

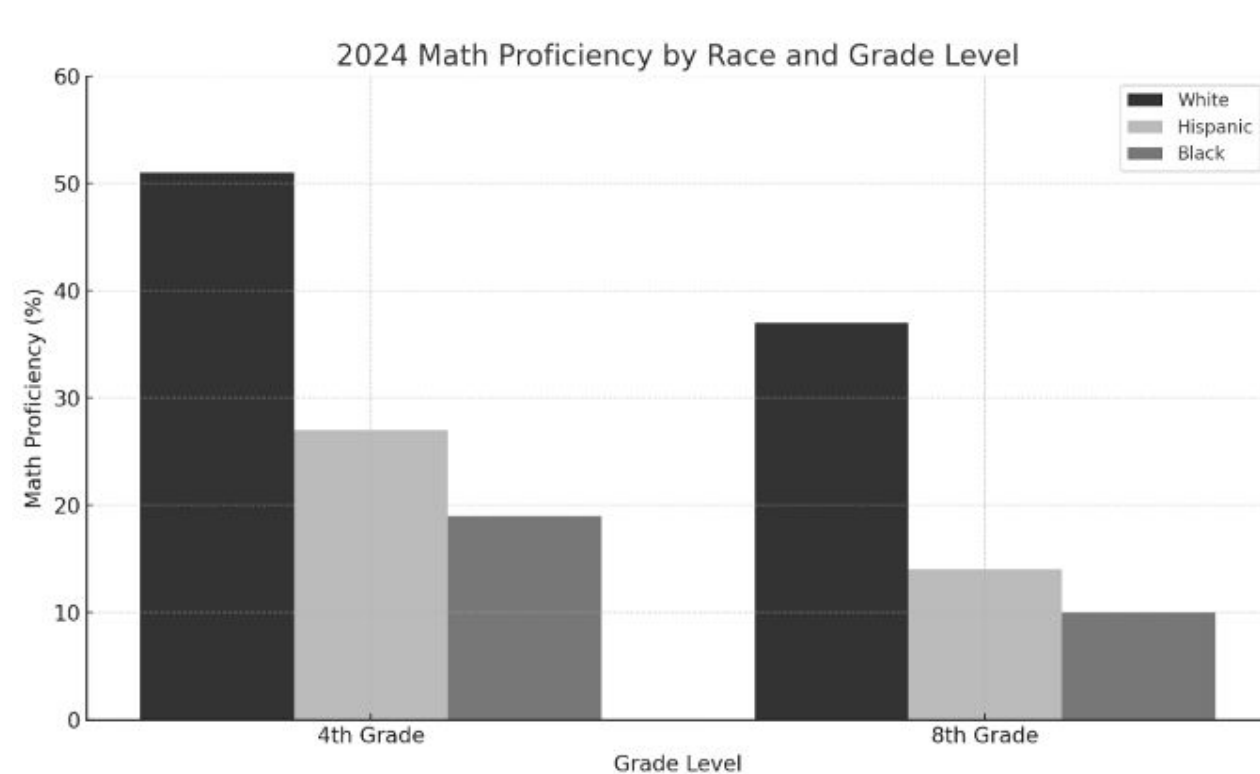
Advancing Civil Rights and Equal Opportunity Through High-Quality Math Instruction

Introduction

Mathematics education is a powerful lever for social and economic mobility, yet historically marginalized students — including students of color, English learners (ELs), students with disabilities (SWDs), and students from low-income communities — have and continue to face systemic barriers that limit their access to high-quality math instruction. These inequities begin in early childhood, widen through inconsistent access to advanced coursework, and are compounded by disparities in teacher quality and a lack of structural supports.

In 2024, according to the most recent data from the National Assessment of Educational Progress (NAEP), only 39 percent of all public school students reached proficiency in 4th grade math, and only 27 percent achieved that mark in 8th grade.¹ Perhaps even more alarming, 24 percent of all public school students in 4th grade and 41 percent in 8th grade scored Below Basic in math.²

Alarming, there are large disparities in student math achievement based on race. In 2024, 51 percent of white 4th graders reached proficiency compared with 27 percent of Hispanic students and only 19 percent of Black students. The disparities persist in later grades. Among white 8th grade public school students, 37 reached proficiency compared with 14 percent of Hispanic students and only 10 percent of Black students.³



Source: NAEP 2024 Math Scores, National Center for Education Statistics

Despite growth in the proficiency rates in 4th and 8th grade math over the past two decades, the Black-white achievement inequality in 4th grade has persisted: The disparity was 32 points in 2003 and in 2024. The Hispanic-white disparity in 4th grade decreased from 27 points to 24 over this period. In 8th grade math, the disparity decreased by 2 points for both Black and Hispanic students.⁴ This evidence of profoundly unequal opportunities is an urgent call to action.

Ensuring equitable access to rigorous, engaging, and culturally affirming math education is not only an academic imperative but a moral one. High-quality math instruction is critical for empowering underrepresented students to succeed in school, pursue STEM pathways, and fully participate in civic life. This brief examines the root causes of unequal math opportunity and offers recommendations for advancing equity in three key areas: early math readiness, access to higher-level math coursework, and equitable access to high-quality math educators.

What Is High-Quality Math Instruction?

High-quality math instruction and curricular materials teach students to progress from concrete understanding to representational and eventually abstract understanding.⁵ High-quality math instruction balances conceptual understanding and computational fluency.⁶ Simply put, high-quality math instruction and curricular materials teach students core skills and how to apply what they have learned. However, what it looks like in practice will likely vary. This is because effective instruction adapts to fit specific contexts and students' current level of understanding.

There is a growing understanding that students need to learn math where one concept builds upon another. This involves encouraging students to see the links between topics, like connecting addition and multiplication in elementary math to ratio and rate to whole numbers in middle school.⁷ For students to access more complex concepts, they must first build an understanding of the preceding content. Thus, experts argue that in addition to mastering their grade's subject material, math teachers must also understand the content in the previous and subsequent grades. Evidence suggests that teacher collaboration, particularly within and across grade levels, can help educators build the necessary conceptual understanding and fluency.⁸

Critically, high-quality instruction is culturally responsive. Not all students learn the same way, nor do they come to school with the same starting point. Good math instruction is adaptive and progressive — meeting students where they are and helping them to progress towards the next skill and concept. Connecting core academic content to students' lives, experiences, and backgrounds helps to build math confidence and self-identity as a “math person.” For example, culturally responsive teaching, such as leveraging students' backgrounds and experiences, has been associated with increased engagement and interest in school and increased educational attainment.⁹

The Importance of High-Quality Math Education for Historically Underserved Children

High-quality math education is foundational to ensuring educational equity and opportunities for success in a global, technology-driven economy. Historically marginalized groups, including low-income students, students of color, English learners (ELs), and students with disabilities (SWDs), face systemic barriers in education that can hinder their access to high-quality instruction, especially in subjects like mathematics. Mathematics is not only a key academic subject, but it also serves as a critical gateway to higher education and careers in fields such as science, technology, engineering, and mathematics (STEM).

For these historically marginalized groups, achieving mathematical proficiency is essential to breaking the cycle of poverty and achieving upward social mobility. As outlined in *Brown v. Board of Education*, the promise of equal educational opportunities must be realized for all students, regardless of race, ethnicity, or socioeconomic status.¹⁰ Ensuring that low-income and marginalized students have access to high-quality math instruction aligns with the broader goals of civil rights, as it provides students with the tools to participate fully in civic life and the workforce.

Mathematics is a critical means of developing analytical skills, logical reasoning, and problem-solving abilities — skills that are essential not only for academic success but also for navigating life’s challenges. Moreover, proficiency in math is often a determinant of future success in college admissions, scholarships, and careers in well-paying fields. Providing historically marginalized students with equitable access to high-quality math education helps to achieve equity in student achievement, fosters civic participation, and supports the realization of the civil rights goal of equal opportunity in school and society.

Employment, Careers, and Long-Term Outcomes with Math Proficiency

A 2024 study that included a wide range of factors (e.g., birth weight, parent education, and math performance from PreK through middle childhood) and their impact on earnings at age 30¹¹ found that improving math scores by half a standard deviation at each life stage (preschool, early elementary, and middle school) has the greatest influence on age 30 earnings. The benefit increases as a child gets older. The impact of improved math scores was far greater than the impact of improved reading scores for the students in the sample. The impact of improved math in preschool was beneficial for all racial and ethnic groups. Improved math scores have an even larger positive benefit on health and the quality of parent-child relationships for preschool children, especially Black and Latino children.¹²

Another 2022 report studied the relationship between 8th grade NAEP math scores and income and found that half a standard deviation increase in NAEP scores was associated with an 8 percent increase in students’ income later in life. They further found that NAEP growth was also related to greater educational attainment, as well as lower teen pregnancy, incarceration, and arrest rates.¹³ These studies underscore that prioritizing math outcomes can have positive long-term effects on students, their families, and communities as a whole.

Artificial intelligence and Next Generation Jobs

High level math proficiency is needed for jobs of the future. AI systems rely on advanced mathematical concepts. Math fosters systematic reasoning and structured problem-solving — skills that are increasingly valuable as AI automates routine tasks — but strategic thinking remains uniquely human. Diversity within the tech sector matters. For example, Black workers accounted for only 7.4 percent of the tech workforce in 2022, despite comprising 11.6 percent of the total U.S. workforce.¹⁴ Similarly, Hispanic workers made up 9.9 percent of the tech workforce in 2022 compared to 18.7 percent of the overall U.S. labor market.¹⁵ Having diversity in AI and tech can reduce algorithmic biases and improve outcomes in making sure that programs are inclusive, ethical, and effective. For example, teams of people working in AI who are from homogenous backgrounds, either by race, class, gender, or disability, can overlook algorithmic biases.¹⁶ Supporting underrepresented students in accessing jobs of the future ensures students of all backgrounds can participate in the economic benefits of these jobs as well as expand user reliability and real-world applicability.¹⁷

Why Children Fall Behind on Math

Several factors may contribute to why children, particularly those from historically marginalized communities, fall behind in math. These factors can be broadly categorized into structural, social, and individual influences:

- *Structural Barriers* — Disparities in funding between schools serving affluent communities and those in low-income areas result in unequal access to resources. Schools with fewer resources may have outdated textbooks, curricular materials that are not aligned to standards, inadequate technology, or insufficiently trained teachers, all of which can contribute to limited math outcomes.
- *School Level Barriers* — Historically marginalized students are often placed in lower-track classes, where they receive less rigorous and less engaging math instruction.¹⁸ These students may also experience disproportionate discipline referrals, which can remove them from instructional time and contribute to their academic disengagement.¹⁹
- *Cultural and Linguistic Mismatches* — Math instruction is often taught in ways that may not align with students' cultural and linguistic backgrounds. For instance, students who are ELs may struggle with math instruction that heavily relies on language skills, even though they may have the cognitive ability to understand mathematical concepts. Similarly, cultural references, examples, monolithic educators, and narrow historical contexts may make it harder for students from diverse racial and ethnic backgrounds to see themselves in the instruction and understand their potential to thrive in mathematics.
- *Stereotypes and Bias* — Bias in the form of low expectations for students of color or students from low-income backgrounds can affect the quality of math instruction they receive. When teachers hold unconscious biases or subscribe to deficit-based models of student capabilities (e.g., being a “math person” or that some content is too difficult for groups of students), it can affect their teaching practices and subsequently affect student learning outcomes.²⁰
- *Lack of Access to Support* — Students from historically marginalized communities have less access to math tutoring or other forms of academic support outside of the classroom.²¹ Without requisite and appropriate resources, it may become difficult for students to catch up when they fall behind and make it harder for students and families to compensate for weak instruction.
- *Math Anxiety* — Students may experience anxiety about math due to negative past experiences or societal stigma about their ability to succeed in the subject. This can create a cycle of fear and disengagement, making it even harder to succeed.

Marginalized Children, Students with Disabilities, and English Learners Are More Likely to Fall Behind in Math

Structural barriers and educational inequities compound on students of color, SWDs, and ELs as well as other historically marginalized children. Disparities that exist in funding between schools serving affluent communities and those in low-income areas result in unequal access to resources. Additionally, schools serving historically marginalized communities often receive less funding than those in more affluent areas.²² This disparity affects class sizes, availability of qualified math teachers, access to high-quality materials, technology, and more.²³

Historically marginalized students are often placed in lower-track classes, where they receive less rigorous and less engaging math instruction. For example, tracking has corresponded with demographics: Black and Brown students were historically placed into lower math courses than white and Asian students.²⁴ Yet, even the statistics around Asian American student performance in math is obscured by the model minority myth.²⁵ When Asian students are disaggregated by ethnicity, disparities within this group are revealed. For example, in Minnesota, which has a high percentage of Southeast Asian refugee students, only 17 percent of Burmese American students were proficient in math — the lowest of any ethnic or racial student group. Less than 40 percent of Lao, Hmong, and Cambodian American students were proficient in math compared to 63 percent of white students.²⁶ These students typically come from refugee backgrounds and are more likely to have lower socioeconomic status and can face challenges regarding stable housing, workforce supports, and other structural barriers.

De facto segregation in schools can also lead to concentrated disadvantages for students from lower socioeconomic backgrounds. Socioeconomic status plays a role in creating or limiting students' opportunities for learning. Students who are hungry, experience housing insecurity, or lack access and resources to instructional support are more likely to struggle in school. Families from marginalized backgrounds may face systemic barriers such as economic hardship, language differences, or unfamiliarity with school math systems, making it harder to support their children's math learning. Students in these settings may attend schools with fewer supports, higher teacher turnover, and limited course offerings. SWDs and ELs are disproportionately tracked into lower-level or remedial math courses, even when they show proficiency.²⁷ Some students (especially ELs and SWDs) may be misidentified or inappropriately placed in special education or excluded from advanced coursework due to language or behavior interpreted as deficits, not differences.

For ELs, challenges in learning math are often compounded by language barriers. Math requires understanding of academic vocabulary, word problems, and symbolic representation — skills that may be difficult to access when instruction isn't linguistically responsive. Teachers may lack strategies to scaffold math instruction for ELs, such as using visuals, bilingual supports, or collaborative structures that allow students to process content in their home language.

Additionally, minoritized students may learn in environments that do not set them up for success. From missing instructional time due to discipline or absenteeism²⁸ to low expectations, these students may not receive the resources and supports they need to thrive compared to their peers. Inadequate math curricula can also fail to reflect students' cultures, languages, and lived experiences. When students don't see themselves or their communities reflected in what they're learning, they may disengage or feel disconnected from the subject. In the school settings that serve minoritized children, there may be an overemphasis on going through the motions. Instruction for marginalized students can emphasize rote learning and procedural fluency, rather than fostering conceptual understanding, mathematical reasoning, and problem-solving. This limits students' ability to transfer their learning to new contexts and leaves them with instructional gaps as they move on to learn more complex material.

Struggling in math coursework is not due to a lack of ability or potential, but rather the result of systemic inequities that limit access to high-quality instruction, culturally responsive pedagogy, and supportive learning environments. Addressing these issues requires a comprehensive commitment to educational equity, justice, and inclusive instructional practices that affirm the identities, languages, and strengths of all students.

Current Issues in Math Access, Instruction, and Outcomes

Course Access

Access and participation in advanced math courses is “strongly correlated with demographics.”²⁹ Research consistently finds significant inequities in enrollment in advanced math courses. The disparity accelerates around Algebra I.³⁰ Taking Algebra in 8th grade is shown to be beneficial and allows students more time to take more advanced math courses.³¹ However, according to the 2020-21 Civil Rights Data Collection (CRDC), 39 percent of public middle schools did not offer the class.³² While limited course offerings contribute to the disparity, even when advanced math courses are available, Black and Latino students are less likely to be enrolled — suggesting potential bias in course placement and access.³³ A 2023 paper reported that high-achieving Black and Latino students enroll in advanced courses at lower rates than their similarly prepared white and Asian American peers.³⁴ The negative consequences of tracking — or placing students in courses based on perceived ability and prior coursework — can contribute to students of color enrolling in advanced math at lower rates.³⁵ Black and Latino students are more likely to be tracked into lower math courses early on, limiting their opportunities to access advanced coursework later on. A 2024 report found that “only 16 percent of Black and 21 percent of Latino eighth graders were enrolled in Algebra I, compared with 27 percent of White students and 38 percent of Asian American students.”³⁶

There is inequitable access to other advanced math and STEM courses. According to the same 2020-21 CRDC survey, 55 percent of white students, 51 percent of Latino students, 47 percent of Black students, and only 32 percent of Native students attended a high school that offers a full range of math and science courses.

Indeed, schools that serve at least 75 percent Black and Latino students offer fewer math and STEM classes than schools with low enrollment of Black and Latino students (25 percent or less of the total enrollment).³⁷ Only 35 percent of schools with high enrollment of Black and Latino students (75 percent or greater) offer calculus compared with 54 percent of schools with low enrollment of Black and Latino students (25 percent or less).³⁸

There are significant national disparities in access and enrollment in advanced math. Inequitable access to advanced math can be related once again to students’ race and socioeconomic status.³⁹ In 2020-21, nearly 3 million students enrolled in at least one Advanced Placement (AP) course. Black students accounted for 15 percent of high school enrollment but only 6 percent of students enrolled in AP math. Latino students were 27 percent of high school enrollment that year but comprised 19 percent of students in AP math. Far fewer students overall participated in the International Baccalaureate program, where Black students were also underrepresented.⁴⁰

Instructional Materials

A 2008 report by the national Mathematics Advisory Panel studied instructional materials and found critical errors and ambiguities in commonly used textbooks. The issue was most pronounced in word problems intended to present “real world” problems. The panel also argued that textbooks are unnecessarily long and often lack critical coherence and sequencing.⁴¹ These findings were consistent with other research that found critical evidence-based practices are often missing from primary grade textbooks.⁴² Additionally, a 2022 review of instructional materials for quality and alignment with high expectations found that — after reviewing 97 percent of known math instructional materials — only 48 percent meet high expectations for alignment. Further, only 48 percent of instructional materials used by teachers are aligned with state math standards.⁴³

Given that math concepts build on one another, another challenge is that instructional materials often do not provide students who are behind with the opportunities to learn content and concepts that are required to meet grade-level expectations. In other words, the focus on grade-level content, while important, can unintentionally make it more difficult for students who are behind to catch up and get back on track.⁴⁴ A 2018 analysis of math assignments found that most assignments were grade or course appropriate yet were low-level and overemphasized “procedural skills and fluency and provide[d] little opportunity for students to communicate their mathematical thinking.” The problem was most severe in higher poverty schools.⁴⁵ Thus, access to good instructional materials is another layer of inequity for minoritized children.

Because students from lower-income backgrounds, who are also disproportionately students of color, have less access to supplemental instruction through tutoring and enrichment, they are more dependent on the quality of instruction and materials provided during the school day. While low-quality instructional materials limit the success of all students, the absence of high-quality instructional materials causes disproportionate harm to marginalized students.

High-Quality Math Instructors

As noted, the most important elements of effective math instruction are rooted in balancing both building students’ conceptual understanding of mathematical principles and developing procedural skills.⁴⁶ In under-resourced schools, math teachers may lack adequate preparation in both content knowledge and culturally responsive pedagogy. They may also lack the training to effectively support SWDs or ELs. Additionally, these schools may also experience higher turnover of teachers, leading to instructional inconsistency and disruption in relationships that support learning and confidence in math.

Teachers

Teachers have been cited as the greatest impact on student achievement of any in-school factor.⁴⁷ Increasing teacher quality is found to be more beneficial than other school-level interventions, such as significantly reducing class size. A 2005 analysis found that improving teacher quality by one standard deviation had a larger positive impact on student achievement than reducing the class size by 10 students.⁴⁸ A robust longitudinal study found that students assigned to high value-added teachers can increase the likelihood of attending college, earning higher salaries, and lower teen pregnancy rates.⁴⁹ A large body of research suggests that teacher experience matters.⁵⁰ A 2016 review of the literature found that teaching experience is correlated with greater student achievement gains.⁵¹

Yet, high-quality teachers are inequitably distributed. Schools that serve a higher concentration of students living in poverty and students of color experience higher rates of teacher turnover.⁵² This contributes to the growing problem of teacher shortages.⁵³ There is especially a shortage of math teachers. Filling teacher vacancies is more difficult in higher-poverty schools and in schools serving large enrollments of students of color.⁵⁴ Research consistently finds that students of color and students living in poverty are disproportionately taught by inexperienced, out-of-field, or uncertified teachers.⁵⁵ Additionally, a 2016 analysis found that students from low-income families are disproportionately taught by teachers working under an emergency certification.⁵⁶

The lack of teacher diversity, especially in hiring and retention, is an ongoing problem. Today, more than half of public school students are students of color, yet roughly 80 percent of teachers are white. If current trends continue, the teacher to student gap for Black students would be effectively unchanged in 2060, and the Latino/ Hispanic gap will increase.⁵⁷ Teachers of color are more likely to work in schools that disproportionately serve students from low-income families.

Yet, a recent analysis of the 2015-16 National Teacher and Principal Survey found that teachers serving high-poverty schools on average earn \$4,100 less than teachers in the lowest-poverty schools.⁵⁸ This disparity is likely to be driven by district budget decisions, as well as by differences among teachers in their level of experience and credentials. There are also race- and gender-based pay disparities. Black teachers earn less on average than white teachers, and female teachers earn less on average than male teachers.⁵⁹ These factors are intertwined. High-poverty schools (which disproportionately enroll students of color) are often under-resourced and on average pay lower salaries. This contributes to higher turnover rates, which in turn leads to these schools hiring less experienced teachers. More novice teachers are often less effective and are more likely to turn over — thereby repeating the cycle.⁶⁰

Instructional Practice

There is a need for investing in mathematics instruction. Recent survey data of math educators' instructional practice found that teachers are just as likely to use “unsubstantiated math practices” as evidence-based methods.⁶¹ An analysis of Algebra I teachers found teachers do not typically employ evidence-based practices and methods.⁶² Reliance on discredited math instructional practices is commonplace, and a study of teacher candidates found that most incorrectly responded to questions about the basic principles of learning mathematics.⁶³

Another problem is that some teachers may also experience math anxiety and subscribe to the view that someone is “just good at math.” These views can affect a teacher’s expectations for the caliber of their own instruction.⁶⁴ Indeed, a teacher’s attitude and mathematical abilities can adversely affect student learning, particularly for girls.⁶⁵

A body of research found that students of color and SWDs are more likely to receive instruction that prioritizes explicit steps and more rote practices at the expense of creative and more in-depth learning opportunities.⁶⁶ Indeed, educators who believe in instruction based on facts transmission often do not have the necessary expertise to teach critical mathematical concepts.⁶⁷ Perhaps most alarming, a 2021 study found that “classes taught by the same teacher receive a lower quality of teaching when they comprise higher percentages of Black and Latinx students.”⁶⁸ This phenomenon was more pronounced in math instruction. The authors theorized that this may be due to perceptions that math ability is an innate talent, which may affect how teachers teach students they perceive to be less capable in mathematics.⁶⁹

Conditions for Creating High-Quality Math Instruction

Creating a high-quality math learning environment for all students, particularly those from historically marginalized backgrounds, requires an intentional focus on equity, engagement, and support.

High Expectations for All Students

Teachers must set high expectations for all students, providing rigorous and engaging math instruction that challenges them to think critically and problem-solve. This means not only focusing on procedural fluency, but also on developing conceptual understanding, mathematical reasoning, and real-world applications of math. Math instruction should be viewed as a way of thinking and understanding the world that is accessible to all students, not just a set of procedures to be memorized.

Safe and Supportive Learning Environments

Schools must provide a safe and supportive environment where students feel comfortable taking academic risks. For math, this means creating a classroom culture where students are encouraged to ask questions, make mistakes, and learn from them. Positive reinforcement and constructive feedback are key to fostering a growth mindset. A positive school climate provides students with the support, safety, and nurturing environment they need to thrive, while a negative or unsafe climate can contribute to adverse outcomes such as disengagement, emotional distress, and academic underachievement.⁷⁰ This is especially important for minoritized students and SWDs who are disproportionately punished and disciplined in schools, which cuts into their instructional time and the relationships they build with their teachers and peers. The value of intentional inclusivity and representation in math instruction is limited when other school policies, such as disproportionate and exclusionary discipline, send the message that some students are less welcome in the school.

Equitable Access to Instructional Materials

High-quality curriculum plays a critical role in improving student achievement. A 2015 study found that high-quality elementary math curriculum is “relatively low cost,” and “more rigorous elementary school math curricula can deliver more return on investment than other reforms.” Since curricula reforms are fairly inexpensive, investing in high-quality math curriculum has a return on investment almost 40 times that of class-size reduction.⁷¹ Studies of the impact of high-quality curricula on student achievement can be as large or larger than those associated with teacher effectiveness.⁷² Ensuring that all students have access to the necessary resources, such as up-to-date materials, access to tutoring, and math-related extracurricular activities, are also critical for creating a high-quality math learning environment. It is important that schools partner with community organizations, after-school programs, and other local resources to provide students with additional support.

Invest in Early Math Readiness

Early math skills are strong predictors of later academic achievement — not just in math, but across subjects. Yet children from historically marginalized communities often enter school with fewer opportunities to engage in rich mathematical thinking due to systemic inequities in early childhood education access and quality. Expanding access to early childhood programs, such as universal pre-kindergarten, can help increase math readiness for young learners, especially for minoritized children.⁷³ Longitudinal studies show that toddlers and preschoolers in early learning programs exhibit stronger performance in math and STEM than children who do not attend these programs through elementary school and beyond. In fact, when caregivers provide sensitive, cognitively stimulating interactions, children show long-term gains in STEM standardized tests and course selection — and this is particularly pronounced for low-income students and students of color.⁷⁴

Access to Advanced Coursework

Advanced course taking is associated with short- and long-term benefits. Students who have taken more advanced math courses have higher rates of college enrollment, persistence, and degree completion. For high-achieving Black and Latino students, enrollment in advanced math can significantly reduce or eliminate the achievement gap with their high-achieving white peers.⁷⁵ Advanced math coursework (such as Algebra I in middle school, geometry, and calculus) is a critical gateway to postsecondary STEM opportunities, yet underrepresented students are often tracked out of these pathways due to bias, limited access, or lack of early preparation.

A 2024 analysis of state math graduation requirements focused on Algebra also found that only 19 states require Algebra II or Integrated Math III as a graduation requirement. This is critical, as Algebra II is considered a baseline for college readiness.⁷⁶ Algebra I and II are strong predictors of college enrollment and completion, as they prepare students for advanced STEM coursework and support long-term academic persistence. Across the states, Algebra I is often the math course that students have to take and sometimes pass in order to graduate. Therefore, early investment in students' core math foundations (i.e., arithmetic fluency, number sense, rational numbers, graphic basics, mathematical reasoning, and early algebra skills) are essential to equip students to successfully pass Algebra I. Providing the conditions early enough to ensure students are ready for algebra is important since passing Algebra I is critical for alignment with many postsecondary pathways, including college.⁷⁷ Because Algebra I serves as a milestone course, early readiness ensures that students — especially those from marginalized backgrounds — have equitable access to graduation pipelines and STEM tracks.

Creating graduation requirements can help to ensure meaningful high school diplomas only if all students are provided the access and support for success in meeting those requirements. The false choice between lowered requirements and inadequate support in meeting those requirements provides no benefit to marginalized students. All students deserve access to college ready curriculum and the opportunity to succeed in those classes and graduate with a meaningful diploma.

Access to Universal Design

Universal Design for Learning (UDL) offers a powerful framework to help all students master math by proactively reducing barriers and accommodating diversity in how students learn, engage, and demonstrate understanding. UDL ensures that diverse learners — including students with disabilities, ELs, and those from varied cultural backgrounds — can engage with rigorous math content at grade level.⁷⁸ Similar to ensuring all instruction is of high quality, even when the stakes of instructional quality are higher for some students than others, ensuring efforts are taken across all curricular content and instructional approaches are accessible to all students provides a universal benefit.

Family Engagement

Engaging families and communities in the learning process supports student success. When families understand the importance of math and can support their children's learning at home, students are more likely to succeed. Schools can host family math nights, offer workshops, and encourage open communication between teachers and families to build a collaborative support network for students. For many parents, their own experiences of math learning may have been plagued with the many barriers referenced above. Schools may need to do the difficult work of helping caregivers to overcome their own internalized sense of “not being a math person” or their beliefs that only some students will succeed in math in order to protect their children from these same barriers.

The Importance of Investing in Diverse, High-Quality Math Instructors

Equitable access to high-quality math educators is among the strongest in-school factors influencing student math achievement. Yet underrepresented students are more likely to be taught by underprepared, inexperienced, or out-of-field teachers. Amidst the shortage of math educators, especially for the most high-poverty school districts, there is currently a wave of attacks on educators.

In March 2025, the U.S. Department of Education eliminated approximately \$600 million in federal teacher training grants designed for high-need rural and urban districts, citing opposition to programs embracing Critical Race Theory and social justice frameworks.⁷⁹

The administration is looking to end the high-quality teacher partnership (TQP) program. The fiscal year 2026 budget proposed eliminating the entire \$70 million TQP grant program, which is aimed at diversifying and strengthening teacher preparation pipelines in underserved areas.⁸⁰ Their elimination undermines the pipeline of well-prepared teachers for under-resourced communities.

Educator Diversity

Teacher diversity is critically important to students' positive experiences in school and to greater student achievement.⁸¹ More importantly, educators of color have been shown to be more effective than white teachers at raising the achievement and graduation rates of students of color.⁸² A 2021 study found that Black students who have at least one Black teacher in elementary school are 9 points more likely to graduate high school and 6 points more likely to enroll in college when compared with their same-school, same-race peers.⁸³ A 2005 study found that increasing the share of math teachers who are Black increases the likelihood that a Black student will continue into more advanced math courses.⁸⁴ These findings are consistent with other research on the impact on achievement of students being taught by teachers who share their racial or ethnic identity. White students also benefit from exposure to racially diverse educators, including increased cultural competence, reduced racial bias, and improved problem-solving skills.⁸⁵

Culturally Responsive Pedagogy

Culturally responsive teaching is a key component of effective instruction, particularly for students of color and multilingual learners.⁸⁶ A 50-state survey of teaching standards found that most states incorporate some features of culturally responsive teaching into their professional standards. However, many of the core competencies of culturally responsive teaching are not included in state standards.⁸⁷ Moreover, states need to do more to clearly articulate how teachers can incorporate this pedagogy into their practice.⁸⁸ Research consistently finds that culturally responsive teaching improves student achievement, motivation, engagement, and problem solving, as well as their sense of safety and belonging.⁸⁹ Darling-Hammond and Cook-Harvey (2018) argue that “Teachers who respect cultural differences are more apt to believe that students from nondominant groups are capable learners and to offset stereotype threat by conveying their faith in students’ abilities.”⁹⁰ Culturally responsive teaching can contribute to greater achievement and an increase in students’ attitude and interest in mathematics.⁹¹

Teacher Preparation, Licensure, and Professional Development

The National Mathematics Advisory Panel (2008) strongly recommended that teacher preservice training must be strengthened to improve teacher effectiveness. They emphasize that “A critical component of this recommendation is that teachers be given ample opportunities to learn mathematics for teaching. That is, teachers must know in detail and from a more advanced perspective the mathematical content they are responsible for teaching and the connections of that content to other important mathematics, both prior to and beyond the level they are assigned to teach.”⁹²

There is also a growing body of evidence that teacher residencies (yearlong training programs that include classroom and coursework experiences) can improve the preparation and retention of teachers while increasing teacher diversity.⁹³ There is also considerable evidence that high-quality professional development can help teachers improve their instructional practice and support better outcomes for students.⁹⁴ Further, the impact of professional development on changing math and science teachers’ instructional practices can happen with focus on specific instructional practices and leading teachers to use those practices more frequently. Active learning increases the efficacy of professional development.⁹⁵

Recommendations

Early Math Readiness:

- For broader recommendations about ensuring equal opportunity in early care and education, see [Civil Rights Principles for Early Care and Education](#).
- Provide universal access to early childhood education programming, such as universal pre-kindergarten, to ensure all children from every background can be prepared to learn and succeed prior to entering kindergarten.
- Invest in recruiting and preparing early math educators.⁹⁶ By investing early in math education, students will be prepared to tackle increasingly complex math education throughout their K-12 schooling.
- Provide professional development for early childhood and K-12 educators (such as training on foundational math concepts, as developmentally appropriate).⁹⁷
- Facilitate family engagement in math, such as by empowering families as partners in early math development through math-at-home toolkits, workshops in multiple languages, and family math nights that demystify math and build confidence.
- Employ early intervention systems by implementing culturally responsive, strengths-based early assessments to identify students who may need additional support, and ensure timely and targeted interventions.

Course Access and Access to Advanced Math Courses:

- Expand advanced course offerings especially to rural areas and under-resourced schools and communities.
- Increase the availability of honors, AP, IB, dual-enrollment, and STEM-focused math courses in schools serving historically marginalized populations.
- Eliminate rigid tracking practices that disproportionately place students of color, ELs, and SWDs into lower-level math courses. Adopt de-tracked models with differentiated support that maintain high expectations for all.
- Strengthen on-ramps to support advanced math instruction and interventions (e.g., pathways for students starting in elementary and middle school to prepare students for higher-level math. Use acceleration models that are inclusive and not exclusive, auto-enrollment for advanced math courses, etc.)
- Use multiple measures for placement — for example, not just relying on standardized math scores for placement. Instead, incorporate classroom performance, teacher recommendations, student interest, and growth data.
- Audit placement procedures to eliminate barriers to participation based on race, ethnicity, first language, sex, and disability.

District/ Local Education Agencies (LEAs):

- Offer math enrichment programs, coaching, bridge courses, and summer math academies to prepare students for early Algebra I (ideally by 8th grade) and beyond.⁹⁸
- Create different compensation incentive structures to attract highly effective math educators to teach in their highest-need schools.
- Provide high-quality, sustained, and embedded professional development, particularly in high-needs schools, focused on improving math instruction, developing high-quality curriculum, addressing biases, and supporting the specific needs of ELs and SWDs.

District/ Local Education Agencies (LEAs), cont.:

- Develop, potentially with support from the state or federal government, alternative pathways into teaching, including teacher residency programs and Grow Your Own programs. Districts can focus on traditionally underserved and understaffed communities while ensuring initiatives lower turnover and contribute to diverse teaching workforces.
- Review math course access across the district and identify inequities. Develop policies to redress inequities and ensure all students have access to rigorous math courses.
- Automatically enroll eligible students into accelerated math courses.
- Develop and maintain professional learning communities for math.

State Policy:

- Assist districts in reviewing and implementing high-quality course materials and ensure that under-resourced communities receive rigorous curricula and instructional math materials. Additionally, provide tutoring and coaching to ensure educators have the tools and supports they need to deliver high-quality math instruction and use standards-based curricular materials. States can also invest in suggesting high-quality curricular materials based on their reviews and audits and help districts access those materials.
- Review teacher preparation programs and ensure that they include culturally responsive teaching practices in both coursework and practicum experience.
- Expand pathways into teaching through partnerships with school districts. Teacher residencies and Grow Your Own programs are effective at developing effective educators from diverse backgrounds who tend to stay in the profession longer than teachers prepared through traditional programs.
- Develop a repository of effective math professional development instructional best practices, strategies, and resources and build tools for LEAs to use to select and implement high-quality professional development with fidelity. Additionally, invest in professional development or learning opportunities that are aligned with high-quality curricular materials,
- Provide resources for low-performing and high-poverty school districts to provide sustained, high-quality math professional development — such as statewide professional learning communities for math.

Federal Policy:

- Provide seed grants to state education agencies (SEAs) and LEAs to develop teacher residency and similar programs focused on attracting high-quality teacher candidates to teach math, particularly in high-needs and underserved communities.
- Increase investment in Historically Black Colleges and Universities, Tribal Colleges and Universities, and Minority-Serving Institutions, particularly in their schools of education.
- Prohibit the use of seclusion, significantly limit the use of restraint, prohibit the use of corporal punishment, end federal funding for school-based law enforcement, ensure enumerated anti-bullying and harassment policies and supports for teacher training on positive responses to student behavior, and advance safe, healthy, and inclusive school climates through federal funding, data, and resource support.

Federal Policy, cont.:

- Ensure thorough compliance with Title VI of the Civil Rights Act of 1964, Title IX of the Education Amendments of 1972, Section 504 of the Rehabilitation Act, and the Americans with Disabilities Act (ADA) to ensure all students learn in environments free from discrimination and have equal opportunity in education.
- Advance access to early childhood education programming, such as Head Start and Early Head Start.
- Boost funding for the Child Care and Development Block Grant to help more families access affordable, high-quality early care and education.

Conclusion

Every student deserves high-quality math instruction that prepares them for success in K-12 and beyond. For too long, historically marginalized students have been denied full access to rigorous, affirming, and engaging math education that nurtures their potential and prepares them for the future. Ensuring that all students — regardless of race, income, language, ability, or geography — receive the mathematical knowledge and skills they need is essential. But instruction alone is not enough. Students also need safe, supportive learning environments that encourage exploration, value their voices, and promote collaboration. Students of color, SWDs, and ELs also deserve additional investments to ensure they receive culturally appropriate, rigorous, timely, and quality instruction. Students also benefit from early access to mathematical foundations, including in early childhood education programs, to prepare them for a lifetime of math competency. Finally, students deserve to access the same high-quality instruction and coursework, including advanced math courses, regardless of their backgrounds. School districts, state leaders, and federal policy leaders must build and maintain a high-quality and diverse pipeline of math educators. When schools commit to these conditions, they empower students not only to succeed academically, but also to think critically, engage civically, and contribute meaningfully to a diverse and inclusive democracy.

Author

This brief was compiled by Natalie Truong, Ph.D., Senior Program Manager, K-12 Education, at the Leadership Conference Education Fund. Natalie is a researcher and advocate with over 15 years of experience advancing equity in K-12 education. Her work focuses on civil rights, data transparency, and policies that can drive more equitable outcomes. Natalie has held leadership roles at national civil rights organizations and regularly contributes to research and advocacy efforts that connect education policy, equity, and community impact.

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