

The State of Math Instruction: Equity, Access, and Outcomes

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Introduction

Math proficiency has declined nationwide — and Massachusetts is no exception. Despite the state’s long-standing position as a national leader in education, recent data reveal mounting concerns about student performance in mathematics. In 2024, the state tied for first on the National Assessment of Educational Progress (NAEP) eighth-grade math assessment, yet only 37% of students scored at or above the NAEP proficient level.¹ More recently, this year’s Massachusetts Comprehensive Assessment System (MCAS) results show that just 41% of students in grades three through eight met or exceeded expectations in math, while only 45% of 10th graders achieved this benchmark — representing a three-point drop from the previous year.²

Beneath these averages, troubling trends are emerging. Massachusetts is among the states experiencing the most significant widening of outcome gaps in math. Our recent analysis shows that Black and Latino students, multilingual learners, students from low-income backgrounds, and students with disabilities are disproportionately performing below mathematics benchmarks.³ Moreover, the lowest-performing students — the bottom 10% — are declining at an especially rapid pace, signaling not only widening gaps but a deeper erosion of foundational math skills among struggling learners.

Our recent poll reveals that concern about math proficiency extends beyond the data. Many parents are worried about their child's math abilities, particularly those with children in grades five through eight and parents of traditionally underserved students. A significant number of parents report actively seeking additional out-of-school support, and the findings highlight troubling disparities in access to rigorous math opportunities.⁴

While some states have taken decisive action — passing legislation that includes targeted interventions, high-quality, standards-aligned curricula, and robust teacher preparation — Massachusetts has yet to do the same. In the absence of a coordinated approach, what and how students learn varies widely across districts, creating inequities in access to rigorous math instruction and effective support.

These disparities shape students' everyday experiences and future outcomes.⁵ When instructional materials lack coherence or rigor, students can become confused, frustrated, and disengaged — fueling math anxiety and the belief that they are simply “not math people.” For many, especially those in underserved communities, this disengagement begins early and compounds over time, cutting off opportunities in advanced coursework and limiting access to high-demand STEM fields.

The consequences extend far beyond the classroom. In a world increasingly driven by data, technology, and problem-solving, strong math skills are essential for success in college, career, and civic life. Without them, students risk being shut out of the jobs and industries that power our economy, as well as from opportunities to fully participate in an increasingly STEM-oriented world.

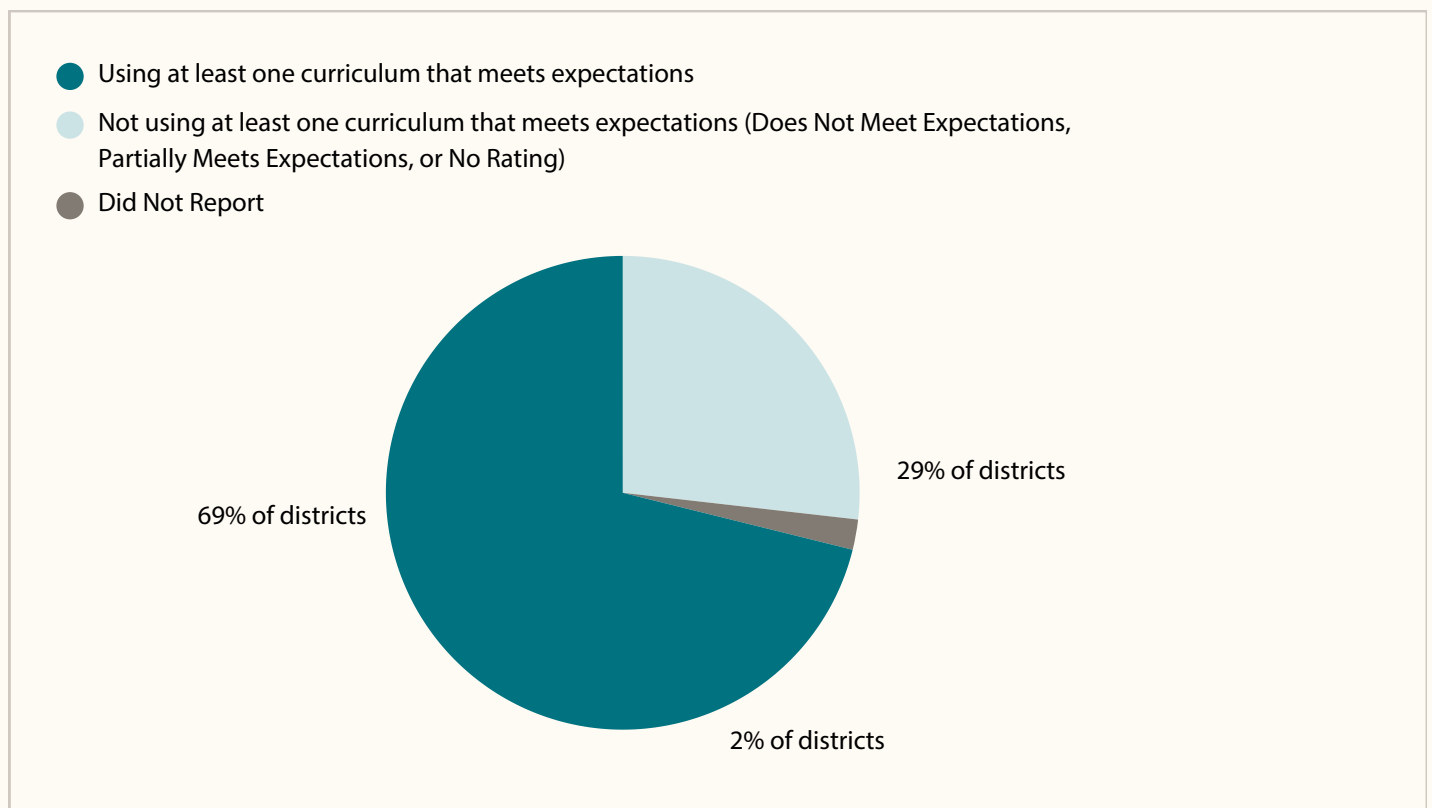
Ensuring that all students — regardless of zip code or background — have access to rigorous, representative, engaging, standards-aligned instructional materials and educators who are adequately prepared to deliver this instruction is essential for advancing educational equity and improving long-term outcomes. Massachusetts cannot sustain its reputation as an educational leader, or its competitive edge in a STEM-driven economy, without addressing these widening gaps and ensuring that all students build the math foundation they need to thrive.

This research brief spotlights key data illuminating two foundational pillars of effective math education in Massachusetts: the adoption and implementation of high-quality math curricula across school districts, and the availability of well-prepared educators capable of delivering rigorous and engaging math instruction. This brief not only highlights current gaps and opportunities in these two domains but also offers several strategic, high-level policy recommendations that complement those in our previous brief. Together, these recommendations provide policy considerations that can help catalyze systemic change and elevate math achievement statewide.

1. Nearly one-third of Massachusetts school districts have not reported using high-quality curricula in any grade, which potentially leaves hundreds of thousands of students without access to instructional materials that meet key standards.

While 68% of districts report using at least one high-quality math curriculum, consistent access remains an issue. These ratings are based on both alignment and usability criteria from EdReports, and curricula must meet expectations in both areas to be considered high-quality. Additionally, 29% of districts are using curricula that either do not meet expectations or have not been rated by EdReports, while 2% did not report their curriculum usage. This suggests that districts across Massachusetts are not consistently using materials that meet recognized quality standards in math, and also signals a concerning gap in reporting and transparency.

Figure 1: Access to High-Quality Math Curriculum Across Massachusetts



Source: Massachusetts Department of Elementary and Secondary Education (DESE) Curriculum Dashboard

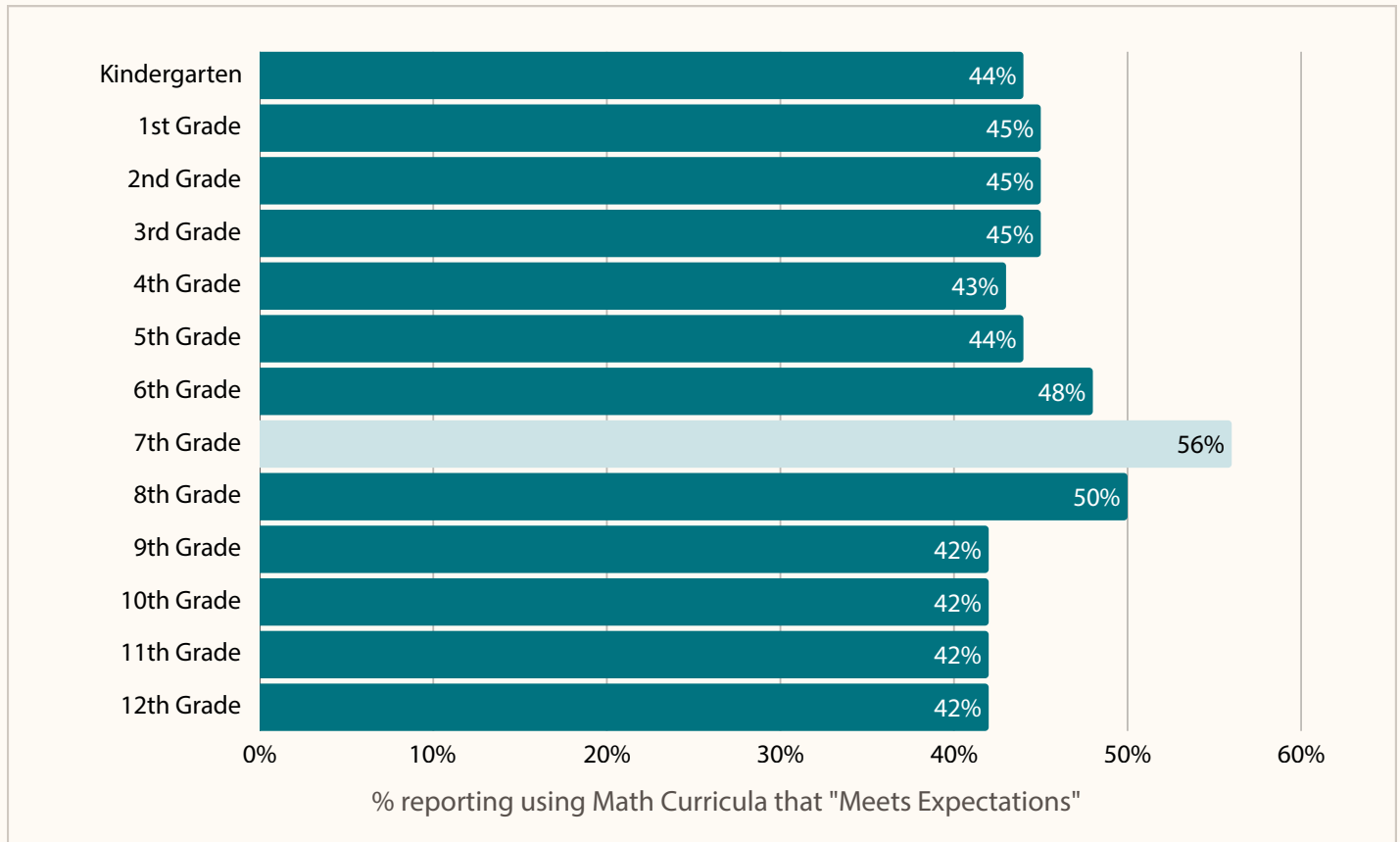
Understanding EdReports' Alignment and Usability Ratings

EdReports evaluates instructional materials across two key dimensions: alignment with college- and career-readiness standards and usability for teachers and students. To meet expectations for alignment, a curriculum must focus on grade-level standards, build content coherently across grades, and provide rigorous instruction that balances conceptual understanding, procedural skills, and real-world applications. Usability ratings assess how effectively the materials support teaching, including clear guidance for educators, differentiation tools, and an organized, accessible design. Curricula that meet expectations in both areas are considered high-quality and well-suited to support effective instruction.⁶

2. Access to high-quality math curricula varies by grade level, with the weakest implementation occurring in the earliest and latest years of schooling.

While nearly 70% of students overall have access to high-quality math materials, usage is inconsistent across grades. Access is lower in elementary grades, peaks in seventh grade at 56%, and then declines again in high school. This uneven adoption across grade levels deepens existing inequities and suggests that improving math outcomes will require not only better access to materials but also more deliberate, systemwide coordination and support — especially in the grades where students currently receive the least support.

Figure 2: Access to High-Quality Math Curriculum by Grade Level



Source: Massachusetts Department of Elementary and Secondary Education (DESE) Curriculum Dashboard

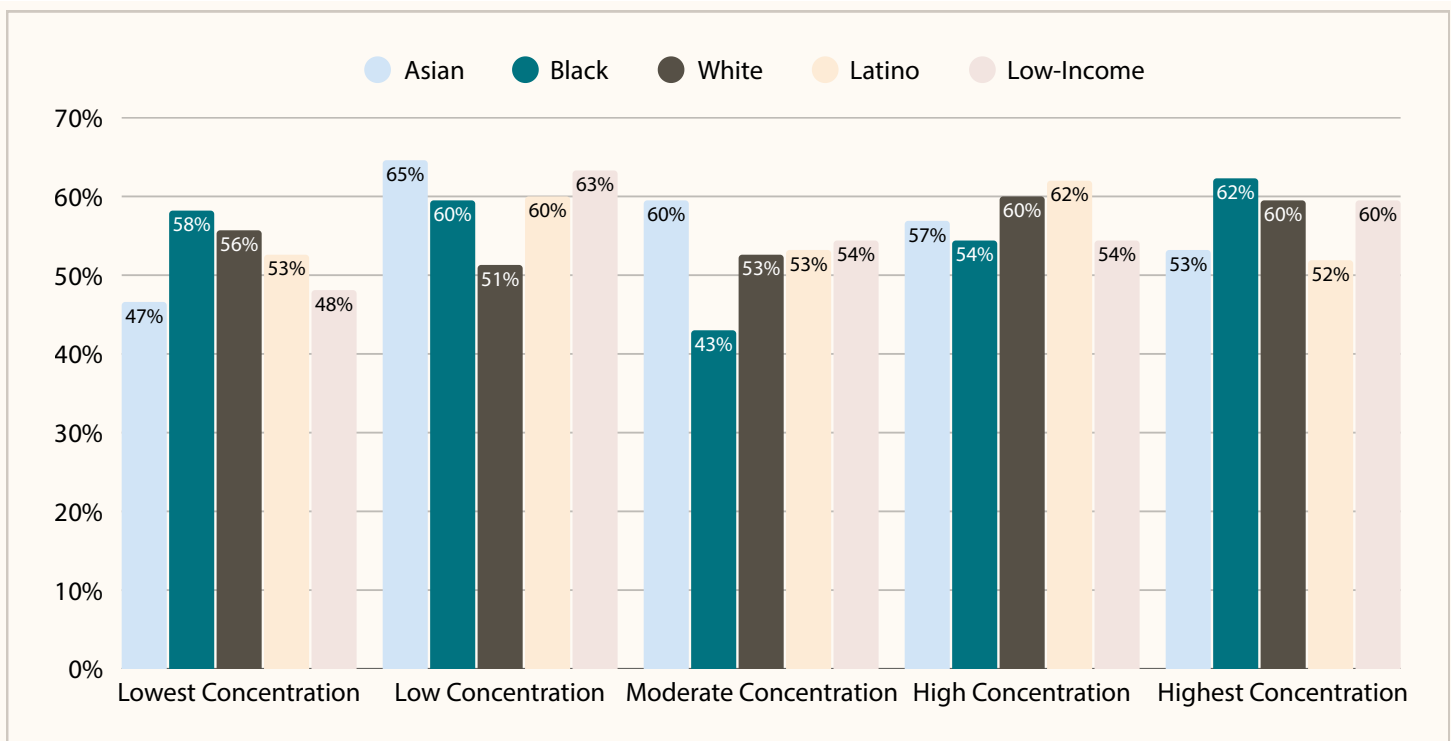
Adoption of High-Quality Math Curricula in High Schools

The adoption of high-quality instructional materials in high schools presents distinct challenges due to a combination of structural and instructional factors. Unlike elementary and middle schools, where curricula tend to be more uniform and standardized, high school coursework is specialized and fragmented across multiple subjects and course levels (e.g., Algebra I, Geometry, Calculus). As a result, schools must evaluate and adopt materials for multiple discrete courses, which increases the workload for curriculum teams and makes coherence across courses harder to achieve. Additionally, procurement issues exacerbate this challenge, as publishers have historically focused on developing high-quality instructional materials for grades K–8, leaving fewer vetted, standards-aligned options for high school math.

3. Access to high-quality math curricula varies across districts, often depending on the concentration of specific student groups.

Districts that serve the highest concentrations of Black students and those from low-income backgrounds have HQIM adoption rates that are comparable to or slightly higher than those in districts with the lowest concentrations of these groups, suggesting that access gaps do not systematically disadvantage these students. In contrast, access to HQIM for other groups, such as Asian and Latino students, shows modest fluctuations across quintiles without a distinct upward or downward trend. Overall, HQIM adoption remains moderate statewide, with no student group exceeding roughly 65% access. This indicates that while access seems relatively equal across student demographics, many districts still lack high-quality instructional materials. This systemic issue limits consistent opportunities for students to engage with strong math curricula.

Figure 3: Access to High-Quality Math Curricula by Student Group Concentration



Source: EdTrust Massachusetts analysis of DESE Curriculum Dashboard (using CURATE ratings) and Enrollment Data

Note: To enable fair comparisons across the state, we grouped districts into five equal-sized categories, known as quintiles. Each quintile contains an equal number of districts, arranged from those with the lowest percentage of a given student group to those with the highest. This method allows us to compare patterns across districts that serve very different student populations, ensuring that no single group of districts skews the results.

When assessing district access to high-quality math curricula (HQIM), we included all districts in the dataset. Districts that did not report any curriculum information were considered not to be using high-quality instructional materials. This approach ensures that statewide averages reflect all students' potential access to HQIM, rather than only those in districts that submitted data.

4. Spending and staffing levels show little connection to whether districts adopt high-quality math curricula — suggesting that access to these materials is not solely dependent on resources.

A regression analysis involving 395 districts revealed that factors such as the presence of instructional coaches, spending on leadership, instructional support, and professional development funding together explained less than 2% of the variation in HQIM adoption, with the overall model not statistically significant ($p = 0.19$). Only spending on instructional materials and technology exhibited a weak, negative relationship with the use of HQIM. These findings highlight that even well-resourced districts still struggle to adopt high-quality materials. The decision to implement rigorous, standards-aligned curricula likely reflects district priorities and leadership, rather than budget capacity. This underscores the need for stronger guidance, accountability, and support to ensure that all students benefit from high-quality instruction.

**Analysis includes only districts that reported both district expenditures and math curriculum information.*



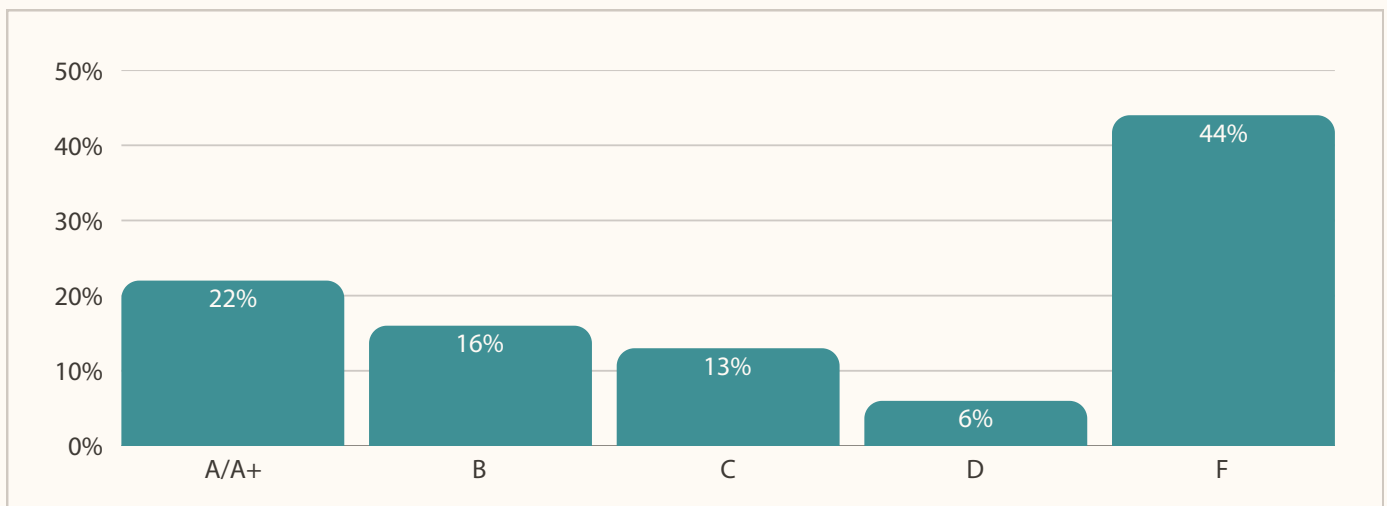
Leadership, Not Spending, Drives Access to Quality Math Materials

District resources explain less than 2% of the differences in HQIM adoption. Spending and staffing have little impact on students' access to high-quality math materials. Even well-funded districts aren't guaranteed strong curricula — what matters most are leadership decisions and curriculum systems. The key takeaway is that access to top-notch math materials depends more on priorities and leadership than on budget. Ensuring that all students receive strong math instruction requires better guidance, accountability, and support — not just more money.

5. Massachusetts is facing both a shortage of qualified mathematics teachers and persistent gaps in teacher preparation — particularly at the elementary level, where strong math foundations are essential.

In the 2022–23 school year, at least 47 states, including Massachusetts, reported shortages in elementary, middle, and secondary mathematics educators.⁷ At the same time, nearly half of the state’s elementary teacher preparation programs received an F grade for providing insufficient instructional time in both mathematics content and pedagogy.⁸ Together, these findings highlight the need for Massachusetts to strengthen teacher preparation, raise licensure standards, and invest in sustained professional development and retention strategies to build a well-prepared, diverse, and stable math teaching workforce across the state.

Figure 4: Massachusetts Teacher Preparation Programs Graded by Instructional Time in Math Content and Pedagogy



Source: The National Council on Teacher Quality (NCTQ), *Solving for success: How to improve math instruction in Massachusetts*

How NCTQ Evaluates Math Preparation in Teacher Training Programs

The National Council on Teacher Quality (NCTQ) examines both the quantity and distribution of instructional hours that teacher preparation programs allocate to math pedagogy and four key math content areas: (1) numbers and operations, (2) algebraic thinking, (3) geometry and measurement, and (4) data analysis and probability.

Program Requirements

- A+** At least 150 instructional hours across the five topics and 100% of the recommended target hours for each topic
- A** At least 135 instructional hours across the five topics and at least 90% of the recommended target hours for each topic
- B** At least 120 instructional hours (80%) across the five topics
- C** At least 105 instructional hours (70%) across the five topics
- D** At least 90 instructional hours (60%) across the five topics
- F** Fewer than 90 instructional hours (<60%) across the five topics

Recommendations & Implications for Practice and Policy

For State Leaders:

1. Build sustainable cross-district learning networks.

- Facilitate collaboration among district leaders to share best practices, identify effective strategies for supporting all students — especially multilingual learners and students with disabilities — and learn from schools that demonstrate strong math growth.

2. Prioritize funding for math improvement efforts.

- Currently, there is no consistent, dedicated statewide funding stream to support math improvement. To address this, the state should establish a dedicated funding stream—modeled on the state’s Literacy Launch initiative — to strengthen math instruction. Investments should include grants for the adoption of HQIM, sustained professional development for teachers and district leaders, high-dosage tutoring, and coverage of recurring digital licensing fees to ensure sustained access to HQIM resources. Such funding will ensure that resources are not only available but also consistently implemented to benefit every student.

3. Strengthen the math teacher pipeline and preparation system.

- Set specific, detailed math standards for elementary teacher preparation programs covering all four core math content areas (numbers and operations, algebraic thinking, geometry & measurement, and data analysis & probability).⁸
- Require elementary teacher preparation programs to focus on math-specific pedagogy to ensure that aspiring teachers learn to translate their content expertise into effective instruction.⁸
- Invest in teacher residency and “grow-your-own” programs to attract and retain diverse candidates, particularly in high-need districts.

For District Leaders:

1. Audit math materials and instructional practices.

- Use tools such as EdReports and Curate to evaluate whether district math curricula meet rigorous standards. During curriculum renewal cycles, review existing instructional materials to ensure they remain the best available options.

2. Invest in implementation, not just adoption.

- High-quality curricula are most effective when supported by strong implementation strategies. To ensure that teachers can deliver rigorous and engaging math instruction, it is essential to combine curriculum adoption with ongoing professional learning, coaching, and dedicated planning time. Professional development should be well-structured and of sufficient duration, coaches must actively support teachers in the classroom, and administrators should be involved in instructional planning to promote consistency and fidelity throughout the district.

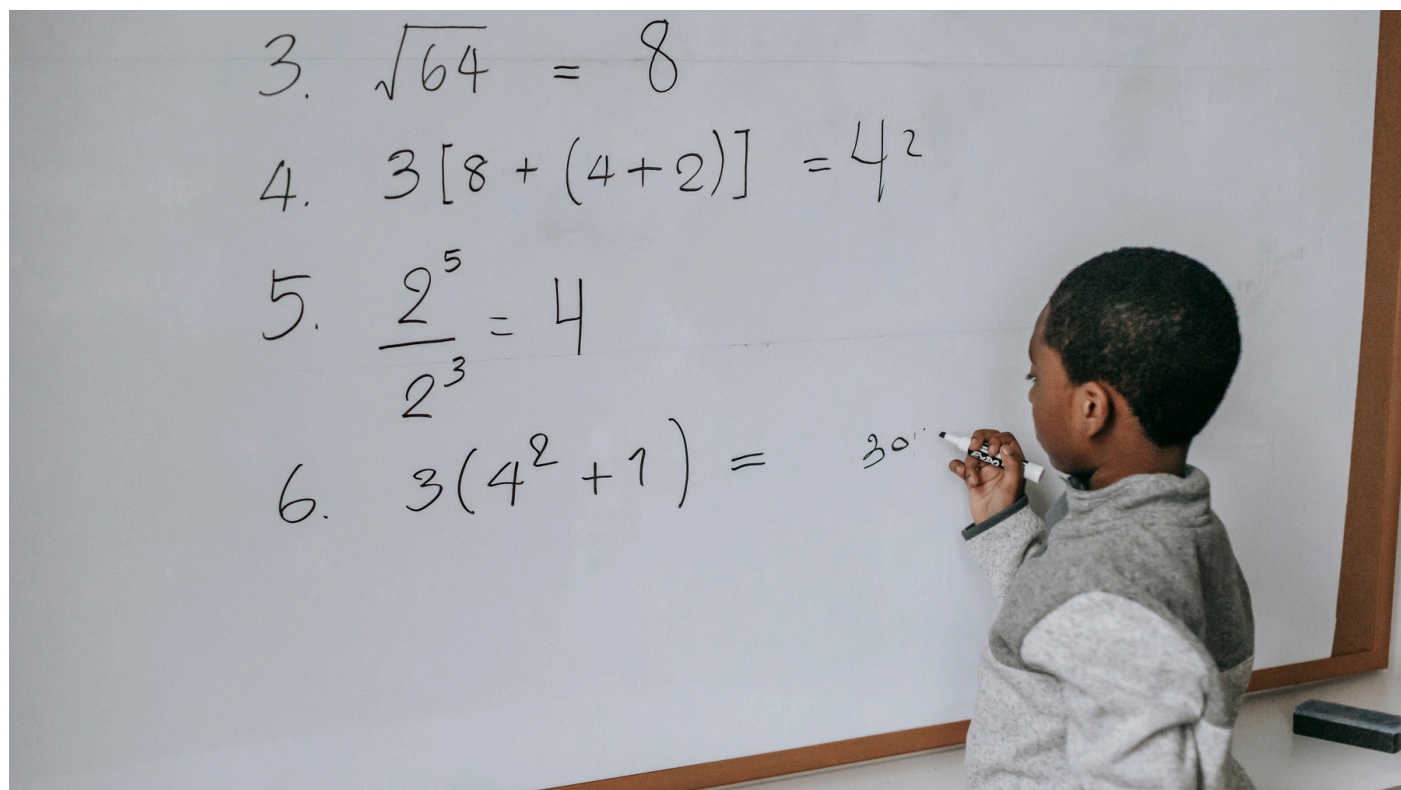
Conclusion

Massachusetts' math challenge is not one of talent or potential; it is one of coherence and commitment. Across the Commonwealth, too many students still lack access to rigorous, high-quality math instruction. One in three districts relies on unvetted curricula or curricula that don't meet the quality review standards of EdReport, and access to strong instructional materials is uneven across grade levels, leaving some students at a disadvantage.

Improving math outcomes will not be achieved through a single solution. While high-quality instructional materials are essential, they alone cannot drive success. For students to thrive, these materials must be complemented by well-prepared teachers, effective classroom implementation, and sustained professional learning. Curriculum quality, teacher expertise, and ongoing support are interdependent; no single element can close opportunity gaps in isolation.

Compounding these challenges, Massachusetts faces a shortage of qualified math teachers — especially in the early grades — and ongoing gaps in teacher preparation and support. Together, these conditions reveal a fragmented system in which access to strong instruction and professional learning often depends more on local circumstances than on a unified state vision.

To make progress toward closing math opportunity and outcome gaps and to uphold its reputation as a national leader in education, Massachusetts must adopt a coordinated, statewide approach — one in which every piece of the puzzle works in concert. Every student, in every grade and district, should have the opportunity to learn from high-quality curricula delivered by skilled, supported teachers within systems built for alignment, equity, and continuous improvement. Realizing this vision will require bold leadership, strategic investment, and an unwavering commitment to ensuring that every piece counts.



Endnotes

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