



DISTRICT LEADERSHIP FORUM

Understanding the Student Math Readiness Problem

Why Districts Face Ongoing Challenges in Math and
How EAB's Research Can Help Leaders Make Progress

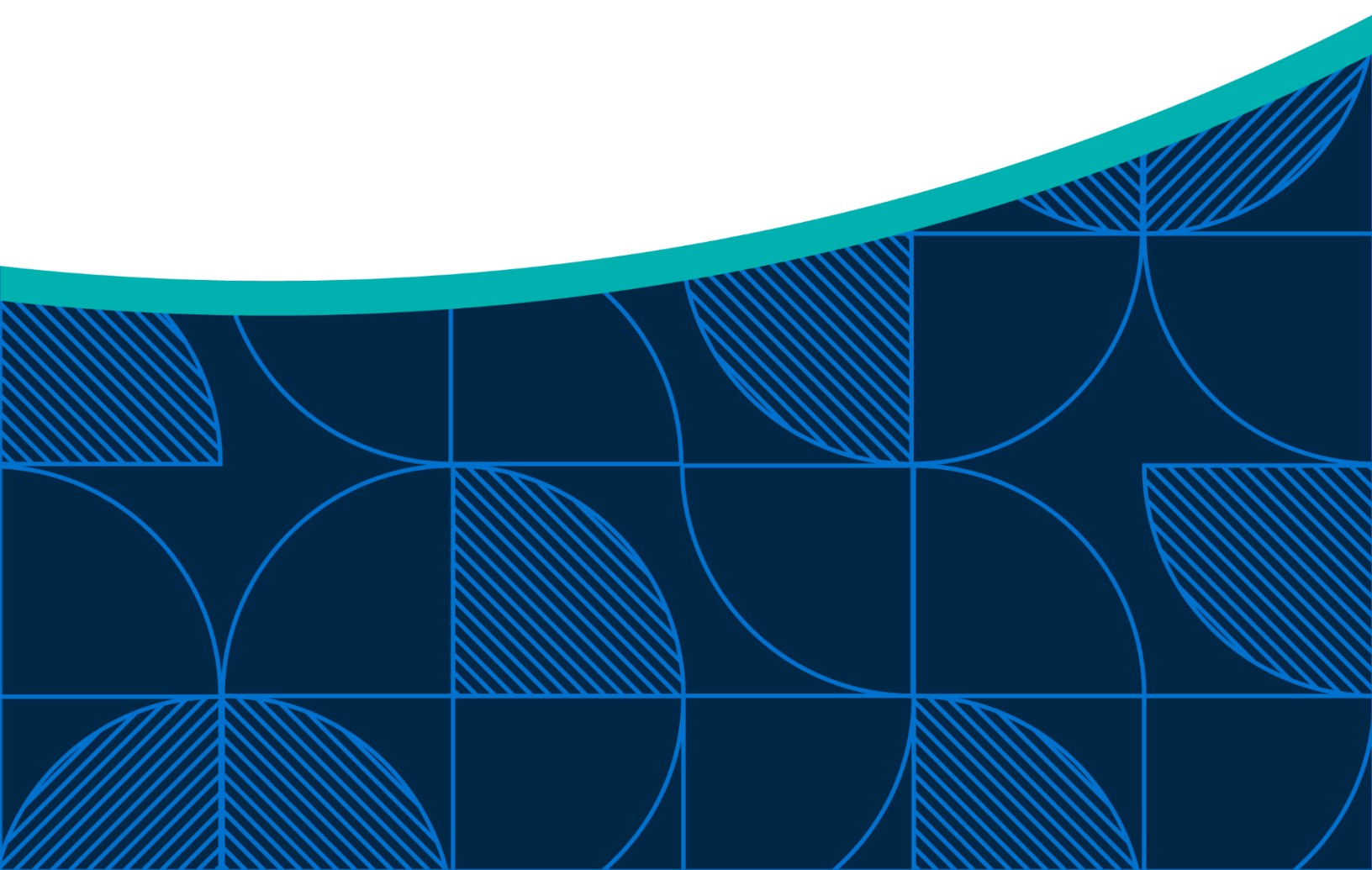


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Executive Summary

Across the country, educators are struggling to make progress in student math achievement¹. National assessment results show record-high numbers of students scoring below grade-level in math, and fewer high schoolers are meeting college-readiness benchmarks. While almost every demographic group saw declines following pandemic-era school disruptions, gaps between groups either persisted or grew wider. Regardless of region or students' historical math performance, administrators and educators see these trends playing out in their districts.

EAB's interviews with district leaders elevated numerous possible causes for declines or slow progress in math achievement. Many leaders cited challenges like socioeconomic barriers and students' limited access to math support at home. Nevertheless, the resource-intensive interventions needed to address these issues made progress feel out of reach.

Early insights from EAB's research reveal three key math challenges that are both within leaders' immediate control and require district-level solutions.

Our ongoing research will focus on addressing these three core challenges:

- First, more students are progressing through grade levels without mastering foundational math skills, leaving them unprepared for grade-level content.
- Second, teachers face increasing difficulty in delivering grade-level math instruction due to competing curricular and classroom demands.
- Finally, more students don't see a clear connection between math and their future goals, not only reducing motivation to persist through challenges but also potentially limiting access to advanced courses or math-dependent careers after high school.

EAB is launching a research effort to address these challenges in math instruction, aiming to produce resources and recommendations based on the real experiences of district leaders, teachers, and students. Through surveys, educator interviews, and best-practice research, EAB will develop actionable solutions for school districts to improve student math readiness and close achievement gaps.

1) Throughout this report, the term "achievement" is used to describe student performance on mathematics assessments, following the conventional terminology employed in federal and state assessment frameworks. While other terms such as "performance" or "learning" are also used in educational research and practice, the use of "achievement" here reflects established assessment terminology rather than any comparative judgment of student capabilities or effort.

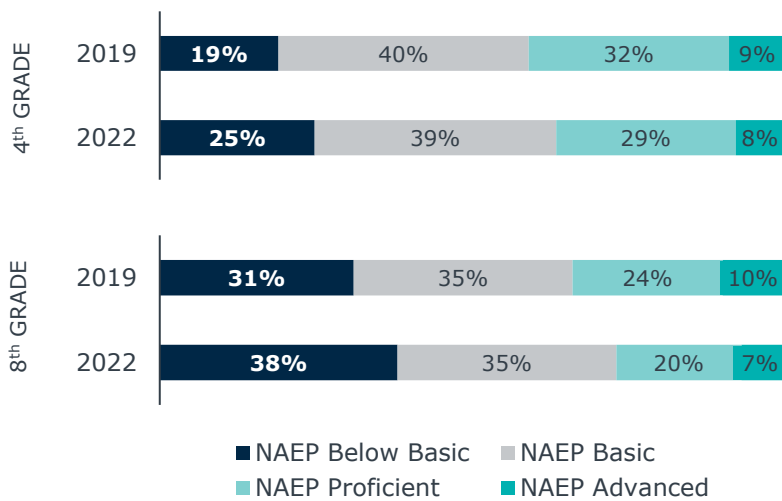
The State of Student Math Achievement in K-12 Public Schools

What has changed about student math performance?

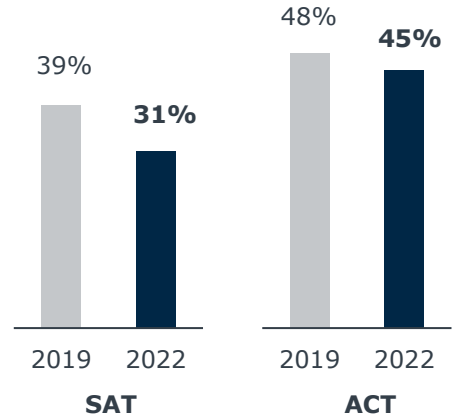
Student achievement on national math assessments fell to historic lows after the pandemic.

National Assessment of Educational Progress (NAEP) results show record-high percentages of students scoring "Below Basic" in math, with 25% of 4th graders and 38% of 8th graders falling into this category. Among high schoolers who took the SAT, 31% met the exam's math college readiness benchmark in 2022, down from 39% in 2019. ACT results also showed a decrease.

4th and 8th grade math NAEP performance by achievement level



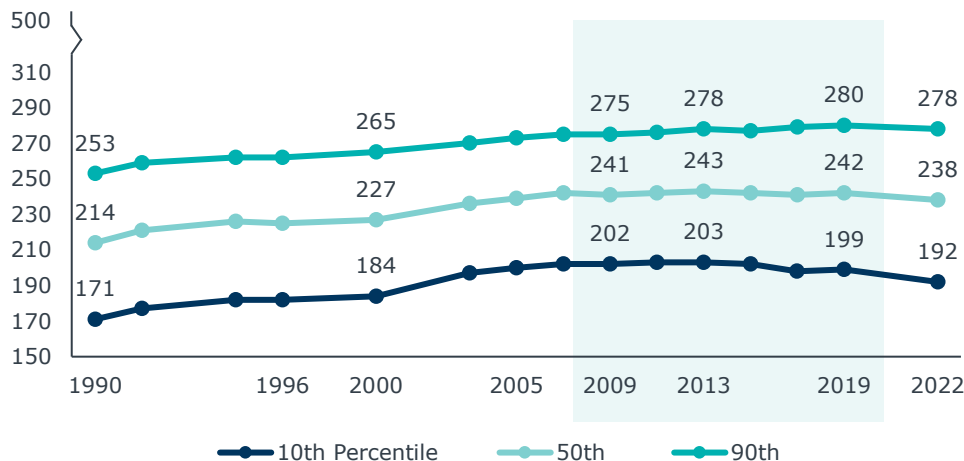
HS seniors meeting ACT or SAT math college readiness benchmarks



Nevertheless, math achievement was largely stagnant even before the pandemic.

Most districts still face challenges in recovering pre-pandemic performance levels – but even then, math progress was already unsatisfactory. NAEP results show little-to-no change overall across 2009-2019.

Trend in 4th grade NAEP math scores at three selected percentiles



Pre-pandemic stagnation was most pronounced among students at or below the 50th percentile, paving the way for even wider gaps after the pandemic.

Source: Nation's Report Card: Mathematics, [National Achievement-Level Results, Average Scores](#); College Board, SAT Suite of Assessments Annual Report, [2019](#) and [2022](#); The ACT, [Profile Report – National: Graduating Class of 2023](#)

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The State of Student Math Achievement in K-12 Public Schools

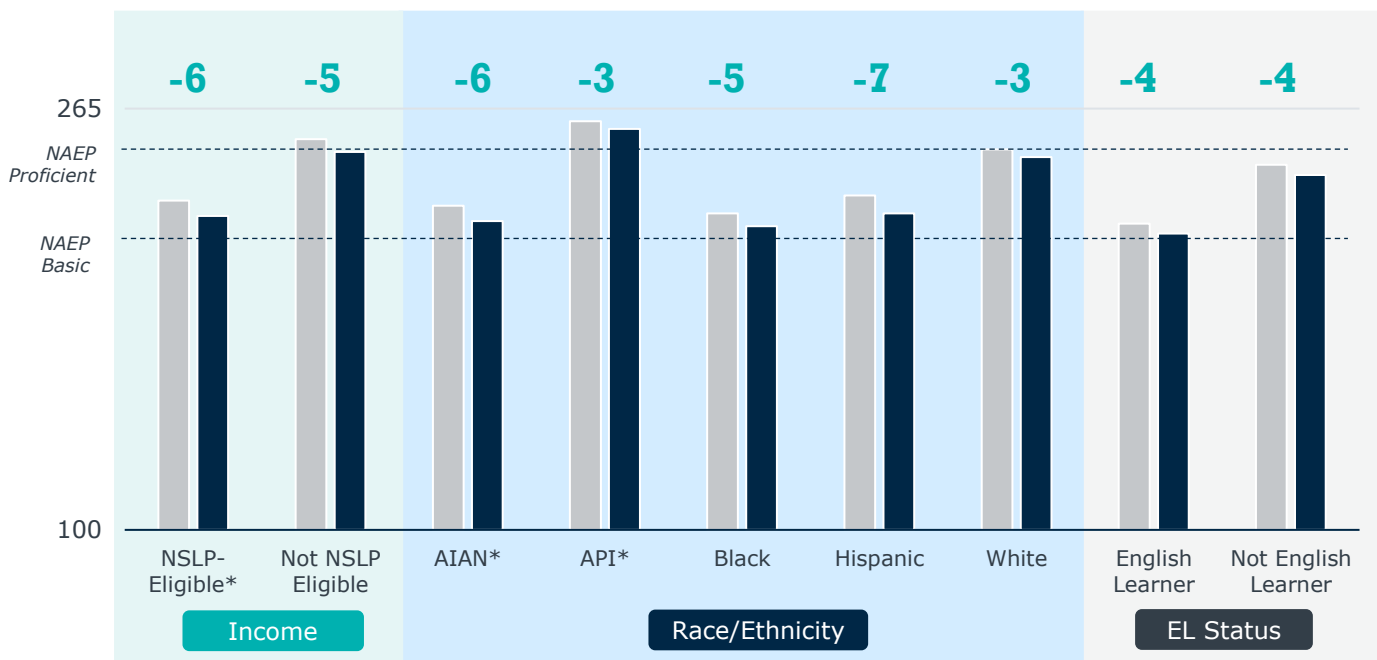
Is this decline in math performance true for all students?

Math achievement fell across demographics, and gaps between groups grew or persisted.

The data below are for 4th grade NAEP scores. Hispanic students saw the most precipitous disruption in progress with a seven-point decline in average NAEP score, equivalent to losing seven to eight months of instruction¹. Eighth grade scores follow the same pattern.

Average NAEP mathematics score for 4th grade students², by student group

■ 2019 ■ 2022



Challenges are persisting beyond high school, too.

Colleges and universities see similar struggles for recent K-12 graduates. [EAB's higher education partners are reporting](#) an overall drop in students' baseline math knowledge and skills as well as an increase in students enrolling in remedial math courses.



Institutions report incoming students struggle with **gaps in core knowledge**



Academic struggles lead to **higher DFW² rates** in introductory math courses



This is a huge issue... We're talking about college-level pre-calculus and calculus classes, and students cannot even add one-half and one-third."

Dr. Maria Emelianenko, Math Department Chair, George Mason University

1) On the NAEP test, a 10-point change typically equates to about one year of learning. Thus, a 7-point drop in the 4th grade NAEP math test would represent approximately 0.7 years, or roughly seven to eight months of learning loss.

2) Refers to % of students in a course receiving a "D" or "F" grade or who withdraw

*"NSLP" refers to National School Lunch Program; "AIAN" refers to American Indian/Alaska Native; "API" refers to Asian/Pacific Islander

Sources: Nation's Report Card: Mathematics, [National Student Group Scores and Score Gaps](#); *The Christian Science Monitor*, 'A huge issue': [US colleges work to shore up student math skills](#), 2023; EAB interviews and analysis

Continued:

The State of Student Math Achievement in K-12 Public Schools

Is this decline in math performance true for *your* students?

Almost all district leaders we spoke to see this challenge in their schools.

While the assessment data on the previous pages offer a point-in-time snapshot of student math achievement, EAB partner district leaders and educators confirm that these trends align with what they observe in their schools today. Even in districts where most students reach proficiency on state assessments, leaders report slow progress. In interviews conducted in late 2024, leaders discussed the math challenges their districts are facing:

"Sixty to eighty percent of our students are performing below grade level, which is very concerning to me. **It's alarming to think that we're sending so many students to high school significantly behind in math.**"

District Leader, Urban West Coast School District

"The pandemic hit, and we had a huge crisis in mathematics... **and we've struggled the last few years to come out of that.**"

Mathematics Coordinator, Rural Northeast School District

"Our middle school scores are alarming, **but that's been a trend for I don't know how many years.**"

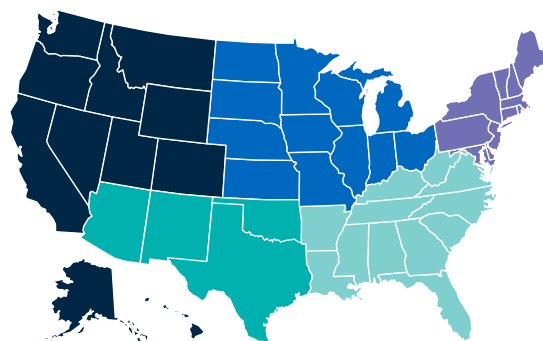
District Leader, Rural Southwest School District

"Our biggest concern as a district has been our math achievement... because **our math scores are very low and have been declining.**"

Assistant Superintendent, Suburban Midwestern School District

"This is an area where our achievement is lowest and slow to improve. We're looking for **research on what and who is making significant progress, and how.**"

Superintendent, Urban Southeast School District



Where do district leaders go from here?

Many leaders expressed doubt that their existing approaches were truly solving the core issues in student math learning. This emerging doubt points to a critical question: *Why* are students falling short in making math progress, and what can district leaders do about it?

“ I think we are doing a better job of holding students to high standards. But as soon as you do that, you start to reveal issues that were likely present even when we [district leaders] were in elementary school, though they may not have been discussed as much.”

– Head of Assessment, Suburban East Coast School District

Three Math Challenges District Leaders Must Address

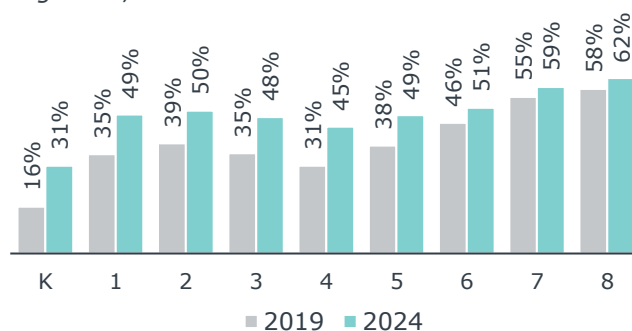
EAB’s analysis and interviews with district leaders highlight three critical challenges in math that directly impact student success and require district-level solutions. Our ongoing research will focus on investigating these problems, identifying where districts need the most support, and sourcing replicable strategies.

1 More students are entering their grade lacking prerequisite knowledge or skills.

National benchmarking data shows that more students in 2024 are missing prerequisite grade-level skills than in 2019, and the percentage grows across kindergarten to 8th grade.

Why This Matters: [The cumulative nature of math](#) means that students who lack prerequisite skills for one grade level will struggle even more in subsequent grades if those gaps are not addressed, compounding their learning difficulties over time.

Percent of students **below grade level** on i-Ready Diagnostic, 2019 and 2024



2 Fewer teachers are successfully delivering and differentiating grade-level instruction.

Even when students arrive with sufficient prerequisites, they often do not get the instruction needed to master grade-level content. Teachers face competing curricular and classroom demands that make it hard to help every student reach mastery. As a result, many must choose between moving ahead with the curriculum or spending more time helping students who need additional support.

Why This Matters: [Research shows](#) that spending too long on remediation limits opportunities for grade-level mastery – but so does advancing too quickly.

Student assignment completion versus mastery of grade-level standards on those assignments

71% of assignments tracked in a 2017 TNTP study were successfully completed by students

17% of those same assignments showed students’ mastery of grade-level standards

3 Fewer high school students believe the math they learn in school is relevant to their future.

In addition to the increasing number of students with foundational skill gaps, more students (and even some educators¹) feel that math taught in school is not relevant to students’ postsecondary futures.

Why This Matters: In EAB’s interviews, educators widely agreed that when [students struggle to connect learning to their lives](#), they are less likely to make progress with skill interventions.

“Math is important, but we’re being taught the wrong kind of math.”

“Not knowing how to do taxes is frustrating, but at least I know algebra.”

- Student participants in YouthTruth Survey, 2023

▶ **80%+** of college professors of humanities, sciences, and business believe incoming high school students **do not have the math skills required** for common college majors¹

Read on to learn EAB’s plan for investigating these challenges.

On the following pages, explore each challenge in detail along with EAB’s proposed research plan to address them.



1) A survey of 300 Alabama professors from non-calculus-intensive fields, including data sciences, natural sciences, social sciences, business, and humanities, found consensus across disciplines that students lacked essential skills in interpreting quantitative information needed for college success.

Sources: Curriculum Associates, [State of Student Learning 2024](#); TNTP, [The Opportunity Myth](#), 2018; YouthTruth, [Making Sense of Learning Math: Insights from the Student Experience](#), 2023; Martin et al., [What Mathematics Do Students Need for College? A Data-Informed Discussion](#), 2023; Hechinger Report, [Professors say high school math doesn’t prepare most students...](#), 2023; EAB interviews and analysis.

How Can Districts Reduce Prerequisite Skill Gaps?

Our Goal: Help districts identify prerequisite skill gaps early enough to guide curriculum pacing, ultimately helping teachers address prerequisite gaps while maintaining grade-level instruction.

Barrier to Investigate: Summative assessments offer a broad view of student achievement but often **lack the granular detail district leaders need to adjust curriculum** or clear next steps for guiding teachers in refining instruction.



Though districts have tools to track math proficiency (e.g., benchmark assessments), many of these tools fail to accurately identify the specific prerequisite skills students lack.

- Many standardized tests and benchmarks show students' proficiency in broad content areas (e.g., algebraic thinking) but don't identify specific standards or prerequisite skills they missed.
- Some leaders question these assessments' usefulness, as they often test content misaligned with the district's curriculum and assess skills that teachers may not have introduced yet.
- Without a clear understanding of students' specific skill gaps, additional math supports risk addressing the wrong skill gaps or duplicating existing efforts.

*"I find [our state data] interesting, but I'm not sure how useful it is beyond showing that more of our students are scoring below basic. We track this data to avoid sanctions, but **it doesn't really help us plan next steps to improve instruction.**"*

District Leader,
West Coast School District



District leaders struggle to adjust annual or semesterly curriculum pacing guidance, leaving teachers to adjust their pacing last-minute – or not at all.

- Even if district leaders feel assessment data offers an accurate picture of students' skill gaps, there is no clear playbook for adjusting curriculum scope and sequence each year while still allowing teachers to stay on track for covering grade-level instruction.
- As a result, teachers must adjust scope themselves, which increases their workload, creates inconsistency in prerequisite skill intervention across classrooms, and can ultimately leave skill gaps unaddressed.

EAB's Plan to Investigate This Problem:

- ❑ Identify commonly missed yet critical prerequisite skills using a combination of data analysis, research review, and educator interviews.
- ❑ Analyze effective district processes for guiding curriculum adjustments based on the most critical prerequisite skill gaps

How Can Districts Ensure Delivery of Grade-Level Instruction?

Our Goal: Help districts provide teachers formative assessment tools, training, and protected instructional time to effectively teach and adjust daily grade-level instruction for all priority standards.

Barrier to Investigate: On a day-to-day basis, **teachers are struggling to deliver and differentiate grade-level instruction** to a widening range of student math knowledge and skills.



Teachers often struggle to identify which grade-level skills students need additional support to master.

- Many teachers lack efficient formative assessment tools aligned to existing curriculum – and even if they do have them, many still struggle to use them effectively (e.g., how to assess a complex standard; when to check for understanding during a multi-day or multi-skill lesson).
- Teachers don't have enough time to give formative assessments in the first place. Teachers report uncertainty about how to balance assessments with core instruction while continuing to address existing classroom management issues.



Even if they know where students need more support, many teachers cannot adjust their instruction in time.

- Many formative assessment instruments lack clear next steps for teachers, such as recommendations or curriculum resources tied to each standard or skill.
- Teachers are often overwhelmed by the number of standards or skills they must address at once, possibly overlooking critical skill gaps as they aim to address every curriculum demand.

*"Students are walking into the classroom with a wide spectrum of mathematical skills, mathematical experience, mathematical competency, student skills –behavior challenges or not. And we're telling teachers, 'Oh, just differentiate.' That's an easy label to put on it. **But we're not providing them the tools.**"*

Head of Assessment,
East Coast School District

EAB's Plan to Investigate This Problem:

- ❑ Identify major yet surmountable barriers to more effective formative assessment via teacher surveys/interviews, noting where perspectives differ from administrators.
- ❑ Highlight success stories for alternative forms of whole-class and small-group differentiation that meets changing classroom management needs.

How Can Districts Strengthen Math’s Relevancy for Students?

Our Goal: Help districts make clear connections between the math skills that colleges and careers deem relevant, what schools teach, and what students consider important for their own goals.

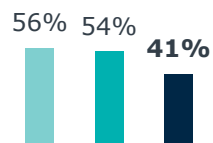
Barrier to Investigate: A growing number of students feel that the **math skills taught in school are irrelevant to their personal goals**, either because the skills genuinely do not apply to their future or because students fail to see their importance.



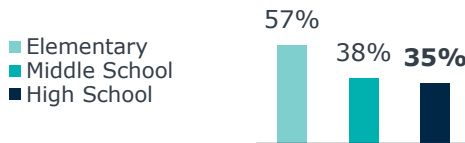
High school math classes are more likely to lack relevant learning experiences for students than other grade levels.

As students progress from grades K–5 to high school, teachers report that they spend less time on activities designed for engagement or aligned with student interests.

"Students apply math to solve problems in real-world contexts"



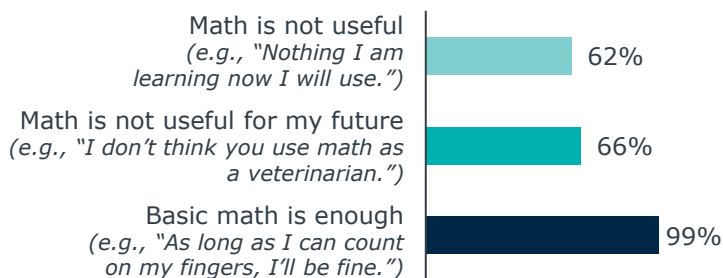
"Students explain their thinking or build on others' thinking"



Even for math skills and courses that are “relevant,” a growing number of students still do not believe the math they learn in school is important.

Surveys show that most students harbor some concern about math relevancy. Even students on an accelerated math track, such as those completing Algebra I in 7th or 8th grade, show no greater enthusiasm for math than their peers¹.

High School Student Perceptions of Math’s Usefulness, General and Advanced Students, 2023



"There's a huge misconception among kids and adults that the only kids who need to take four years of math are kids who are going to be engineers."

Director of Mathematics,
East Coast School District

EAB’s Plan to Investigate This Problem:

- Conduct interviews and review research to find strategies that connect math instruction with real-life applications.
- Analyze data from higher education and the labor market to help districts align math courses with future career needs.

1) According to a [2023 YouthTruth survey](#), 57% of students agree that it is important to learn math. This sentiment cut across demographics, including advanced math learners.

Sources: EdReports, [How Do Students Engage With Mathematics in the Classroom?](#), 2023; Douglas, A. et al., ["He's Probably the Only Teacher I've Actually Learned From" ...](#), 2024; EAB interviews and analysis

How Your District Can Inform EAB's Research

EAB is conducting research to tackle the challenges surrounding student math readiness, and your district's insights can make a difference.

[Reach out to our research team](#) to find ways you and others in your district can help shape strategies for addressing math skill gaps, supporting responsive math instruction, and enhancing math relevancy.

Core Research Questions Driving EAB's Math Research



How can districts reduce prerequisite skill gaps?



How can districts ensure delivery of grade-level instruction?



How can districts strengthen math's relevancy for high school students?

Your participation is also an opportunity to guide the direction of research. These are our three current focus areas, but we may shift focus or iterate our point of view as we uncover new insights.

How Your District Can Get Involved

- Connect with one of our experts to review your district's summative assessment results for common prerequisite skill gaps (e.g., state assessment data, diagnostic assessment data).
- [Participate in an EAB research interview](#) to discuss common areas of struggle for students and teachers in the math classroom.
- Invite your teachers to participate in research interviews to uncover common frustrations with formative assessment and differentiation.
- Share your innovative math course pathways or math engagement techniques with our research team.

▶ [Complete this 1-question survey](#) to connect with our math research team.



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ABOUT EAB

At EAB, our mission is to make education smarter and our communities stronger. We work with thousands of institutions to drive transformative change through data-driven insights and best-in-class capabilities. From kindergarten to college to career, EAB partners with leaders and practitioners to accelerate progress and drive results across five major areas: enrollment, student success, institutional strategy, data analytics, and diversity, equity, and inclusion (DEI). We work with each partner differently, tailoring our portfolio of research, technology, and marketing and enrollment solutions to meet the unique needs of every leadership team, as well as the students and employees they serve. Learn more at eab.com.