner, but only if our students have the mathematical fluency to question, interpret, and apply what the technology produces. Without that foundation, we are not building a workforce—we are building a risk.

Mathematics is not abstract—it's applied logic that protects health, secures systems, saves money, and saves lives. And yet we continue to teach it as if its primary purpose is to solve a problem on a test, not to solve problems in the world. No wonder students are not persistent or resilient in pursuit of STEM careers.

In Closing
This is our moment to act. Senate Bill 19 is the most strategic, research-aligned, and workforce-responsive piece of mathematics legislation Ohio has seen in decades. It directly responds to verified achievement data. It honors student diversity. And it positions mathematics where it belongs—in service to the future.

As a former high school Chemistry and Algebra II teacher, STEM principal, curriculum director, and now staunch strategist in linking learning to life, I urge you: Let us not hold our students hostage to a 20th-century sequence that fails to serve our 21st-century economy.

Please help pass SB 19 and equip every Ohio learner with the math they need to build, innovate, analyze, and lead.

Thank you for your time and consideration.

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