STATE OF THE AMERICAN STUDENT 2025

Getting Students Back on Track in Math

CRPE
REINVENTING PUBLIC EDUCATION

ASU Mary Lou Fulton College for Teaching and Learning Innovation
Arizona State University

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PUBLIC EDUCATION

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Executive Summary

Five years after Covid-19 disrupted schools, American students are not just recovering slowly—many are falling further behind.

This is especially true in math. However, this is not simply a pandemic problem. The math crisis began over a decade ago and has deepened into a national emergency.

After steady improvement over two decades, math performance in the United States peaked in 2013. Since then, scores have declined and have been in freefall for the lowest-performing students. Nearly four in ten eighth graders now score below Basic on the Nation's Report Card, and the achievement gap has reached historic highs. The groups in steepest decline include girls, low-income students, Black and Latine students, students with disabilities, and multilingual learners. But across the board, the results are alarming. Students report that math is the subject most likely to make them feel anxious, defeated, or invisible.

However, this crisis is solvable. Math may be one of the most fixable problems in American education, because student math achievement is highly responsive to what happens inside schools—perhaps even more so than reading. The quality of instruction, the strength of the teacher workforce, and the availability of timely support significantly impact math learning. Steady progress and narrowed gaps in math outcomes occurred in the late 1990s and early 2000s. This was likely due to focused efforts to raise achievement expectations, especially for the lowest-performing students.

> *"[I would ask the teacher for help] but it would always be pushed to the side. … Me and one of my friends, we didn't even do the math final project. It just ended up getting passed. I didn't really learn anything those last couple months."*
>
> *—Recent high school graduate, RI, 2023*

This report answers two urgent questions:

1. **Why is math in such steep decline?**
2. **What would it take to turn the tide?**

Drawing on national assessment data, student voices, practitioner interviews, and a review of recent reforms, we identify both the system-level breakdowns and the bright spots that show what's possible when it comes to improving math education in the United States.

KEY DRIVERS OF MATH DECLINE

Our review of the evidence suggests that at least four policy trends are at play in the math declines.

- **Research-backed strategies are not reaching the classroom.** Ideological debates have crowded out clarity, with some groups and researchers opposing direct instruction (in which teachers demonstrate or explain procedures or concepts) for struggling students, and a lack of clear guidance for teachers about what the research shows. Rigorous studies show that schools should emphasize math facts, procedural knowledge, and deeper conceptual thinking, but teachers are unclear about the right balance. Direct instruction—the most evidence-based approach for struggling learners—is too often underused.
- **Standards and accountability are weakening.** In many states, test scores are inflated, report cards are opaque, and grade inflation misleads families about student progress.
- **The supply of qualified teachers is eroding.** The number of teacher preparation program graduates prepared to teach math fell by 36% between 2012 and 2020. Math vacancies are growing, especially in high-poverty districts.
- **Systemic rigidity, tracking, and unequal opportunity hinder progress.** Schools are not equipped to serve the growing diversity of student needs. Most operate with outdated models that assume all students can learn the same content at the same pace. Too many students, in particular those from already disadvantaged backgrounds, fall behind early on and never get the chance to take college-track courses. This "leaky pipeline" effect limits students' access to careers that require advanced math skills.

But there are bright spots. States like Alabama, districts like Union City in New Jersey and Ector County in Texas, and public charter schools with intensive coaching and data use demonstrate that gains are possible—and replicable.

OUR CONCLUSION

Fixing math education in the United States is a complex equation—no single solution will solve the crisis. But while it may be daunting, the math problem is also eminently solvable.

It will require clear goals: There should be national and state-level campaigns and policies to ensure every student is ready for Algebra I by eighth grade.

Solving the math education problem will also require determination from policymakers at every layer of the education system to focus on **five mutually reinforcing solutions:**

1. **Evidence-based instruction that meets individual needs.** Every student deserves high-quality, explicit instruction grounded in what works. Teachers need clear guidance on balancing conceptual understanding with procedural fluency. They also need real-time data to identify gaps and target instruction. Practices that aren't backed by evidence should be left behind.

2. **High expectations and transparent accountability.** States must recommit to preparing all students for success in Algebra and beyond. That starts with setting meaningful standards and giving families clear, actionable information about student progress. Schools falling short should be required to adopt evidence-based curricula and supports like explicit instruction and targeted tutoring.

3. **Creative models to address the math teacher shortage.** Math learning depends on access to qualified teachers. To attract and retain strong math educators, states should explore bold strategies: differentiated pay, team-teaching models, math specialists, and smarter deployment of existing talent. The goal isn't just more teachers, but the right people in the right roles.

4. **A new delivery system without dead ends.** The current model—especially for students with missing skills or special education needs—isn't working. We need flexible pathways with multiple on-ramps, automatic acceleration, and no lower-track dead ends. Students should be able to advance as soon as they're ready. That means rethinking everything from course structures to assessments and professional development so the whole system works coherently.

5. **Engagement that lasts.** Students need to believe that math matters and that they can succeed. Real-world applications can help—but only when paired with strong instruction. Engagement alone won't drive learning. It must be part of a broader system that supports student growth every step of the way.

This report suggests that improving math will require reintroducing and modernizing some reforms that were showing progress a decade ago: namely, holding schools accountable for performance and ensuring that quality teachers lead classes. Coherent, evidence-backed instruction is key, as are policies that specifically support high-risk students and promote open access to advanced coursework.

Emerging innovations can also help systems reach more struggling math students, including new AI-powered tools, inventive approaches to staffing, and real-time information for parents about their children's math skills. In the end, the key will be a commitment to plug the holes in America's leaking math pipeline so that far more students develop mastery of the basics, access upper-level courses and in-demand careers, and confidently navigate adult life.

We cannot afford to wait. Math is not just a school subject—it is a foundation for economic mobility, civic engagement, and global competitiveness.

The solutions are in reach. The question is whether we will act on them. Let 2025 be the year we treat math education as a solvable equation—and commit to guaranteeing success for every student.

Fast Facts

Academic recovery remains incomplete.

92%

Public school leaders who share concern about academic recovery.

K-12 Dive

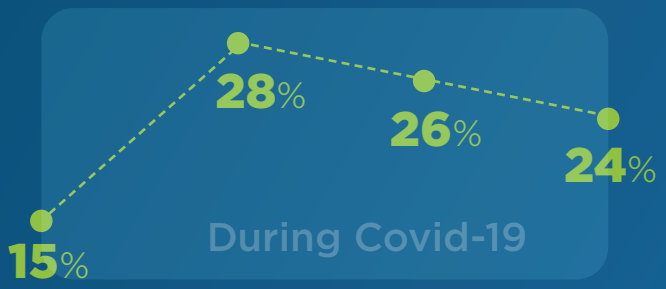
~75%

Percent of college faculty who say current students are less prepared in critical thinking, reading, and analysis compared to pre-Covid students.

College Board

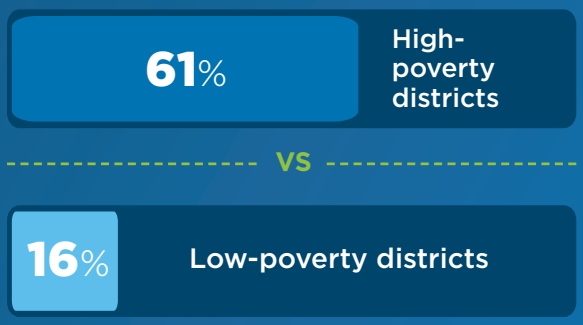
Too many vulnerable students have disengaged from school.

K-12 STUDENTS CHRONICALLY ABSENT DURING COVID



Return2Learn

DISTRICTS REPORTING HIGH OR EXTREME LEVELS OF CHRONIC ABSENTEEISM



RAND

Young people continue to struggle with mental health.

40%

High schoolers in 2023 who reported persistent sadness or hopelessness

20%

High schoolers who seriously considered suicide

~10%

High schoolers who attempted suicide

DHHS CDC

3x

Likelihood that parents of chronically absent children report behavior or mental health issues.

USC

The pandemic accelerated a preexisting decline in math performance.

2013

Year math scores began to fall nationally.

-11pt

2013-24 decrease in NAEP 8th-grade math scores

+9%

2012-22 Increase in the proportion of students experiencing math anxiety

In 2024, NAEP 12th-grade math scores were the lowest recorded since the current assessment began in 2005.

NAEP Nation's Report Card

EdWeek

Almost no one is immune.

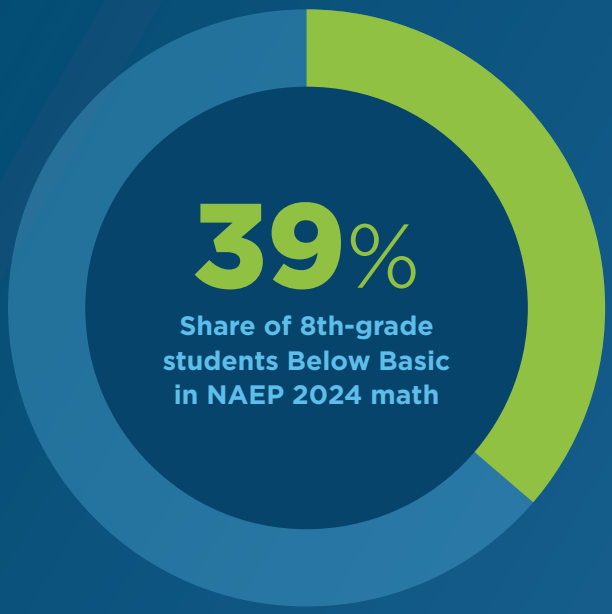
Scores declined between 2019 and 2024 for all but the highest-performing students at the 90th percentile (NAEP).

Students today aren't getting the math learning opportunities they deserve.

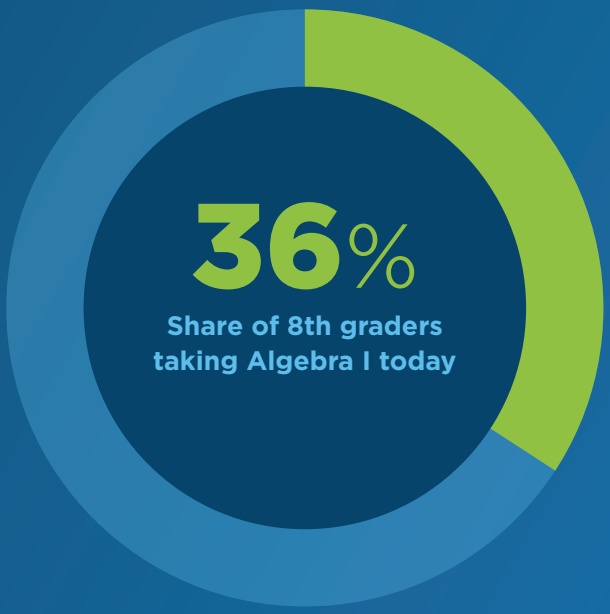
80%+

Portion of US students who attend school in districts that haven't fully recovered academically in math post-pandemic

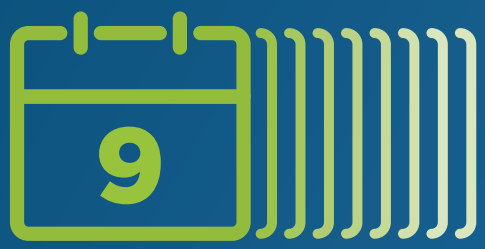
Education Recovery Scorecard



Nations Report Card



EdResearch for Action



Additional schooling time required for 8th graders in 2024 to reach pre-pandemic achievement levels in math

An estimated 33% of 12th graders were academically prepared for college in mathematics in 2024, down from 37% in 2019 (NAEP).

NWEA

Disparities are deepening.

BY RACE

-2pts Decline in 4th-grade math scores between 2019 and 2024 for White students

-4pts Decline in 4th-grade math scores between 2019 and 2024 for Black and Hispanic students

NAEP

BY ACHIEVEMENT LEVEL

+4pts Change in math scores for US 4th-grade students at the 90th percentile, 2011–24

-12pts Change in math scores for US 4th-grade students at the 10th percentile, 2011–24

NAEP

BY FUTURE SUCCESS

Compared to students scoring Below Basic on NAEP 8th-grade math, students scoring in the Advanced category are...

4x more likely to attend college

30x more likely to complete a 4-year degree within 5 years

EducationNext

Gaps are becoming chasms. With declining scores for lower-performing students at the 10th and 25th percentiles, the achievement gap between the highest- and lowest-performing students continues to widen and was larger in 2024 than in all previous assessments.

NAEP

Parents and students aren't getting the truth about performance.

>40% Share of grades that are inflated

Crescendo Education Group

89% Share of parents who believe their child is on grade level in math based on report cards

Learning Heroes

39% Share of students who are performing at Proficient or above in NAEP 4th-grade math

Nations Report Card

Teachers aren't getting enough training and support to teach math effectively.

55%

Share of middle school math teachers without a math or math education degree

US DOE NCES

-36%

Change in the number of math teachers graduating between 2012–13 and 2019–20

CRPE

40+DC

Number of states with laws designed to improve reading instruction and outcomes

EducationWeek

EdWeekMarket Brief

13+DC

Number of states with laws designed to improve math instruction and outcomes

Alexander Kurz, "Navigating the Math Wars: A Practical Guide to the Divides and Debates Influencing Math Instruction" (forthcoming, Center on Reinventing Public Education, 2025).

I. Situation Report:

2025 STATE OF THE STUDENT

March 2025 marked five years since the start of the Covid-19 pandemic, sparking widespread reflection. CRPE marked the occasion with two papers.

One took stock of the lessons our researchers have documented and synthesized over the past five years; the other considered what those lessons imply for a path forward.

> *Five years after the pandemic disrupted education, public schools are still struggling to recover. Achievement gaps have widened, student performance is in decline, and many schools have reverted to an outdated, ineffective system that fails to meet today's challenges.*
>
> *Instead of leveraging innovative solutions that emerged during the pandemic—such as personalized learning models, microschools and learning pods, and community-led initiatives—education leaders defaulted to pre-pandemic norms. Funding was misallocated, bureaucracy stifled adaptability, and political battles over school closures and safety measures overshadowed the need for long-term systemic reform. The result? A generation of students is falling further behind, and public confidence in education is eroding.*

Also released in 2025, the 2024 National Assessment of Education Progress (NAEP) results exposed that achievement of the lowest-quartile students is in a free fall. This impact is also compounding, especially for students with disabilities and other vulnerable populations. These declines underscore a profound, long-standing truth about hard-wired inequities in the American education system: opportunities to learn, including access to quality teachers, are unequally distributed.

The State of the American Student in 2025 is—once again—dire. The data reveals trends that will have profound and lasting impacts on students' lives and the US economy for years to come.

These results were a wake-up call for those who had held out hope that pandemic recovery rates would dramatically improve without the dramatic course correction we've long called for.

The same month those NAEP results were released, Americans saw the beginning of a sharp realignment of the federal role in education. The Trump administration's dramatic entry into public education—slashing personnel and programs at the Department of Education—claimed a desire to address broken aspects of American education. But the administration so far has no evident approach to fixing them.

The State of the American Student in 2025 is—once again—dire. The data reveals trends that will have profound and lasting impacts on students' lives and the US economy for years to come.

Where Do We Go from Here?

Fortunately, the future is not set in stone. Progress is possible.

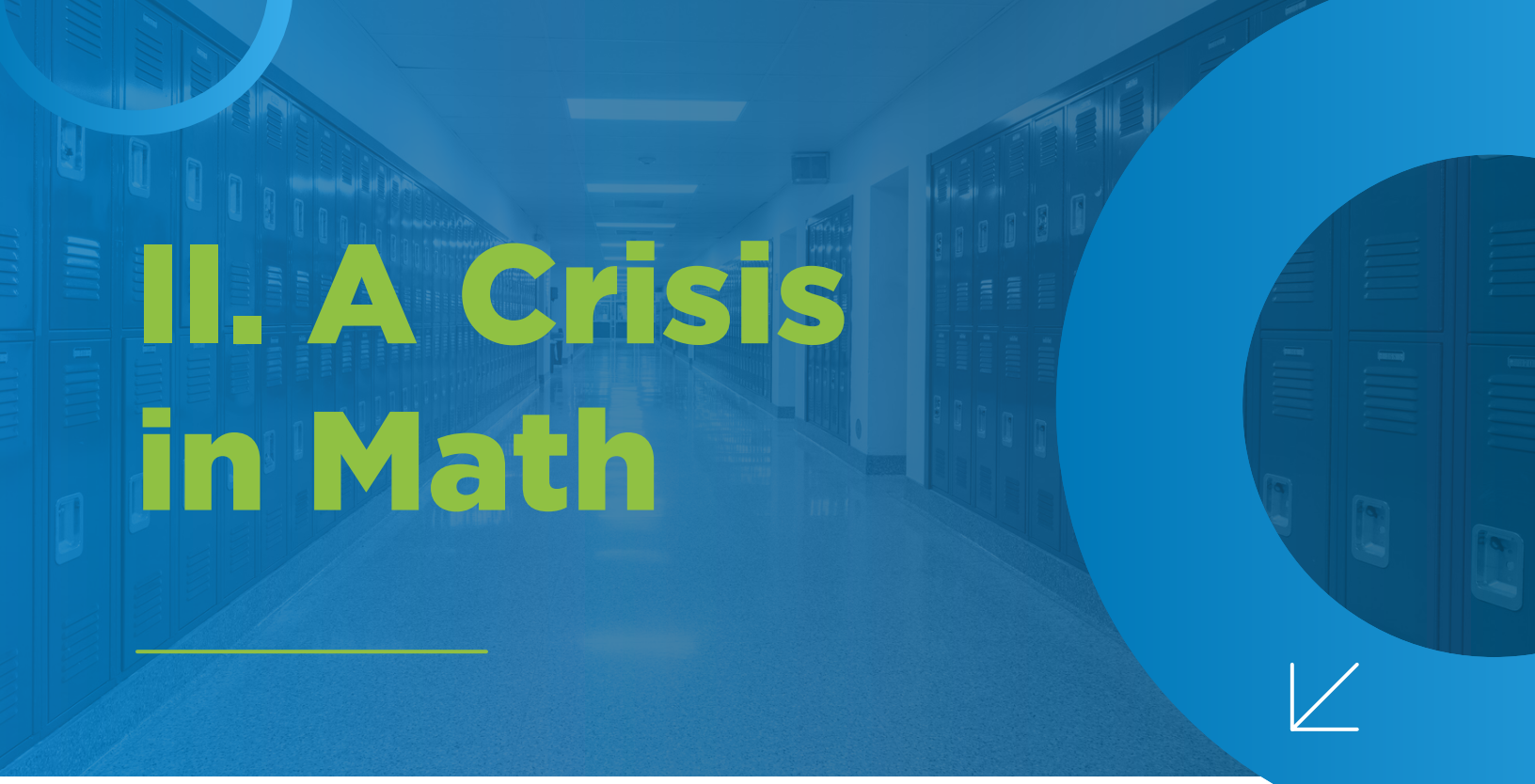
> ***"Roughly one third of the students whose K–12 careers were upended by the pandemic have since moved on to college or careers, often without being given the opportunity to make up for the learning they missed in high school. That's a national shame. But it is not too late for us to do right by the 35 million students following in their footsteps. The only question is whether we will do so."***
>
> *—Martin West, professor, Harvard Graduate School of Education (via Education Next)*

The 2024 NAEP showed glimmers of hope, with average fourth-grade math scores showing signs of recovery for the first time since the pandemic. It also revealed where states and districts are bucking the national trends and helping students regain what they lost through a steadfast commitment to evidence-based, strategic reforms.

And while new federal policies promise disruption, they also crack open opportunities to make long-needed changes. Burning everything down without a plan to fix it won't help. But neither will protecting the status quo nor turning our eyes away. Leadership and action are urgently needed to identify effective new policies and implement them, even if they are controversial.

We have much to learn from creative solutions on the periphery about the potential to leapfrog seemingly intractable problems. Innovative staffing models, leveraging community organizations, and technology-enabled math programs are just a few examples.

In this year's State of the American Student, we picked one topic—math achievement—and went deep to understand the problem, unpack what's behind it, and chart a bold and viable path forward.



II. A Crisis in Math

We focused this year's report on math for two reasons.

First, math is highly sensitive to the quality of instruction in schools—maybe even more than reading, as evidenced by the steeper drop and quicker rebound in math scores after school closures. Math achievement is a powerful indicator of how effectively schools are managing factors within their control. If schools are getting math right, there's a good chance they have adequately prepared teachers who are delivering effective instruction based on a coherent, well-designed curriculum.

Second, math is a subject that bears heavily on the future of America's economic prosperity. At the national level, math achievement is associated with innovation and economic growth. An analysis of global reading, math, and science results, for example, found that a country's math achievement was more positively associated with indicators of innovation, such as new patents, than performance in the other subjects.

The dismal state of national math achievement will hinder current students' adult lives and well-being. Improving math scores is associated with increases in adult earnings. Performance in high school math can heavily influence a student's economic prospects, regardless of what they wind up doing after graduation. The jobs of the future will require all workers to regularly develop new skills, which can't happen without a strong foundation in math. Math occupations, like data science, which gleans insights from big data, are outstripping the rest of the job market and commanding more than double the median wages.

> *"This is an all-hands-on-deck moment for education. … Our challenge isn't just to get back to normal; it's to reverse decades of deterioration."*
>
> *—Jared Polis, Colorado Governor and National Governors' Association Chair (via National Governors' Association)*

Raising American students' math skills is both crucial and urgent, and schools hold the keys to high-quality instruction. But schools' ability to deliver it is hobbled by an education system in which low expectations and grade inflation are flourishing, and ideological fights impede effective instruction from reaching struggling students.

To reverse America's math crisis, we must first understand it. The steep learning losses triggered by Covid-19 were not a disruption to a well-functioning system. Simply hoping math learning will improve over time is not only naive, it's educational malpractice. Governors, state leaders, and district administrators must be clear-eyed about the systemic issues that have contributed to more than a decade of stagnation and decline in math achievement.

Simply hoping math learning will improve over time is not only naive, it's educational malpractice.

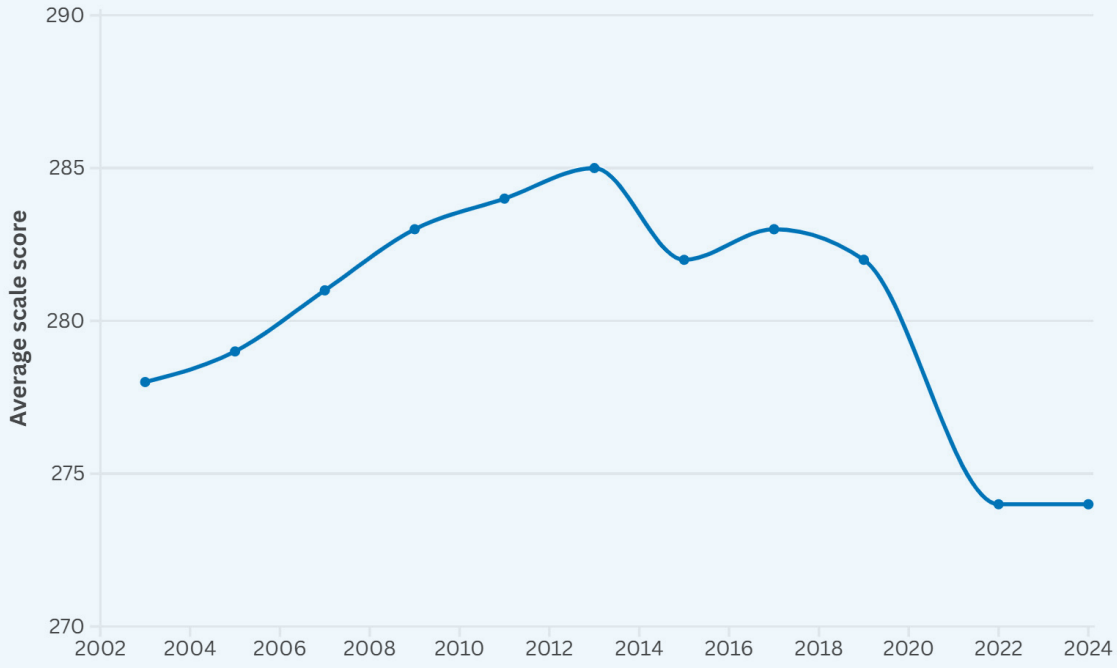
From Plateau to Plunge

Math declines began years before the pandemic. After years of modest but steady gains through the early 2000s, math achievement as measured by NAEP began to plateau in 2013 and decline in 2015. As Figure 1 shows, 2013 marked the end of a period of slow but sustained progress and the beginning of what quickly became a steep decline. Then came the drop: Eighth-grade math scores fell more than ever before in 2022. And the 2024 results show no meaningful recovery.

Figure 1
Math scores were improving until 2013, then stagnated and fell

Change in NAEP 8th-grade math scores relative to 2013

The Bottom Is Falling Out



Source: NAEP

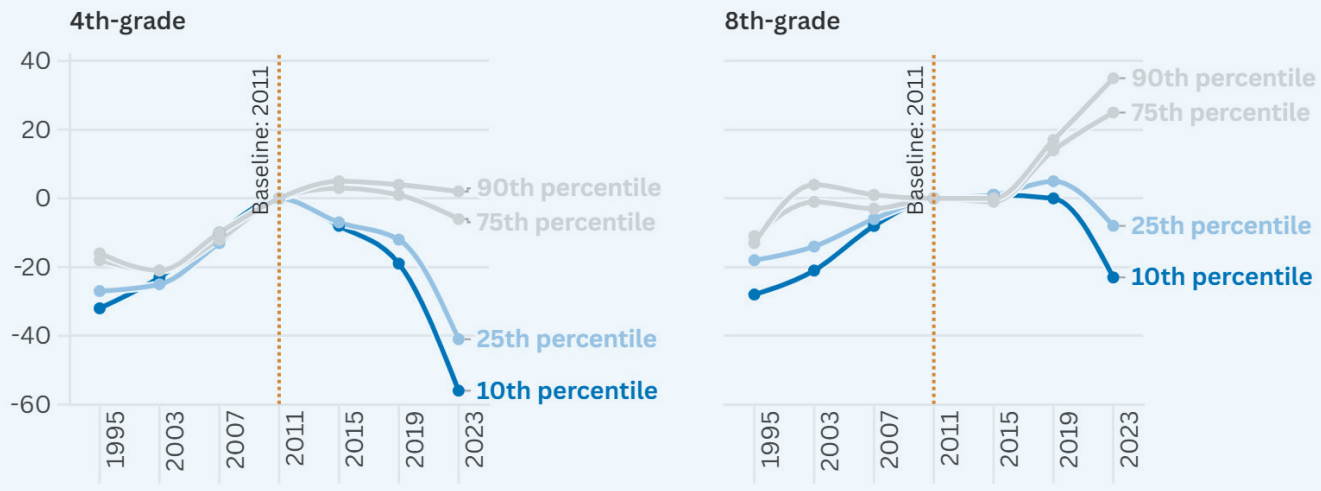
Students across subgroup categories saw math gains in the early 2000s, but the math decline since then has been unevenly distributed. On NAEP scores, gaps between the highest and lowest performers began growing noticeably in 2017. Higher-achieving students began to rebound after the pandemic in 2024, but the lowest-performing students—those in the 10th and 25th percentiles—suffered the steepest and most enduring declines. The Trends in International Mathematics and Science Study (TIMSS), an international math and science study, tells a similar story. US fourth graders in the top 90th percentile lost little ground between 2019 and 2023. But as Figure 2 shows, those in the bottom quartile fell precipitously, continuing a decline that began more than a decade ago.

"When we limit access to the power of math to a select few, we limit our progress as a society."

—Vicki Abeles, director of Counted Out, a documentary exploring the intersection of mathematics, civil rights, and democracy (via NYT)

Figure 2
The lowest-performing students' math scores have plummeted since the early 2010s

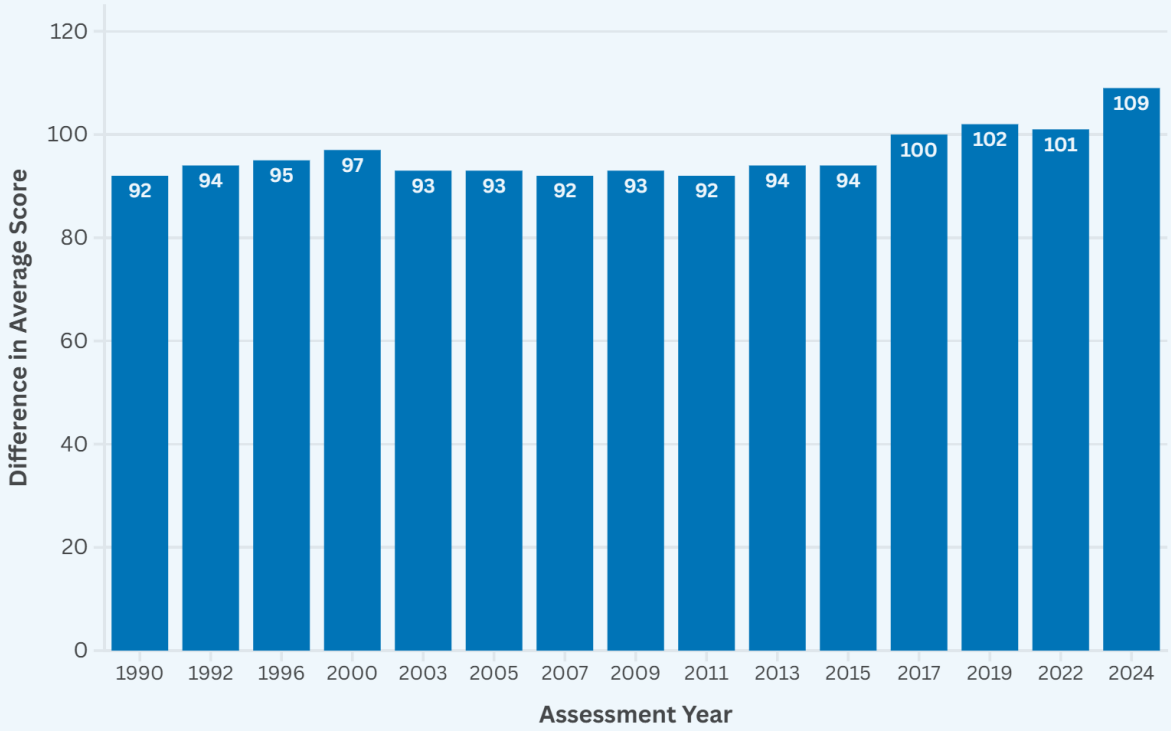
US TIMSS Scores Relative to 2011: 1995-2023



Source: TIMSS

The range of math learning needs is now wider than at any other time on record. Figure 3 shows that since 1990, the gap between the highest- and lowest-scoring students on NAEP has grown 18% wider (from 92 to 109) among eighth graders. Among fourth graders, it has grown more than 8.5% wider.

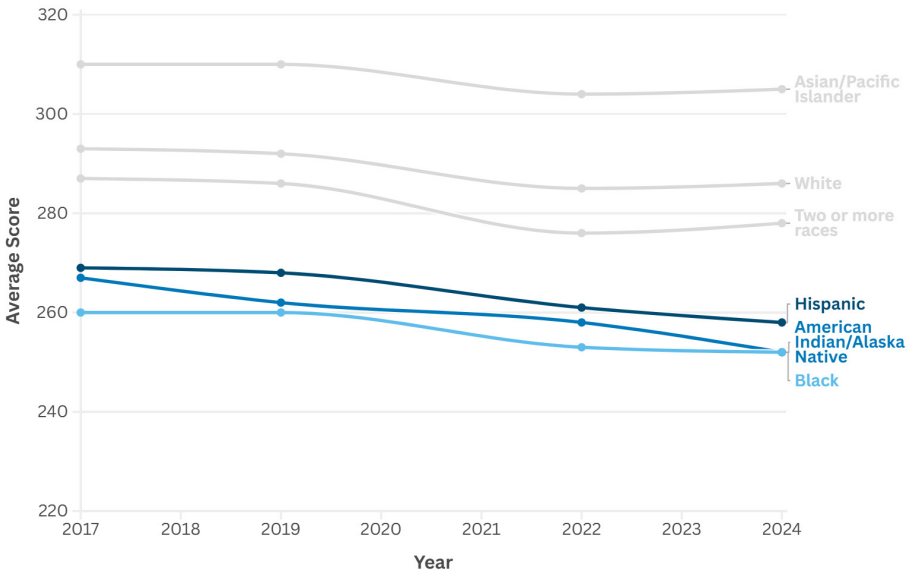
Figure 3
The range of NAEP math scores is wider than at any other time on record
Difference between 10th and 90th percentiles in NAEP 8th-grade math, by year



Source: NAEP

Figure 4A
The most vulnerable students are not recovering from pandemic losses

Average scores on NAEP 8th-grade math by **race** since 2017



Source: NAEP

Growing achievement gaps exist in virtually every community in America, with disproportionate losses for already vulnerable students whose math scores have persistently lagged. As Figure 4 shows, significant subgroups of students, including girls, students with disabilities, students learning English, and Black, Indigenous, and Latine students, began to see performance declines in 2013 and have continued to lose ground since the pandemic. The low baseline scores for some of these groups make the ongoing losses especially devastating: for example, on the 2024 NAEP, over half of fourth graders with a disability and three quarters of eight graders with a disability scored Below Basic. In comparison, students not in these subgroups still saw steep pandemic losses but have begun recovering since then.

Figure 4B
The most vulnerable students are not recovering from pandemic losses
Average scores on NAEP 8th-grade math by **EL status** since 2017

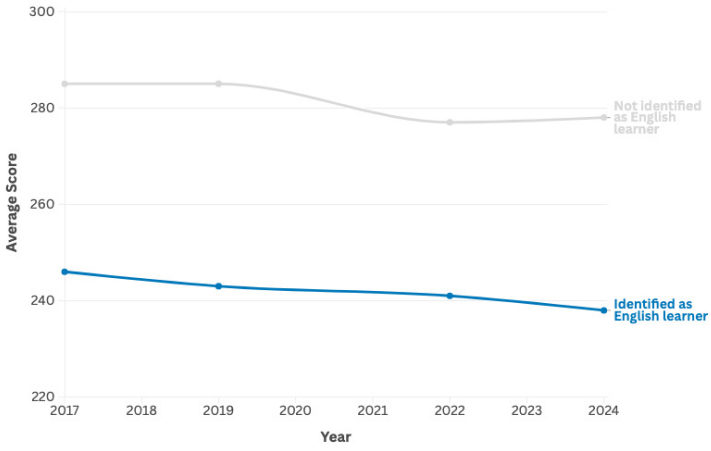


Figure 4C
The most vulnerable students are not recovering from pandemic losses
Average scores on NAEP 8th-grade math by **SPED status** since 2017

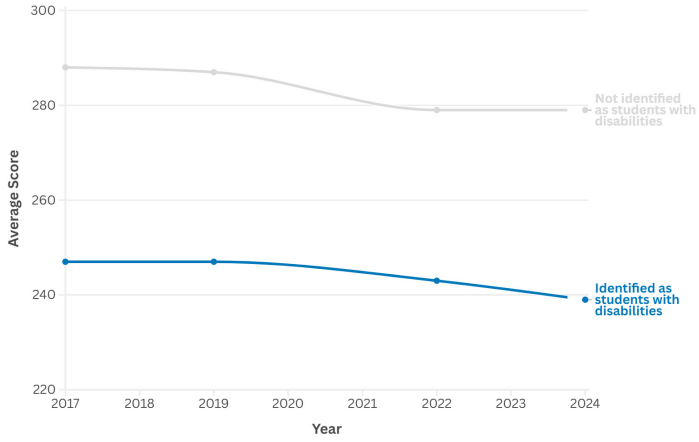


Figure 4D
The most vulnerable students are not recovering from pandemic losses
Average scores on NAEP 8th-grade math by **economic disadvantage** since 2017

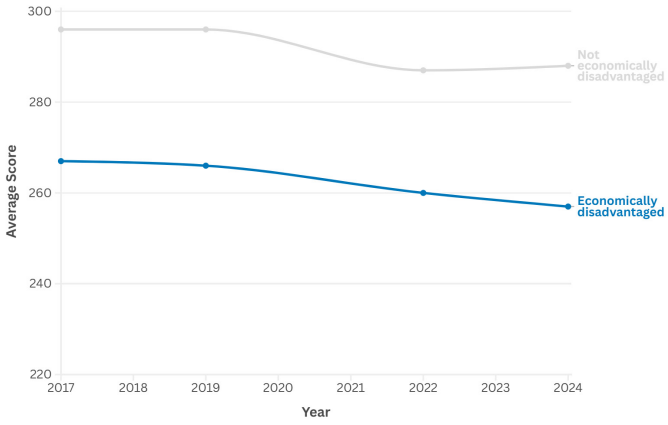
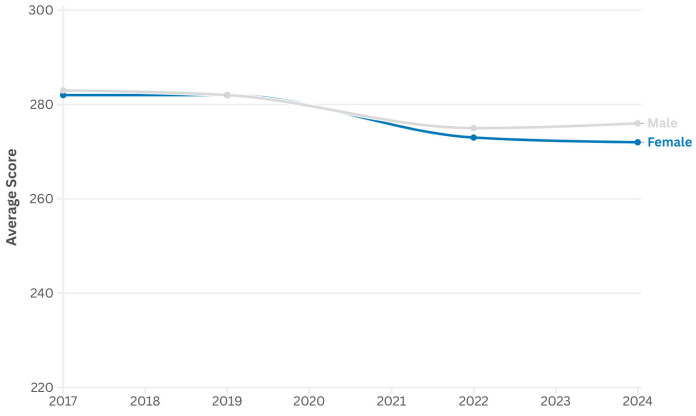


Figure 4E
The most vulnerable students are not recovering from pandemic losses
Average scores on NAEP 8th-grade math by **sex** since 2017



Source: NAEP

States Are Obscuring the Problem

The federal Every Student Succeeds Act (ESSA) explicitly "requires every state to develop a concise and easily understandable" report card that lives online. As our research showed last year, very few states meet the mark. The same is true when it comes to reporting math outcomes.

While NAEP, TIMSS, and other national scores paint a clear picture, many states are obscuring data about student performance and opportunity that people need to know about—especially for different groups of students.

We reviewed each state's primary report card for information about math performance and opportunity, as well as for the report card's user-friendliness and accessibility.[1]

Performance: Many states miss the basics. Only 18 states met the unambitious bar of breaking math achievement and growth data down by student subgroup in a way that we thought was clear and understandable. For instance, 13 states still do not report *any* measure of mathematics achievement growth on school report cards; other states report growth measures in forms like Z-scores that we think most parents won't be able to understand.

Opportunity: Nearly a blank page. Opportunities matter as much as outcomes. We looked for data in state report cards on algebra success and advanced course-taking—37 states had neither measure. Given that educational leaders often decry an excessive focus on test-based outcomes, we were surprised that so few states have included additional measures of student access and opportunity to learn math. When states do report opportunity measures, they are often in composite indexes that add up multiple (often five or more) opportunity measures, rather than breaking them out in a useful way.

Accessibility: Still too hard to use. Parents shouldn't need a manual to navigate school math data, but most report cards don't make finding information easy. Just eight states had readily accessible report cards with clear data and the capacity to compare schools. Parent-friendly user guides ranged from nonexistent to 20-page-plus PDF glossaries. But regardless of format, very few were helpful for the average user.

Of the 50 states, only Illinois earned the maximum possible points by providing comprehensive math performance and opportunity data that our reviewers thought most parents would be able to use and understand.

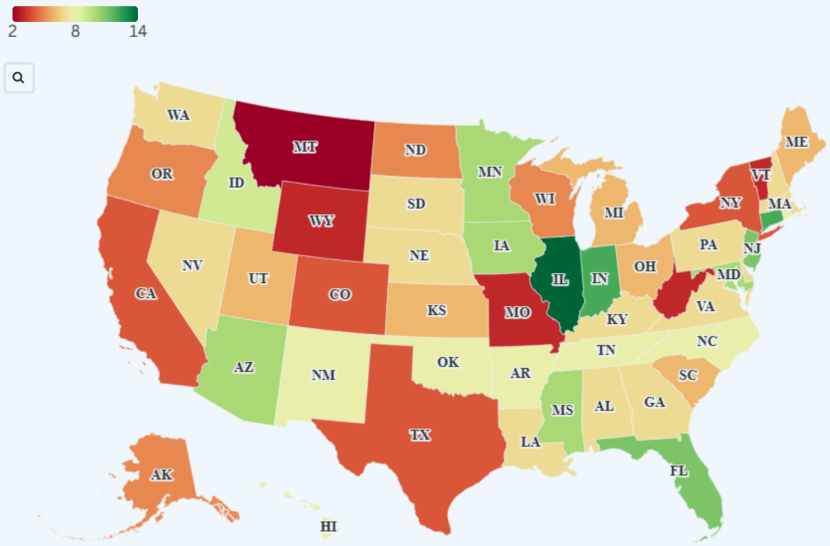
"Me and one of my friends, we didn't even do the math final project. It just ended up getting passed. I didn't really learn anything those last couple months."

—Recent high school graduate, RI, 2023 (via CRPE)

1. We scored each report card in three domains across seven indicators: math performance (subgroup data and growth), math opportunity (algebra success and advanced coursework), and accessibility (ease of finding, interpreting, and comparing data). Each indicator was scored from 0 to 2, for a total of 14 possible points. Zero indicated something was impossible to do/find for our team, 2 indicated something was easy to find and interpret, and 1 indicated anything in between.

Figure 5
Few states provide transparent information on math performance and opportunities

Points earned in an analysis of state report cards for seven math performance and opportunity indicators, by state



Source: CRPE analysis • For each state report card, we scored seven indicators on a scale of zero to two, for a total of 14 possible points. Zero points meant that the indicator was impossible to find and interpret, two points meant that the indicator was easy to find and interpret, and one point meant anything in between.

Source: CRPE analysis

Educators, policymakers, and families can't respond to gaps in learning or opportunity if they can't see them. Transparent and user-friendly report cards are a basic but essential tool—and right now, too many states are falling short.

Students Speak: "I Don't Understand This"

The numbers tell one story. Students tell another.

From others' research and our own, we collected countless stories revealing not just the scope of the academic crisis, but its emotional and psychological toll.[2]

Too many students describe teachers who undermine their enthusiasm and derail their progress. If teachers don't encourage their learning and welcome their questions, students don't feel supported to learn.

> ***"One thing I don't like is when I ask a teacher a question because I don't understand it, and then they make me feel like I'm a bother and I really shouldn't ask more questions. And that prevents me from learning. And I hated that because I actually want to know."***
>
> *—Junior student, CT, 2022 (via CRPE)*

> ***"I never ask for help because I am shy and don't want to be wrong."***
>
> *—Black male student, NY, 2024 (via Math Narrative Project)*

> *"I really struggled when it came to higher-level algebra because I just didn't know anything."*
>
> *—Student quoted in Associated Press, 2023*

2. These student quotes were drawn from three sources: 1) CRPE's own research in New England high schools in 2022–23; 2) A youth-led focus group on culturally responsive and sustaining math education hosted by BUILD in 2022; and 3) interviews and focus groups from the Math Narrative project on how to improve students' experiences in math in 2024.

Confidence in math is fragile—and once lost, it's hard to regain. This is especially true for more reserved students or those who don't see themselves as "math people," most of whom decide this about themselves by the end of elementary school.

> ***"When I think about math, I feel anxious, nervous, and honestly, I don't really like it, and I think this is because … from a young age, I just felt dumb or just super slow compared to the rest of my classmates."***
>
> *—Hispanic female student, 2024 (via Math Narrative Project)*

Students' emotions and attitudes toward math are central to math success because they directly affect student engagement, achievement, and future opportunities. When a student is afraid of math or convinced they "just can't do it," they are less likely to participate in class, practice essential skills, or enroll in advanced courses. Teachers can exacerbate that anxiety.

> ***"I get anxious when asking questions in class because I don't want to look stupid … and math is one of my tougher classes to learn."***
>
> *—Hispanic male student, TX, 2024 (via Math Narrative Project)*

However, unsupportive teachers fueling student anxiety doesn't account for the scale of America's math crisis. This issue is likely one symptom of far more systemic problems. Here are those problems—in students' own words.

- **Low expectations.** Especially in the wake of the pandemic, schools confronted students' academic struggles and demotivation by making math easier—exactly the opposite reaction to what students needed.
- **Lack of access to qualified teachers and effective instruction.** Some students reported a wholesale lack of instruction as a barrier to their learning. Students cannot learn if they don't have skilled teachers. Students attending high-needs, high-poverty schools are more likely to have newer and inexperienced teachers, which can lead to further learning difficulties.
- **A system designed to let students fall through the cracks**. Schools are not designed to catch gaps and address them in real time. In an era when student absenteeism is a chronic and persistent problem, students who miss foundational instruction rarely have a chance to make it up.

> *"We just don't have a teacher, and we just keep having subs. We literally teach ourselves. We have to teach ourselves … in a certain time before it gets off to the next thing."*
>
> *—Latine female student, CA, 2024 (via Math Narrative Project)*

These explanations for the math crisis go far deeper than just "Math makes me nervous" or "I had a teacher who didn't like me."

When students have positive math experiences, it sounds—predictably—like a function of teachers they like and learning they're confident about. Excellent math teachers and math instruction exist throughout this country. Most readers can recall a teacher who found creative ways to reach students, build confidence, and help students excel in and love the world of math.

> ***"My geometry teacher, I really like her. She makes sure to explain everything, so she makes sure that everyone is comfortable to ask questions. She says, 'You could even ask me privately' for the people who are shy to talk in front of the class, and I like that. The teachers who just give you answers, those teachers really bother me. I'm asking you for help. Not the answer."***
>
> *—Asian American/Pacific Islander female student, TX, 2024 (via Math Narrative Project)*

> ***"[My teacher] is just the most kind-hearted woman to ever exist. She just knows us. I had her my freshman year as well, so it's like she had me freshman year and senior year, so it's like a full circle almost. I feel a level of comfortability in her class that I don't feel anywhere else, because I'm not very good at math. I'm okay, but I'm not the biggest mathematician out of the school, and she just makes it feel so comfortable [to] ask questions. I'm not afraid to mess up."***
>
> *—Junior student, CT, 2022 (via CRPE)*

These students' positive experiences must be made the norm across our nation, not a function of chance. After all, research shows that one of the best ways to prevent math anxiety is good instruction that solidifies foundational skills. And high expectations coupled with attentive teacher support are the best things schools can do to ensure students who are quiet or anxious about math do not fall through the cracks.

Students want to succeed in math. In the youth-led focus group hosted by BUILD in 2022, students reflected on what it felt like to be in math class. Two of the feelings students described most were "nervous" and "anxious." How do they want to feel? "Productive," "intelligent," and unashamed: "I want to feel like I am untouchable and shameless," one participant said.

"When I finally get a math problem that I've been struggling with correct, I feel like I've conquered the world."

—Hispanic female student, 2024 (via Math Narrative Project)

The Leaky Pipeline

Why has math proven so vulnerable?

Math learning is "ruthlessly cumulative," as MIT professor Steven Pinker once said. To learn more advanced concepts, a student must first learn more basic ones, and a student showing skill gaps needs more support before tackling advanced concepts.

Unfortunately, gaps begin early. Girls begin falling behind boys within the first four months of the first year of school. And since the pandemic, students are *entering* school further behind and failing to catch up. Left unaddressed, their missing foundational skills will prevent them from advancing to high levels of math achievement. The recent i-Ready math performance data shows all tested students (K-4) continuing to fall further behind pre-pandemic test-takers.

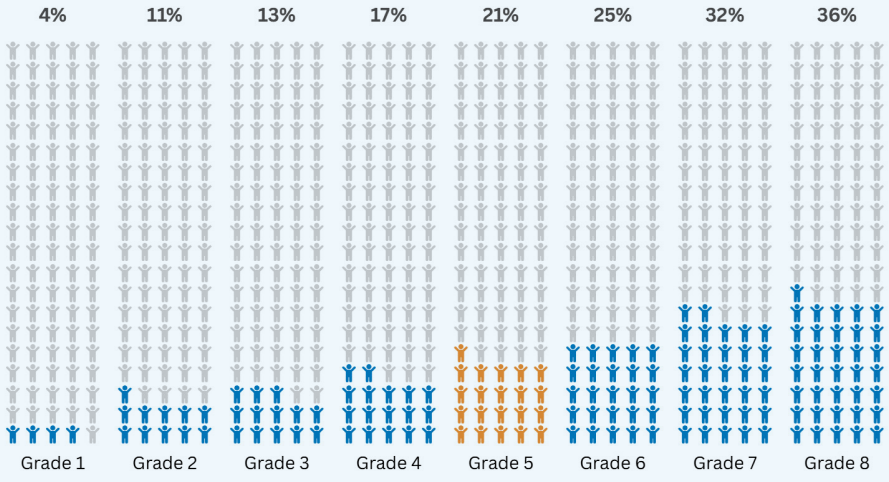
The gaps that emerge don't just sit still—they grow. Each year adds more complexity, and early struggles compound. Harvard's Martin West compared it to skipped retirement savings: missing a deposit doesn't just create a temporary shortfall—it costs future interest too. Likewise, missing foundational math instruction creates gaps, but also makes the learning of new math concepts and skills more difficult.

We heard this from "Nora," a student who was sick at home when her class covered multistep subtraction. She then missed more days (and other lessons) because she was avoiding exams and assignments that she couldn't do. Nora had previously considered herself a strong math student, but she began to struggle, and her math grades fell. It took two full years, and home re-teaching by her father and a tutor, before she fully caught up. But she is now less confident in her math abilities and has less interest in pursuing a math- or science-related career. Multiply that story by millions, and the scale of the crisis becomes clear.

> *"Doing nothing is going backward."*
>
> *—Scott Peters of NWEA, quoted in EdSurge, 2024*

Figure 6
On i-Ready tests, a fifth of all math students are below grade level by grade five

Students below grade level by year in mathematics



Source: Curriculum Associates via Hechinger Report, August 19, 2024

Left unaddressed, small gaps in math skills in the early grades can have significant consequences in middle and high school. Algebra I is often called the "gateway to higher-level math," but a TNTP report found that about half of students taking Algebra I arrived knowing only one-third of the concepts and skills they would need to be successful—and these students rarely met expectations for grade-level performance on state tests.

Middle school math-tracking acts as math predestination, putting some students on a track to take Algebra I in eighth grade or earlier. Students who wait until high school to take algebra have less academic success and limited opportunities to take advanced courses before graduating, which limits their college and career options. Less-advantaged students are less likely to be placed in advanced math courses, even when they demonstrate readiness. High schools with many students from low-income families or a high proportion of students of color are less likely even to offer advanced mathematics courses. This affects a significant number of students. On the 2024 NAEP, only 35% of eighth graders were in Algebra I or above, and most of those were the highest-performing students.

High school graduates are increasingly unprepared for college and career. Even students attending elite colleges are part of this trend: Harvard University recently created its first-ever math remediation course.

This is the pernicious **leaky pipeline**. At every juncture of the journey to high-level math success, students are at risk of slipping away due to inconsistent or low-quality instruction, missed content, lack of intervention, and lack of opportunity to move up to more rigorous courses.

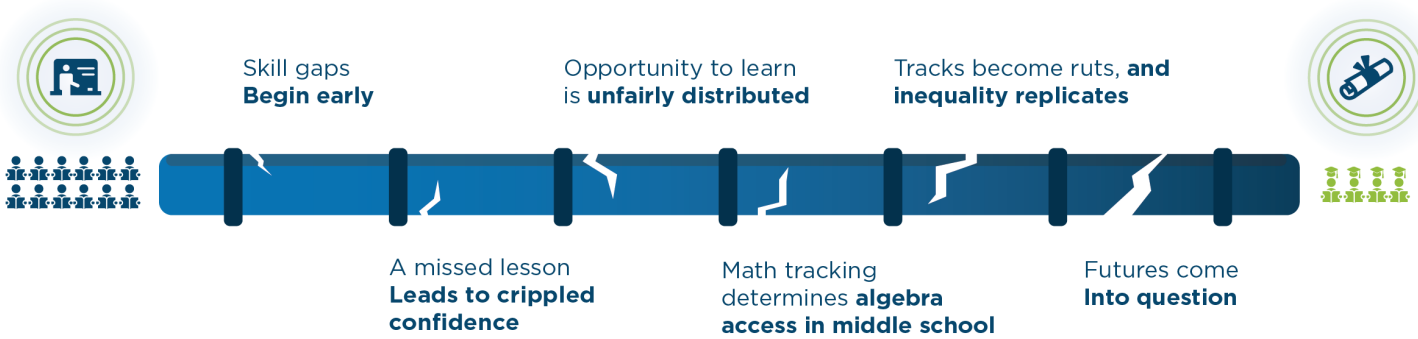
Fast Fact

Students who score in the Advanced category in NAEP eighth-grade math are:

4x more likely to attend college

30x more likely to complete a 4-year degree

within five years than their peers who score Below Basic.



It is no wonder there are so many students struggling in math, and no wonder the gaps continue to grow. The pipeline to math success desperately needs to be fixed. Tutoring and short, frequent assessments that flag which students are falling behind can keep math learning on track. But right now, these interventions are not implemented at anything close to the scale needed.

American Competitiveness at Stake

> ***"The dwindling of the middle is something that distinguishes the United States."***
> *—Peggy Carr, commissioner, NCES (2024)*

As each successive graduating class of US students has continued to fare worse in math, their ability to compete for jobs that depend on computational and conceptual math knowledge—such as roles in data science, AI development, and other science and medical fields—is in greater jeopardy.

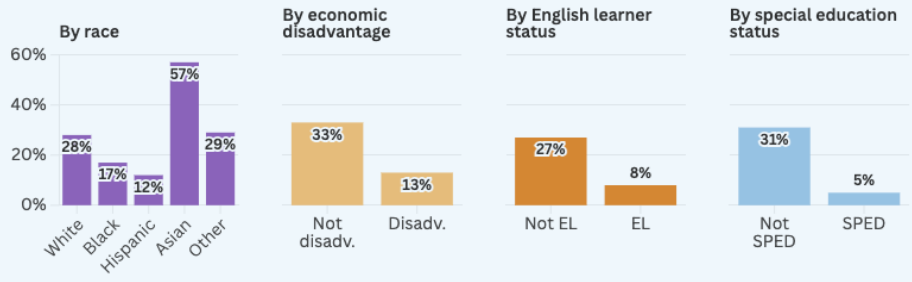
In the most recent TIMSS report, US eighth graders scored below most developed countries in math. Figure 9 shows that a full 19 other countries participating in the exam measurably outscored US students, including Australia, Lithuania, and Malta.

In Massachusetts, students taking advanced math are disproportionately more advantaged.

In Massachusetts, researchers examined over 4,000 distinct course-taking sequences across hundreds of math courses from 2014 to 2022. They found that calculus was accessible almost exclusively to those students who entered high school ready to take geometry or higher as their first math course. These students earned higher average grades, scored better on standardized tests, and failed fewer courses than their peers who had to start high school in Algebra I or lower. The calculus students were also disproportionately white, Asian, and economically advantaged, highlighting how early access to advanced coursework continues to reflect and reproduce societal inequalities. (CRPE commissioned the analysis with support from the Barr Foundation.)

Figure 7
Student taking advanced math courses in Massachusetts were disproportionately more advantaged

Percentage of MA students taking calculus by subgroup

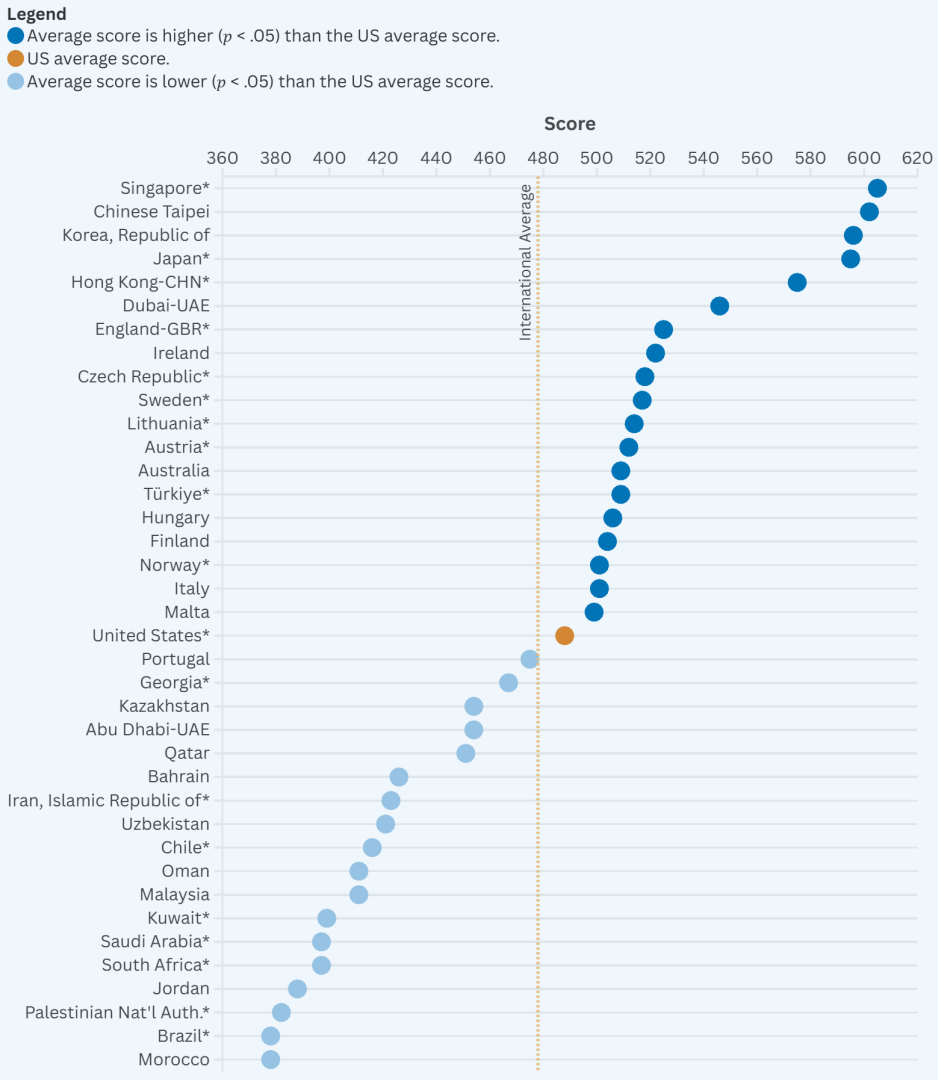


Source: Patrick Denice, associate professor, University of Western Ontario (article forthcoming)

But, interestingly, PISA scores show there is wide heterogeneity in US performance: the highest-achieving state, Massachusetts, achieved an average score similar to those of the UK and Australia (ranked about 16th), but the lowest-achieving state, New Mexico, performed comparably to Romania and Kazakhstan (approximately 45th). Progress is possible in the United States if states can learn from each other and enact research-based strategies. But first, we must understand what went wrong.

Figure 8
US 8th graders scored below those in most developed countries in math

Average scores and difference from the US average of 8th-grade students on the TIMSS mathematics scale, by education system: 2023



Source: TIMSS 2023

III. How We Got Here

America's math problem is complex, but its warning signs have been visible for years.

Our review of the evidence suggests that at least four policy trends are at play[3] in the math declines:

- Ongoing ideological fights — the "math wars" — trumping the evidence about math instruction;
- Weakened commitment to school-level accountability and high expectations;
- Declining access to quality math teachers; and
- A rigid and outdated instructional delivery system incapable of handling growing variation among learners.

"[System leaders] need better insights on what caused our depression [in education performance] and better ideas for reinvigorating instruction. We've all got a role to play."

—Tim Daly, Education Next

3. Nat Malkus's analysis for American Enterprise Institute shows that while various explanations could play a role for declining achievement in both math and reading, none provide a single, tidy explanation. The fact that US adult math and literacy proficiency are also declining means that in-school factors alone aren't fully explanatory. And the fact that the United States is unique among its peers for growing math achievement gaps also rules out global factors, like the Great Recession, as easy explanations.

The Math Wars

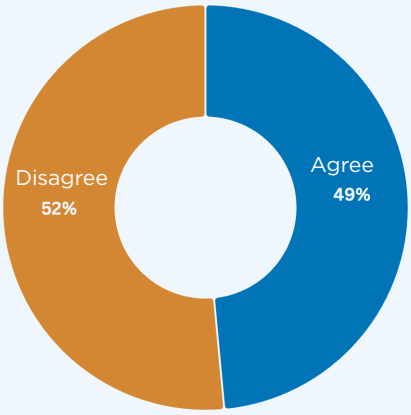
> ***"Both sides of the argument sometimes act as though there is no room for the other one in the same classroom, but this is simply not true."***
>
> *—Kristen Smith, math instructional coach, in Edutopia*

The math wars have been simmering for a century.[4] At the heart of the conflict are two visions of how math should be taught. On one side are "traditionalists" who emphasize math facts and fluency, and support teaching math procedures directly. In a lesson, teachers might show students how to add 1/2 and 1/4 on the board, then give them a worksheet with 20 similar problems to practice.

On the other side are "progressives" who emphasize a deeper understanding of mathematical ideas and support teaching students through problem-solving. Here, teachers might give students measuring cups and recipes, then ask them to figure out how much rice they need for two recipes requiring 1/2 and 1/4 cups of rice. The debate is still alive and well in American classrooms today: in a 2024 EdWeek poll, math teachers were almost evenly split.

Figure 9
Math teachers are divided on instructional approaches

Teacher responses to the statement: Students learn math and science best through procedures, not by solving big problems.



Source: EdWeek, May 30, 2024 Percentages do not add to 100% due to rounding.

The evidence shows that an either/or framing is misleading. Students need both conceptual understanding and procedural fluency, and—crucially—the two support each other. There's no evidence to show that teaching either procedures or problem-solving is exclusively "best." According to a summary of a recent peer-reviewed article, "Children learn most effectively when instruction follows an evidence-based cycle: grounding facts in conceptual understanding, using brief timed practice to make those facts automatic, then returning to discussion and reflection to deepen that knowledge."

4. Alexander Kurz, "Navigating the Math Wars," forthcoming.

A National Mathematics Advisory Panel sponsored by the US Department of Education came to the same conclusion in 2008:

> *High-quality research does not support the contention that instruction should be either entirely "student-centered" or "teacher-directed." Research indicates that some forms of particular instructional practices can have a positive impact under specified conditions.*

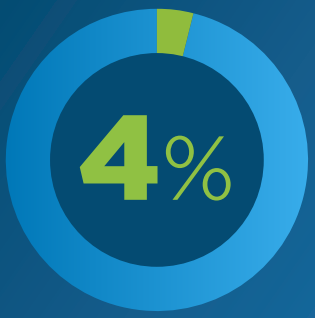
Nevertheless, researchers on both sides elevate their own evidence and discredit the other side. "This is more like a religious disagreement," policy expert Tom Loveless said. The polarization leaves little room for the balanced and specific guidance that teachers need to ensure that every student learns math.

Strong evidence for explicit instruction, in which teachers directly explain math concepts and procedures while also supporting deep thinking and student engagement, also exists. Explicit instruction is effective for all students, and it's essential for struggling students, whose math scores have fallen the most. But explicit instruction also aligns with ideas from the traditionalist side of the math wars, making it controversial when it shouldn't be. Advocates for progressive education worry that too much explicit instruction will stifle students' curiosity and appetite for deeper math understanding, so they dismiss it as an approach that should only be a last resort to patch skill gaps. However, according to special education and math researcher Amelia Malone, "These are not 'remedial' practices—they are hallmarks of excellent instruction."[5]

The disagreement isn't just among researchers, since many organizations that practitioners look to for guidance and curricula also lean toward one side or the other. Educators receive different guidance depending on which organizations they look to, which leads their instructional approaches to skew either traditionalist or progressive. No major math education organization is delivering unbiased guidance and helping educators navigate the confusion. In a recent example, the National Council of Teachers of Mathematics issued a joint statement with the Council for Exceptional Children that advised teachers on best practices for teaching math to students with disabilities, but left out high-evidence strategies like explicit teaching. The statement appears to have been influenced by progressive views on how to teach math, despite attempting to draw on all the evidence that exists.

The lack of unbiased guidance leaves teachers and school systems adrift, and has likely played a part in why math achievement gaps have grown since 2013. Although the Common Core State Standards call for a balanced approach to math instruction, they were often implemented (starting around 2012) with a bias toward conceptual understanding and more progressive teaching methods. While evaluating Common Core is nearly impossible due to varied implementation, some evidence suggests that it widened achievement gaps.

Fast Fact



of administrators report using the "science of math" extensively to guide their selection of math curriculum.

5. From an interview between CRPE researcher Chelsea Waite and Dr. Amelia Malone, March 26, 2025.

Moreover, widely used curriculum review tools like EdReports focus heavily on whether materials align with Common Core standards, but don't evaluate the strength of the instructional strategies themselves. As a result, some widely used curricula—like Singapore Math—don't pass muster for standards alignment despite having strong research backing, while others—like Illustrative Mathematics—are top-rated but still subject to concerns about inadequate practice time and supports for diverse learners. Meanwhile, according to an EdWeek Marketplace study, only 4% of administrators reported using the "science of math" (or the most substantial evidence about how to teach math) to guide their curriculum decisions. There is an urgent need for clarity among district decision-makers about what amounts to effective math instruction—standards-aligned or not.

The math wars echo the "reading wars" of past decades, but resolving them may be more difficult. The science of reading established that systematic phonics and phonemic awareness instruction were an essential component of effective reading instruction, and discredited ineffective methods like three-cueing. In math, progressives malign high-evidence strategies like explicit teaching—similar to phonics before the science of reading revolution—but unlike in reading, there's no widely implemented "wrong" approach taking their place.

The question is not which side in the math wars is right and which is wrong, but what is the right combination of evidence-based instructional strategies—including explicit instruction—that will ensure every student will develop procedural skills and conceptual understanding.[6] It's as if the two sides are arguing over sun exposure, with one side only pointing to skin cancer risks and the other only highlighting the benefits of Vitamin D.

The evidence on effective math instruction has yet to generate the policy and media excitement to match the science of reading discussion. A nationwide review found that school systems have been more focused on reading than on math. Reading has likely captured more attention (most notably through Emily Hanford's viral *Sold a Story* podcast and ensuing policy action) because of widespread agreement that students can and must learn to read; an easier scientific debate to resolve; emotional and policy urgency; and stronger public advocacy than math instruction. It's time for that to change.

Leadership is urgently needed to cut through the math wars and provide clear, unambiguous guidance to the field about what rigorous evidence does and does not support. Teachers and families too often are not aware of policies and practices that have failed to produce results, such as a pedagogical emphasis on "productive struggle" before explicit instruction or policies to automatically enroll more students in advanced math courses regardless of readiness.

Continued ambiguity is a recipe for continued educator confusion and harm to students.

6. As policy researcher Tom Loveless pointed out, despite the fact that Common Core standards call for teaching conceptual understanding, procedural fluency, and application with "equal intensity," research hasn't actually established the *equal* part. Researchers need to determine rigorous evidence for the balance of instructional approaches that students need in different circumstances.

How The Math Wars Played Out in Common Core Implementation

Around 2010, many districts seized the opportunity to modernize math instruction through the Common Core State Standards. The standards themselves called for teaching a balance of conceptual understanding and procedural skill, and they emphasized accuracy and recall. But in their rollout, experts emphasized conceptual understanding far more, and at the expense of procedural practice and recall. Teachers reported that they were assigning far fewer practice problems and asking students to explain their answers in multiple ways instead of relying on standard procedures. Many teachers were still learning the new approaches themselves, while parents, confused by unfamiliar strategies and diagrams in children's workbooks, were left unable to help.[7]

For students already behind, such shifts may have generated more confusion and delivered less of the practice and explicit instruction they needed. Research has shown small positive effects from Common Core on student achievement overall, but not for economically disadvantaged students struggling in math or for students with disabilities. The result is that an ambitious effort to raise academic expectations may have inadvertently contributed to widening achievement gaps. Teachers needed—and still need—more explicit instructional guidance that prioritizes evidence, not ideology, on what's best for students struggling in math.

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7. Common Core State Standards co-author Jason Zimba argued that "the teacher is there to explain the curriculum," though many teachers were still trying to understand it themselves. Given that research suggests even small amounts of "math talk" at home can boost understanding and performance, the sidelining of parents could have been a factor contributing to declining math skills.

Weakened Accountability and Lowered Expectations

> ***"Why would anyone want to lower standards? It's like telling everyone that they're a great swimmer when you know half of us really are drowning."***
>
> *—Pete Shulman, former deputy commissioner at the New Jersey Department of Education, in Free Press (2025)*

Over the past three decades, US education policy has swung from pursuing strong federal accountability to deference to states. The result is a post-pandemic era of lowered expectations, inflated grades, and obscured learning gaps.

The mid-90s saw the advent of the standards movement, in which most states—led by governors and business leaders—passed ambitious legislation to bring a greater focus on teacher quality and outcomes in public education. There were also efforts to increase school-level flexibility and supports—accompanied by heightened school-level accountability for results. At the same time, the charter school movement was promoting the idea of higher expectations and greater choice, especially for disadvantaged students.

The 2002 No Child Left Behind (NCLB) Act delivered a shock to public education through muscular federal accountability mandates. The law set the ambitious target of 100% student proficiency by 2013–14 and required schools to show "adequate yearly progress" for all students and subgroups. Research shows that NCLB drove gains in math, particularly for disadvantaged students and in states with previously weak systems. Around the same time, national foundations made significant investments in charter school expansion, especially in inner cities, and in alternative teacher preparation programs and policies.

The era of high expectations and accountability for results, however, had its fair share of unintended consequences and political backlash. Some states lowered standards to show better proficiency levels, and some schools concentrated support narrowly on "bubble students" near proficiency cutoffs. Teachers' unions saw charter schools and teacher quality initiatives as an existential threat. Parents, especially in the suburbs, got tired of the emphasis on testing.

The Covid-19 pandemic was the nail in the coffin for accountability. Still, states had for years been walking away from commitment to related reforms, including Common Core State Standards, charter schools, and provisions to ensure teacher quality. The timeline of widening achievement gaps and declining math scores roughly corresponds to the ebbing commitment to high standards and accountability.

In the years since the start of the pandemic, states have been lowering the threshold for proficiency on exams and ditching tests required for high school graduation. Democrat-led New York and Republican-led Oklahoma both reported improved proficiency rates in 2024 after lowering proficiency levels in 2023. In 2013, 24 states had a graduation exam or exit test; by 2025, only six did. The Trump administration has shown little commitment to a muscular federal role in accountability, cutting back on oversight and signaling a desire to "return" power to states.

In the same climate of weakened state accountability, grade inflation has soared. In Washington State, students' average math GPA jumped 0.34 points from 2019 to 2021—triple the increase of the prior eight years. In North Carolina, math proficiency dropped 11 points while A and B grades declined by only 3 points. A national study from 2021 to 2023 found that 57% of grades didn't align with student knowledge as measured by tests, and two-thirds of those misaligned grades were inflated, most often for underserved groups. ACT data show rising GPAs, especially in math, despite falling test scores. By 2021, even students scoring in the 25th percentile were graduating with B averages or better.

Fast Fact

The 2024 NAEP showed that

89%

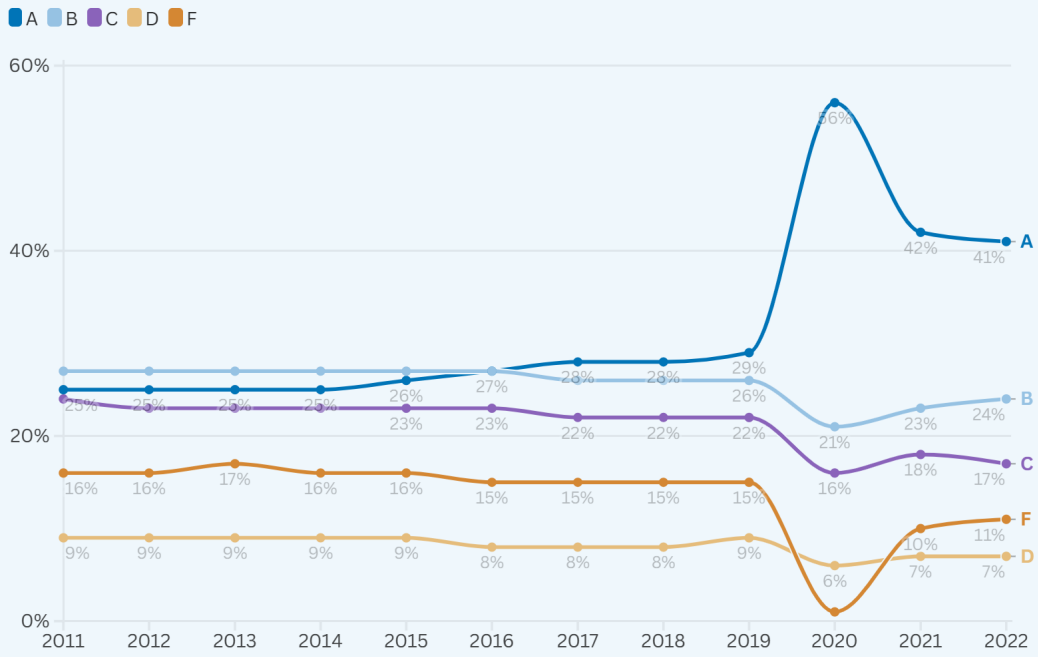
of parents believe their child is on grade level in math based on report cards. But actually, only

39%

of students are performing at proficient or above in 4th-grade math.

Figure 10
The pandemic promoted an explosion of grade inflation

Distribution of math grades A-F, 2011-22



Source: CALDER Center, 2023

Grade inflation has consequences. It masks fundamental skill gaps, misleads families, and can lower student motivation by suggesting that a decent grade is attainable without real effort. It also creates what one study called an "urgency gap." If families think their children are doing fine, they may be less likely to seek help, contributing to low participation in academic recovery efforts. Schools may miss key intervention moments, misallocate resources, or act too slowly to address learning gaps. Educators, in turn, inherit students with inflated transcripts but real skill deficits.

It is impossible to say how much the declines in math scores are related to lower expectations and a flagging commitment to adult accountability, but no serious analysis can dismiss the strong likelihood.

Declining Access to Qualified Math Teachers

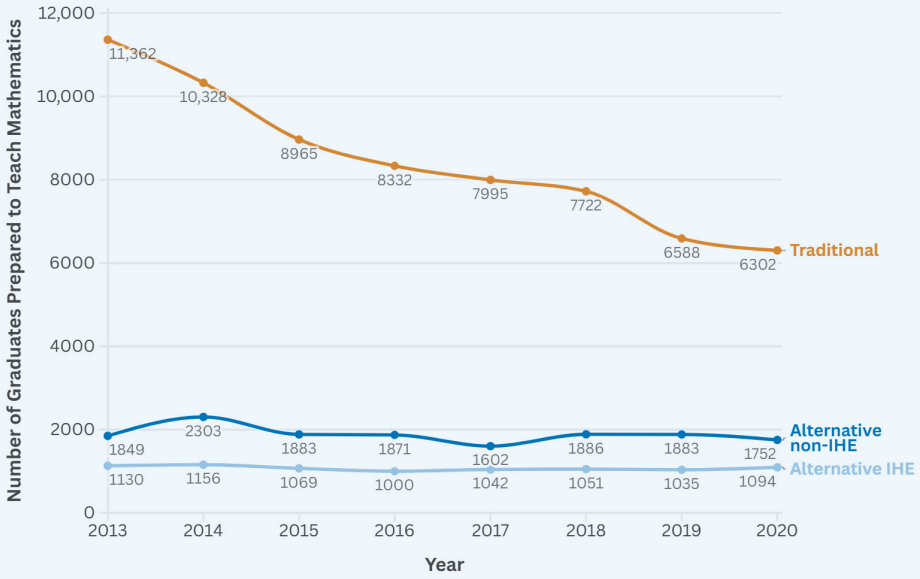
> ***"There is a persistent misconception that anyone with a high school diploma has the requisite math knowledge to teach elementary math. In reality, teaching elementary math requires both a conceptual understanding of foundational mathematics and pedagogical knowledge of how to teach the concepts."***
>
> *—NCTQ, April 2025*

Teacher quality matters. But access to qualified math teachers has always been unequal, and it has worsened in recent years due to a shrinking pipeline of new teachers, especially those with a math teaching specialty.

Today, teacher preparation programs are producing only 77% of the overall graduates they did just over a decade ago. And fewer preservice teachers are specializing in math. As Figure 12 shows, the number of graduates prepared to teach math declined by 36% between 2013 and 2020, with a 45% decline in traditional preparation programs alone.

Figure 11
Fewer preservice teachers are specializing in math

Number of teacher preparation program completers prepared to teach mathematics, by program type



Source: "Access to Qualified Math Teachers for All Students." CRPE, 2025.

US schools also report significant challenges in filling math vacancies. A Gallup poll from late 2024 found that 82% of all K–12 leaders said it's challenging to hire qualified math teachers, and half said it's "very challenging." Based on the NCES School Pulse Panel in August 2024, 28% of public schools had at least one math vacancy before the start of the school year; 15% had two. Of those, 61% reported difficulty finding a fully certified math teacher to fill the position. Vacancies are highest in schools serving mostly low-income students, enrolling mostly students of color, and in urban areas. This is likely one driver of the widening chasm between the highest math performers and the most struggling students.

Even when teaching positions are filled, teachers are not always fully credentialed to teach the subject. Roughly 11 to 12% of teachers are not fully certified for their assignments, which includes teachers with emergency credentials and those who are teaching "out of field" in a subject they're not certified in.[8] Over half of middle school math teachers lack a math or math education degree.

8. Emergency and provisional certification programs have been successful at increasing the number of teachers in classrooms, but evidence on their efficacy is mixed. Some recent evidence suggests that emergency-licensed teachers during the pandemic performed similarly to other newly hired (and licensed) teachers. But studies in Massachusetts and Texas suggest that emergency-licensed teachers without any prior exposure in education—such as classroom experience or an attempted licensure exam—could harm student learning.

And even when teachers are credentialed, new research shows that they may not have been well-prepared to teach math. The National Council on Teacher Quality examined over 1,100 elementary teacher-prep programs and found that they do not allocate adequate time for math content learning. American teachers in lower grades also have limited mathematical content knowledge compared to international peer countries.

Teachers may also struggle with math anxiety, which affects many adults and especially women, who make up nearly 90% of elementary school teachers. Some reporting has even suggested that a lack of confidence in math is part of what leads some teachers to seek elementary teaching positions. Since students can "catch" math anxiety, its prevalence in early classrooms means many students have the deck stacked against them. Improving teachers' math skills, however, could prevent them from developing math anxiety.

There is shockingly little effective state leadership for ensuring that all students can experience effective math instruction. In a recent report, NCTQ found that only one state—Alabama—has "Strong" policies for improving math teacher effectiveness, which include auditing teacher preparation programs for robust math instruction and requiring districts to support teachers to implement high-quality math curricula. Seven states received "Unacceptable" scores.

States must strengthen their policies for ensuring math teacher effectiveness. But even filling every school with qualified math teachers will not solve the problem. In a system where most teachers single-handedly instruct groups of 30 students, the growing variation in students' skills and needs is too much for even the most qualified math teachers to address.

A Rigid and Outdated Delivery System

> ***"The delivery system in mathematics education—the system that translates mathematical knowledge into value and ability for the next generation—is broken and must be fixed. This is not a conclusion about any single element of the system. It is about how the many parts do not now work together to achieve a result worthy of this country's values and ambitions."***
>
> *—US Department of Education National Mathematics Advisory Panel, 2008*

Most American classrooms adhere to some basic assumptions. One teacher will lead a classroom. Students in each class should all learn the same material at the same time. And students who need additional support to succeed in class will receive it outside. In reality, this model works only when all or most students are entering the class with the prerequisite skills for the class and require little or no special attention from the teacher. This is rarely the case with math.

Typical classrooms leave educators with an impossible task. NBC News reported on a South Carolina math specialist who was scrambling to support teachers who needed to create twice as many ability groups as usual to ensure that every student received instruction on their level: "Panic ensued," she said, as teachers threw up their arms and declared, "There's no possible way I'm going to be able to do this!" The trade-offs are daunting: either include a wider range of students in each ability group—meaning some students will not be receiving instruction targeted to their precise needs—or stretch the same teacher across twice as many groups, diluting their time, attention, and energy and possibly their effectiveness.

Instruction marches on, whether or not students have mastered it. A growing movement seeks to ensure that all students have access to well-designed curricula that deliver rigorous content at grade level. But these curricula are designed to ensure that all students receive demanding grade-level content and do not account for the reality that many students didn't master the precursor material in prior grades. They write: "As a result, math educators have the massive challenge of both teaching grade-level material and addressing students' individual needs."

Siloed interventions compete with core instruction. Because the same teacher cannot possibly deliver multiple types of individual interventions and core whole-class instruction simultaneously, students who need tutoring, language support, or special education services often find themselves pulled out of their main classes to receive support services—thus reducing their access to core instruction. This zero-sum approach, in which more access to core instruction means less individualized intervention and vice versa, ultimately shortchanges students. The result: the most marginalized students secure fewer opportunities[9] to learn grade-level standards compared to more advantaged peers.

Ability tracking reigns. A common but crude response to widely varied student skills is tracking, in which schools evaluate students for their learning and ability, then group them in different classes with peers at similar levels. This practice restricts opportunities for some and reinforces inequality, but can also ease the logistical challenges of supporting diverse needs, since it reduces the amount of variation in each classroom. "Detracking," meanwhile, removes the barriers students face in accessing courses, but can wind up pushing some students into courses they're not ready for and delaying or preventing other students from moving ahead.

The assumptions behind how most schools deliver instruction were never well-suited to how students actually learn. And now recent trends point to rapidly increasing learner variability in classrooms: In earlier sections, we highlighted growing gaps between the highest- and lowest-performing students, dating back to 2013. Shifting demographics in many regions and states are resulting in a growing number of multilingual learners. And the number of students identified with disabilities has been growing for decades. Diagnosis rates for attention deficit hyperactivity disorder (ADHD) and autism are both on the rise. The share of students who receive services under the Individuals with Disabilities Education Act (IDEA) has reached 15 percent, with further increases projected in future years.

Fast Fact

According to Curriculum Associates' i-Ready tests

1/5 of all students are behind grade level by 5th grade

and

1/3 are behind by 8th grade

9. Ashley Jochim and Alex Kurz, "Outmatched: Special Education Can't Solve Problems Rooted in the Education Delivery System" (forthcoming, Center on Reinventing Public Education, 2025).

This growing variability leaves education systems with a stark choice: either rethink the standard assumptions about how schools are organized to deliver instruction, or run the risk of predictable academic downspiraling for students who "can't keep up" while adding to the strain on teachers.

TRIAGE OR TRANSFORMATION?

Math teachers want to provide a transformative learning experience for students, helping them both master complex material and develop a love for numbers and computational thinking. However, most end up triaging instead, making choices on who they can best help in the classroom and whom they must funnel into remediation tracks or special education.

A recent TNTP report found that the most effective approach to addressing learning gaps in Algebra I was a system of individualized interventions that prioritized critical precursor skills and ensured that each student received the most challenging material they were ready to master.

That is a far cry from the current state of affairs, however. As the TNTP report concludes:

> *Unfortunately, this level of instructional coherence is rare. In many schools, Tier 2 materials only loosely connect to core classes, and assessments measure different things in each tier. Core teachers and specialists may not have time to meet or connect their lessons. As a result, the students who receive the most support typically have the most disjointed experiences at school.*

The current delivery model is simply not designed to ensure that every student masters grade-level content. Teachers are, out of necessity, merely passing students on from grade to grade, whether or not they have mastered key concepts. Students may receive good grades in the class, leaving parents to think all is well. Then, in the absence of a coherent system, those students' future teachers have to triage as best they can: help the students closest to grade level, give struggling students the simplest material just to keep them stable, and hope the rest can stay afloat with minimal intervention. Teachers care deeply about student success, but the current delivery system prevents them from stewarding each student's math mastery.

This is a fundamentally broken approach—and it must stop.

Teachers should not be triaging in Algebra I. It's an impossible task, and too many students are already too far behind at that point. Rather than triaging, schools should practice "preventative medicine" in grades K–7. If a student is failing to grasp a math concept or misses a week of instruction, they should receive immediate help. A substantial body of research suggests more effective instructional methods, such as:

- individualized tutoring integrated with core instruction;
- extended time for math instruction during the school day;
- math placement decisions based on student competencies, not rigid tracking;
- and identifying and addressing critical precursor skills in early grades before they compound.

In addition, emerging solutions such as AI-powered individualized learning and tutoring hold significant promise, though the evidence base is still small and the tools themselves are still developing.

Can AI Revolutionize Math Education?

While AI platforms, in particular large language models like GPT-4, demonstrate strengths in algebra and arithmetic reasoning, they struggle with more complex and visual-spatial problems. Despite limitations, AI-powered instructional tools, such as Khan Academy's Khanmigo and DreamBox, are already attempting to personalize math instruction, diagnose misconceptions, and significantly boost math outcomes, especially among disadvantaged students.

However, key considerations remain about AI's effective integration into mathematics education. Educators have cautioned about the potential pitfalls of students using AI to shortcut learning rather than fostering deep conceptual understanding. And while the evidence base supporting AI's efficacy in mathematics instruction is growing, many AI tools still require robust research, including randomized controlled trials, to confirm their educational impacts fully. For example, promising early pilots like Khanmigo and Saga AI Tutor have yet to be conclusively validated through rigorous studies.

Looking forward, rapid advancements in AI, including its use in systems that combine language reasoning power with precise computational capabilities and improved image recognition, promise more accurate and visually integrated math instruction. And AI's potential extends beyond instruction and assessment.

For example, AI might empower parents to closely track their students' progress and alert them to any missed foundational skills. It might allow educators to cut through ideology to bring a more evidence-based approach to helping struggling students. Advances in AI could enable students without access to advanced coursework to learn more independently. The possibilities are just beginning to take shape.

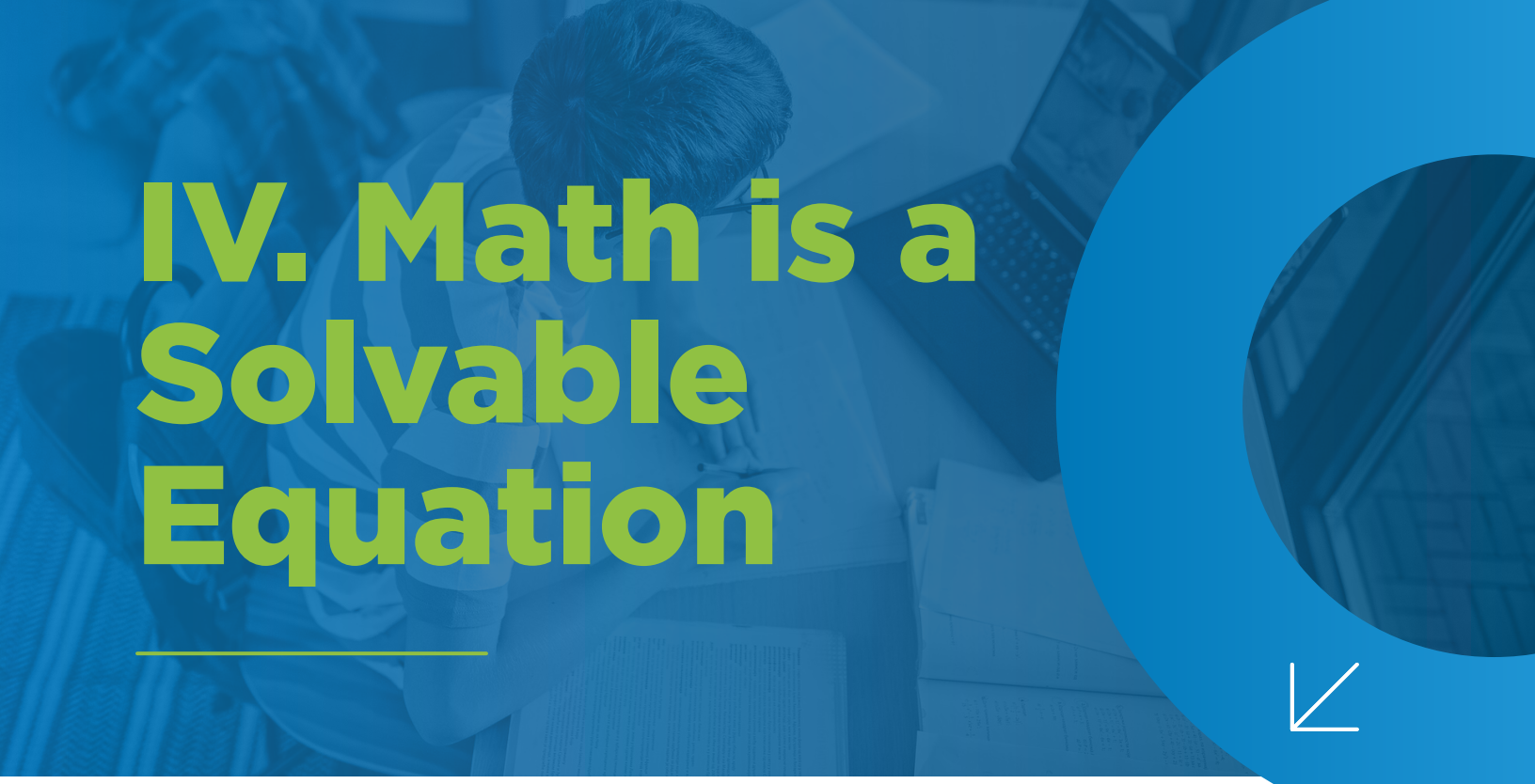
An important question is whether more money is the answer. In some cases, it may be. However, tracking, uneven expectations, and lack of attention to true mastery exist in the highest-resourced schools as well as the lowest. The challenge is rethinking schools' use of time, talent, data, expectations, and incentives so that no student ever falls behind.

Transformative math instruction is something every child deserves. In the next section, we propose how it can happen and what it will take.

Unanswered questions about what's driving math declines

In our research, we found several additional hypotheses that could be part of why math achievement has declined, but they lack sufficient evidence. Probing into these questions could help further illuminate what states and districts must change to achieve math success.

- Women and people of color have seen expanding professional opportunities in the past decades. **Have schools lost out on a strong pipeline for math teachers in a "brain drain" to other professions with better pay and benefits?**
- Charter school founder and policymaker Steven Wilson has argued that racial justice advocates who were critical of "no excuses" pedagogy led schools formerly seen as beacons of rising achievement to retreat from a culture of high expectations and adult accountability. **How are schools striking the right balance of strategies to both affirm students' identities and achieve math excellence?**
- The science of learning is clear that well-being (e.g., basic needs, relationships, and relief from chronic stress) is essential for students' readiness to learn. However, some research suggests that efforts to support student well-being post-pandemic have bordered on leniency. **What kinds of student well-being practices in schools help or hurt math outcomes, and in which circumstances?**



IV. Math is a Solvable Equation

The crisis in math learning is real and urgent. But it is also solvable.

Math may be one of the most tractable challenges in American education. Unlike other crises driven by social forces outside schools' control, math performance is highly sensitive to what happens inside classrooms: the quality of instruction, the depth of teacher knowledge, and the availability of timely support.

That's what makes this moment both a warning and an opportunity. It should be heartening for educators, parents, advocates, and policymakers to know that with the right instructional pieces in place, schools can have an outsized role in turning the math achievement tide.

Imagine a world where there are no dead ends. Schools are committed to diagnosing students' needs and have systems in place to close gaps. Elementary and middle schools address missing skills as soon as they are apparent, and use a combination of small-group instruction and AI tutoring to address them. Students—and their families—know exactly what they still need to learn and have what they need to stay on track. No student arrives in Algebra I doomed to fail. Even if they do struggle initially, they still have boundless opportunities to succeed. They're immediately placed with a small group of students on their level and receive targeted interventions to solidify their skills and demonstrate why math matters in the world they know and the world they'll inherit. Every student graduates with the foundational math skills and confidence they need to adapt to a changing economy, to keep themselves and their families secure, and to make sense of the issues that affect them as democratic citizens.

> *"When students experience math in the way we know is possible … their interest, motivation, and persistence are evident. That is the math classroom we want all students to find themselves in."*
>
> *— Bob Hughes, director of K-12 education in the U.S. Program, The Gates Foundation, in "The Math Classroom All Students Deserve"*

This vision is at once obvious and radical. If we want American students to regain confidence and competence in math—and to compete globally in the decades ahead—we need a **nationwide commitment to reimagining how we teach, support, and believe in math learning.** Some states, districts, and schools are showing what making that commitment can deliver.

The Proofs: What Progress Looks Like

Across the country, bold leaders are already demonstrating what's possible. Math gains are achievable when states, districts, and schools combine strategies that build teacher supply, creatively deploy math talent and great teachers, spread and incentivize effective teaching practices, and distribute learning opportunities fairly. In short, solving for students' math success is possible through comprehensive and interlocking reforms. To solve for better math outcomes, states and districts can learn from what's worked.

ALABAMA'S STATEWIDE COMMITMENT TO MATH IMPROVEMENT

- Alabama has outperformed every other state in fourth-grade math growth since 2019
- The state performs highest in the nation when NAEP scores are adjusted to compare students with similar demographic traits

Alabama is one of the only states where fourth-grade math achievement on the NAEP has improved since the pandemic. Over the past five years, the state has dedicated more than half a billion dollars to both math and reading improvement. The investments will be ongoing, thanks to increased spending for math and literacy reforms in a budget passed earlier this year with historic increases to education funding. There is more work to do, especially to improve eighth-grade math achievement and close the gap between high and low performers. And because Alabama has historically struggled with achievement, simply getting the basics right—like consistent instructional delivery—can drive noticeable gains. But the statewide commitment to improvement, along with proof points from districts combining multiple reforms, demonstrates that progress is possible. Specific bright spots include two rural districts, DeKalb County and Piedmont City, where more than 70% of the students are considered low-income.

> *"We made a total transformation about five years ago. We decided that we were going to let data make every decision."*
>
> *—Piedmont County School District Superintendent Mike Hayes (via WSFA)*

In DeKalb County (8,300 students), Superintendent Wayne Lyles has led the district in adopting key reforms, including high standards and high-quality curriculum, intensive use of data to help target instruction and provide accountability, and increased support for teachers. The district used Covid relief funding to hire Julie West, an educator and principal who grew up in the county, to lead a math makeover in elementary schools. "Data or it didn't happen," West is fond of saying. "Don't tell me you did something unless you have the proof that you did it." The district's elementary math and special education teachers have all received foundational math training through a state program, and secondary math and science teachers can receive higher pay for participation in the same program. The district has increased teachers' collaborative planning time and uses "learning rounds"

that give teachers a chance to observe their colleagues. A key part of DeKalb's math success is following instructional best practices, like broader use of manipulatives (foam blocks, rainbow-colored measuring sticks, etc.) to make complex math concepts more concrete and increase arithmetic fluency for younger students.

Piedmont City (1,100 students) is using many similar strategies, notably the extensive use of data to drive instructional decisions, systematic and explicit instruction, and the use of small groups to target interventions. A longer school year allows educators to engage in "data days" every four weeks, when they get together to analyze the numbers. Longer math classes (120 minutes each, up from about 50) give elementary students more time on task.

In 2022, the state passed the Alabama Numeracy Act to encourage other districts to undertake similar reforms. This act provides more support to elementary school teachers, including high-quality curriculum, additional coaches, and extensive training—all paid for with increased funding.

OUTCOMES-BASED TUTORING AND WORKFORCE INVESTMENTS IN ECTOR COUNTY, TEXAS

- Teacher vacancies reduced from 350 in 2019 to 29 in 2024
- Grades 3–8 math performance in 2024 returned to 2013 levels, reversing a steep plunge that reached its lowest point in 2016

In Odessa, Texas, Ector County ISD (34,000 students) combined results-based tutoring with teacher workforce investments to address low performance and a significant staffing shortage. The district tackled multiple challenges at once instead of separately, and was able to turn around after being on the verge of a state takeover in 2019.

During the pandemic, 6,000 of the district's 34,000 students—the majority of whom are low-income—received 1:1 tutoring, which tied payments to student growth, creating real accountability for providers and aligning incentives with outcomes.

To address teacher shortages, the district introduced several bold new initiatives with financial bonuses (supported by state funding) and leadership opportunities for teachers. For example, outstanding teachers could become "master teachers" and receive a pay boost for splitting their time between teaching and mentoring new teachers. Highly qualified teachers were compensated for working in the lowest-performing schools. Partnerships with local colleges and universities strengthened preparation pipelines, including a one-year residency and a principal apprenticeship.

"Boosting student achievement starts with equipping and supporting teachers. Incentivizing the best teachers to work in our lowest-performing schools allowed us to put the most-qualified teachers in front of the students in most need of support."

—Superintendent Emeritus Scott Muri (via Education Recovery Scorecard)

WHAT WASHINGTON, DC'S MOST-IMPROVED SCHOOLS REVEAL ABOUT MATH SUCCESS

- 40 schools in Washington, DC show exceptional math growth. Students improved by an average of 23 percentage points on the state assessment in one year
- In grades K–2 at these schools, the share of economically disadvantaged students on grade level in math rose 18 points to 68%

While just 22% of DC students met grade-level expectations in math in 2023, analysis from EmpowerK12 showed that 40 public and charter schools in the district are achieving growth that far exceeds citywide trends, particularly for economically disadvantaged students. These "bright spots" share common practices that can inform broader policy and system investment.

What's working in these schools?

- They maximize instructional time by structuring math blocks to include daily data-driven intervention. Schools like KIPP DC Promise use "double blocking," allowing teachers to reteach concepts immediately based on quick daily assessments at the end of each lesson.
- They invest in instructional coherence. They use high-quality instructional materials paired with weekly collaborative planning and embedded coaching. For example, Center City PCS integrates real-time assessment with structured professional development, supporting teachers to balance conceptual understanding with procedural fluency.
- They cultivate math confidence and celebrate mistakes as learning opportunities. Combined with high-quality instruction and materials, this mindset work helps students see themselves as capable math thinkers.
- They engage families as partners in math learning, offering suggestions for home-based math practice and family math nights where parents and students can experience how math is taught together.

In a 2024 survey, DC Public Schools parents ranked math as the most important subject their children take. These schools are early proof points for what systemic improvement in the district can look like when strong instructional practices are sustained and supported.

COACHING, DATA, AND DAILY LEARNING OBJECTIVES BOOST MATH OUTCOMES AT ALBUQUERQUE COLLEGIATE CHARTER SCHOOL

- In 2022–23, the school's math proficiency outpaced the state average (31% vs. 24%)
- Since pandemic school closures, the percentage of fourth and fifth graders on grade level in math has increased from 24% to 70%

After the Covid-19 pandemic, Albuquerque Collegiate Charter School saw a troubling math gap: while the school prioritized reading support, math instruction fell behind. By third grade, many students lacked basic number sense. At the same time, many elementary school teachers lacked confidence in teaching math.

The school responded with a systemwide approach to math acceleration grounded in data, coaching, and curriculum. Every teacher is paired with a coach in frequent data meetings to review student progress and adjust instruction in real time. Teachers also receive intensive support: three weeks of summer training, weekly professional development, eight data days, and weekly coaching and observations. The school redesigned its math curriculum to emphasize daily learning objectives and use exit tickets to plan interventions when students aren't grasping key skills. Upper elementary teachers became math content specialists, with more time to improve their expertise and share with other teachers.

STRONG LEADERSHIP AND SMART INVESTMENTS BOOST ACHIEVEMENT FOR ENGLISH LEARNERS IN UNION CITY

- Math achievement has recovered to pre-pandemic levels

Union City Public Schools in New Jersey (13,000 students), a majority Spanish-speaking district (95% Hispanic; 35% English learners), has become a model of improvement through evidence-based instruction, strong leadership, and investments in bilingual and early childhood education. Slated for state takeover in 1989, the district is now ranked third in New Jersey for performance among high-needs districts and graduates more than 90% of its students. Reading performance in grades 3–8 has improved steadily since 2014, while math achievement has recovered to pre-pandemic levels.

The district has used several strategies:

- In 2022, it used state grants to launch high-impact, small-group tutoring by its teachers rather than outside vendors.
- District leadership provides targeted support for struggling schools, including frequent site visits, while central office staff are assigned to specific schools and sometimes specific grade levels, giving them greater insight and involvement in decision-making.
- With 75% of students speaking Spanish at home, the district pays for select teachers to receive bilingual/English as a Second Language (ESL) certification and offers an extra ESL class period to students.
- Since 1989, the district has offered a high-quality curriculum to private early learner centers, which has helped boost subsequent elementary school achievement.

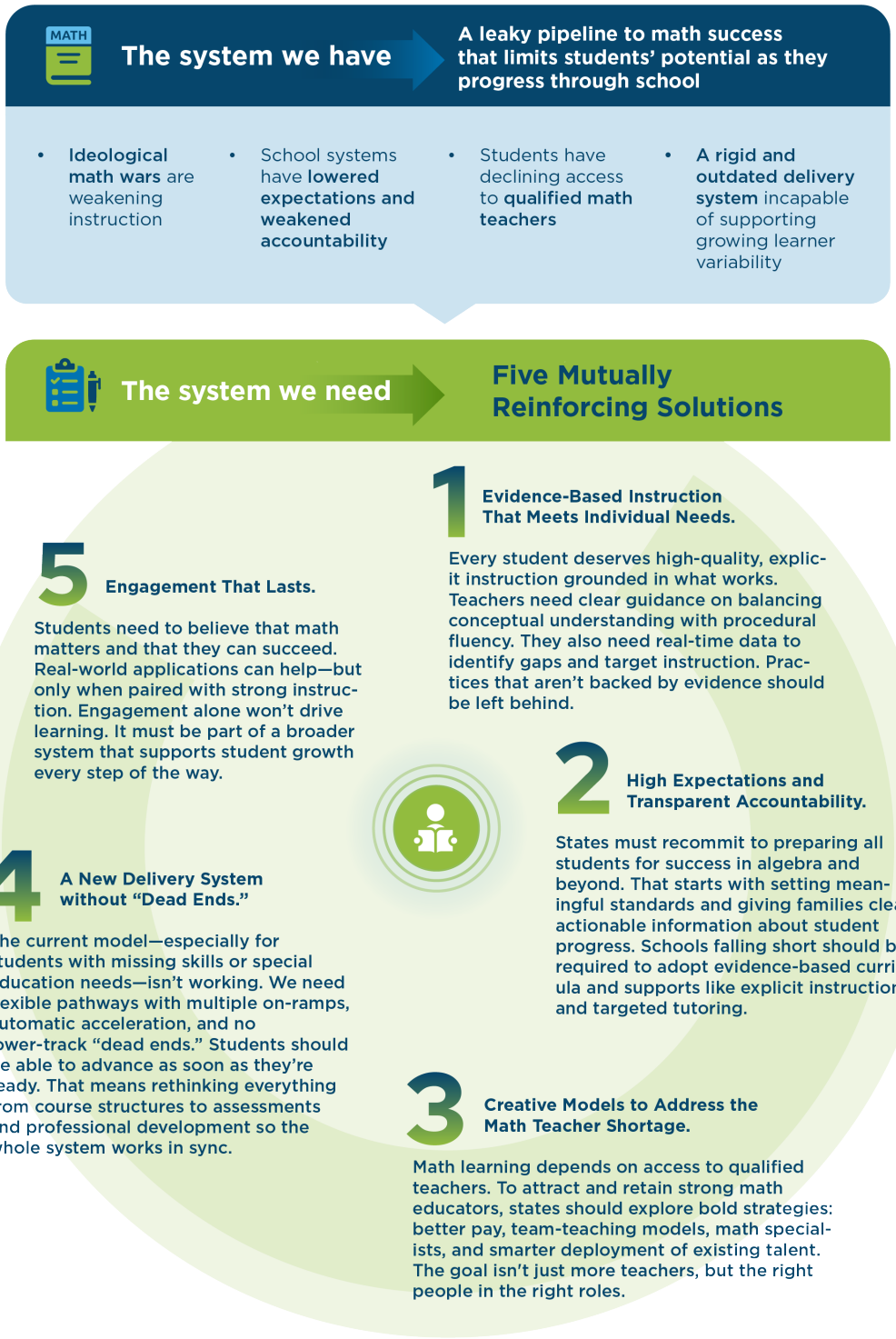
THE FRAZER SCHOOL'S TEAM-BASED MATH SUCCESS

In just a few years, the independent Frazer School in Gainesville, Florida, has shown how a commitment to a coherent schoolwide approach—team-based competition—can drive academic excellence. Founded by legendary math coach Will Frazer, who led the Buchholz High math team to 16 national titles, the school builds its culture around collaboration, mentorship, and rigorous challenge. Every student joins at least one academic team. In math, this approach is already yielding extraordinary results: Frazer's middle schoolers dominated Florida's MATHCOUNTS competition with five students in the countdown round. In addition, the high school team claimed the 2025 Mu Alpha Theta national title. But beyond trophies, the school's core innovation is cultural—older students coach younger peers, everyone is invested in the team's success, and learning becomes joyful, collaborative, and purposeful. Whether or not the Frazer School's approach is right for other schools to adopt, its results show what's possible when academic challenge is not just encouraged, but institutionalized in a coherent schoolwide model.

The Formula: Focus on Five Mutually Reinforcing Elements

States cannot buy or mandate their way out of the math crisis. There is no secret solution hidden in one program or curriculum. The roots of the problem are complex, and the solutions must be comprehensive. Isolated interventions won't succeed. Instead, progress depends on building a coherent system in which multiple strategies work together. Weakness in one area can undermine the rest.

We've identified **five mutually reinforcing solutions.** Each is essential—and together, they form a powerful formula for change. These solutions hold the potential to accelerate math learning and begin to restore the academic momentum of the 1990s and early 2000s. But each one supports and depends on the others.



Where to Start: Advice for State Leaders

States can't fix this overnight, but they can lead with urgency and strategy. Here's how:

1. **Set bold goals.** For example: "All students will be prepared for Algebra I by eighth grade by 2030." Track progress by student group and course completion, not just test scores.

2. **Target urgent needs.** Focus on students who fell furthest behind. Streamline early-grade math to prioritize foundational skills.

3. **Rebuild the system.** Tackle all five solutions—evidence-based instruction, accountability, staffing, innovative delivery, and engagement that lasts—at once. One-off reforms won't be enough.

4. **Invest in innovation.** Support schools experimenting with new strategies—from tutoring and co-teaching to AI-powered curricula—and scale what works.

5. **Let research lead.** Ensure that struggling schools follow evidence-based practices and support ongoing research to inform better implementation.

What Funders and Advocates Can Do

> ***"I believe that solving the problem requires exactly the kind of community organizing that changed the South in the 1960s."***
>
> *—Bob Moses, discussing his Algebra Project and the role of community involvement in boosting math learning*

1. **Bridge research and practice.** Convene experts and journalists to cut through ideological debates and highlight what works in math instruction.

2. **Lead a public campaign.** Build national energy around math success. Help parents and teachers understand—and demand—what works.

3. **Support community action.** Equip parent and grassroots advocates to push for evidence-based solutions.

4. **Fund diagnostic tools.** Give teachers and families the tools to identify learning gaps and take targeted action.

5. **Back systemic reforms.** Prioritize investments in solutions that connect—like creative staffing models that enable new delivery approaches.

V. Conclusion

The United States has a serious math problem. Students are not learning math at adequate levels for a thriving and competitive economy.

Advanced math learning opportunities, high expectations, and adequate help are not available to large swaths of the student population that could, with the proper support, excel in math. As a result, America is squandering talent and losing out to other countries. This is a problem that will only get worse as AI and other emerging technologies influence the jobs of the future. **Our students need a firm command of computational fluency, mathematical reasoning, and real-world problem-solving to compete in the workforce and shape the future of technology, climate policy, public health, and civic life.**

Foundational computational math and science skills, as well as higher-order math comprehension and reasoning, will increasingly be required to solve looming complex questions such as climate change, AI technologies, and public health challenges. **The math that students learn today is the infrastructure for tomorrow's economy—and their own economic mobility.**

State, local, and federal leaders all have a critical role to play in reversing the last decade's declines in math. The problem is solvable. The evidence is in place to make significant progress. New technologies exist to help overcome barriers in uptake and scale. **States must commit not just to vague improvement goals, but to clear targets like eighth-grade Algebra I readiness and to transparent reporting on whether students are on track.**

Yes, quality math teachers are in short supply, but policymakers can leverage existing talent in new ways and create effective new pipelines. **Innovation—like AI-powered tutoring, mastery-based learning systems, and real-time diagnostics—can help, but must be rigorously tested and thoughtfully deployed.**

Let 2025 be the year every state commits to eighth-grade Algebra I and evidence-based instruction in every classroom. Let it also be the year we rebuild student confidence in math and tell families the truth about where their students stand and what it will take to get them ready for the future. The math is clear. It's now up to state leaders, policymakers, and educators to show their work.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