Solving for X in Texas

Math Trends, Challenges, and Opportunities for the Lone Star State

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Executive Summary

Texas has a math problem

As the number of math and STEM-oriented jobs increases at a rate faster than the national average, Texas students must be equipped with the mathematics knowledge and skills to secure high-wage, high-demand jobs, and innovatively lead in the ever-changing workforce.[8]

Unfortunately, Texas students are not demonstrating the level of math achievement needed to be successful in today's — or tomorrow's — economy. The state of math achievement in Texas is dire. While the state made general investments in remediation and acceleration efforts after the pandemic, students are not recovering as quickly in math as in other subjects.[9] In nearly every tested grade, Texas students remain below pre-pandemic math achievement with less than half of students at grade level.[10] This recovery is further complicated by the fact that so many parents are unaware of the reality of how their child is performing in math, with only 10% of parents believing their child is behind at all.[11]

Texas' math problem is not new

Texas' problem with math started long before the COVID-19 pandemic caused unprecedented disruptions to learning. To address this more than decade-long decline, Texas should prioritize building a strong and enduring foundation of math in the early grades, which will prepare students for more complex math, STEM coursework and advanced critical thinking in the middle and later grades. Math learning builds, so the solution needs to start in the early years and grow consistently over time.

[1]2023 STAAR Results accessed via TAPR Statewide Report
[2]NAEP Texas State Profile
[3]NAEP Data Pull
[4]2022 TEA Annual Report & NAEP Texas State Profile
[5]2023 STAAR Results accessed via TAPR Statewide Report, The percentage of students performing at or above grade level in 4th grade in 2023 is the same as 2019.
[6]Texas Education Agency, A-F System Refresh Update Call Dec 1, 2022 Presentation (Slide 21), 2022.
[7]Learning Heroes and Gallup - B-Flation (2023)
[8]U.S. Bureau of Labor Statistics
[9]The Commit Partnership Analysis
[10]2023 STAAR Results accessed via TAPR Statewide Report, The percentage of students performing at or above grade level in 4th grade in 2023 is the same as 2019.
[11]Learning Heroes and Gallup - B-Flation (2023)

7 Fast Facts

55%

of Texas students are below grade level in math.[1]

21-point decline

in the percent of Texas eighth graders scoring at or above "Basic" on the National Assessment of Educational Progress since 2011.[2]

Texas eighth graders dropped roughly two grade levels in data analysis, statistics, and probability skills since 2011.[3]

only 11%

Of Black eighth graders are considered proficient, while Texas is ranked No. 1 for Black achievement on both fourth- and eighth-grade math.[4]

In nearly every grade, Texas students remain below pre-pandemic math achievement.[5]

Less than half of Texas high school graduates meet college readiness benchmarks in math.[6]

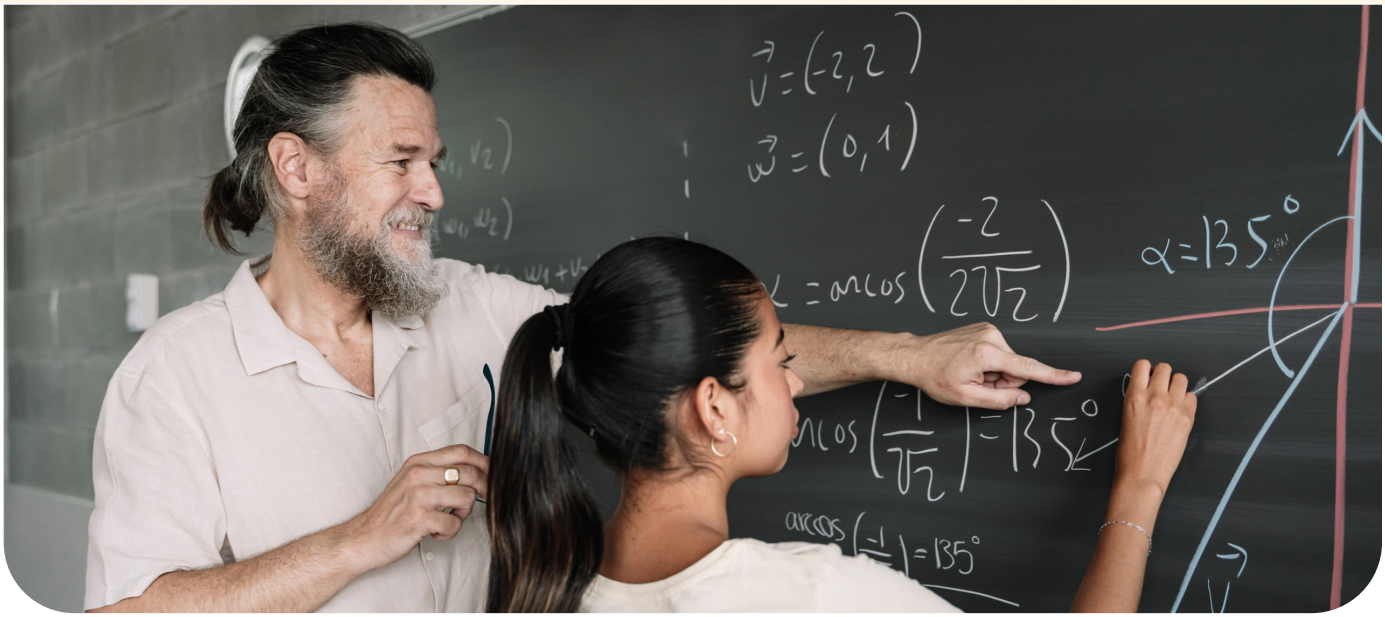
1 in 10

parents believe their child is performing below grade level in math.[7]

This is a problem Texas can solve

Texas has adopted promising reforms in recent years, and state leaders have an opportunity to learn from the policies and practices being implemented in other states as they improve mathematics instruction and outcomes. States like Alabama, Florida and Arkansas have taken bold steps in student intervention and acceleration, teacher training and parent notification, positioning themselves as leaders in mathematics and STEM education.[12] While policymakers contemplate ways to improve math education in Texas, it is worth considering options that take a comprehensive approach incorporating students, teachers and parents to help students succeed, such as:

- Supporting high-quality math instruction.
- Producing high-quality professional development and coaching to ensure teachers are equipped with tools to help struggling students.
- Increasing the emphasis placed on math content and pedagogy in Educator Preparation Programs.
- Measuring math achievement in high school grades to increase transparency.
- Utilizing math "screeners" — short diagnostics that identify who is struggling and what types of support they need to progress toward grade-level goals — in early grades and promptly notifying parents of identified difficulties.
- Providing parents with resources to support tailored "math-at-home" instruction.
- Developing targeted plans for children in need of math intervention, including activities during the summer



Ensuring that students have strong foundations in mathematics is not just about individual achievement, it is about preparing a workforce that is capable of leading in industries vital to Texas' economy, such as energy, agriculture and technology. If Texas does not address the systemic issues that it has with mathematics education and achievement, it will be relegating its students to the side lines of the future workforce without the skills and knowledge to take full advantage of the promise of the Texas miracle.

[12] Education Week: 7 States Now Require Math Support for Struggling Students (Schwartz 2023)

CHAPTER 1

Math Achievement in Texas by the Numbers

- Texas' Ranking and Performance on the "Nation's Report Card"
- Texas student performance on a Texas test
- MAP Growth assessment data tells a similar story
- College readiness exams are clear — the majority of Texas students aren't ready

CHAPTER 1

Math achievement in Texas by the numbers

Texas students are struggling in math. Although pandemic-related disruptions obstructed learning, low math proficiency among Texas students predates COVID-19. If not corrected, Texas students — and the state's economy — will be left behind.

The evidence of low math proficiency is found in a variety of national and state assessments that measure math aptitude and achievement. The National Assessment of Educational Progress (NAEP), the State of Texas Assessment of Academic Readiness (STAAR), the Measures of Academic Progress (MAP) Growth assessment, and several college readiness assessments all say the same thing: **Texas has a math problem.**

KEY TAKEAWAYS

- **Across national and state assessments, the SAT, ACT, and district diagnostic tests,** Texas students are struggling in mathematics.
- **Texas student performance in math began declining prior to the pandemic, though school disruptions had a real impact.** The percentage of eighth-graders scoring at or above "Basic" on the NAEP has fallen by over 20 percentage points since 2011. The percentage of eighth graders scoring Proficient in math has fallen 16 points over the same time period. **This results in less than one-fourth of Texas eighth graders being Proficient in Math.**
- **More than half of students are below grade level in math in Texas.** Just 45% of students meet grade level standards in math on the STAAR exam across all tested grades. At the peak, just prior to the COVID-19 pandemic, only 52% met grade level standards.
- **College entrance exam data shows consistent year-over-year declines in the percentage of tested students meeting math benchmarks.** The percentage of students meeting math benchmarks on the SAT has fallen from 42% to 32% since 2017. The percentage of students meeting math benchmarks on the ACT declined from 47% to 30% since 2014.
- **Texas student math achievement continues to decline after fourth grade.** Texas currently ranks No. 14 in fourth-grade math but No. 25 for eighth-grade on NAEP. Cohort analysis reveals Texas students experienced substantial loss of proficiency between fourth- and eighth-grades, prior to the pandemic. The most recent available data shows the Texas graduating class of 2023 had 43% of students scoring at or above Proficient in fourth grade. This dropped to only 30% by the time the same cohort of students reached eighth grade.

Texas' Ranking and Performance on the "Nation's Report Card"

The National Assessment of Educational Progress shows persisting declines in math among Texas students.

The National Assessment of Educational Progress (NAEP), commonly referred to as the "Nation's Report Card," is the only national standardized testing program designed to track academic performance across states. Since 2002, states have been required to participate in these testing programs for math and reading to receive Title 1 funding from the federal government.[13]

While the NAEP tests several subject areas, it gives unique insight into the performance of fourth and eighth graders in math and reading, allowing the public to compare student achievement trends across states and over several decades.

The NAEP has three achievement levels: Basic, Proficient and Advanced (see graphic below). Students who do not meet the threshold for Basic performance are identified as "below Basic" in NAEP reports. These performance levels do not correspond directly to those used in Texas or other state assessments. This is because state assessments measure against the standards set by the state. Instead, NAEP's levels provide an understanding of whether students can perform basic or complex tasks in the assessed grade and subject.

NAEP achievement levels are based on a long-standing process conducted by the National Assessment Governing Board, which oversees the assessment. The achievement levels in mathematics were set in 1992 with adjustments to weights made in 1996.[15] This process involved 20-30 subject matter experts, a role fulfilled by teachers and other experts, who set standards based on their knowledge and expertise guided by past student responses and performance on the NAEP. NAEP's Basic level sets a standard for knowledge and skills that are fundamental to a child's learning. The Proficient level indicates students who have shown competency beyond the fundamental material. But it does not necessarily indicate that students are performing on grade level as NAEP adheres to different standards than state grade-level assessments. The Advanced level indicates a student's superior performance.

National Assessment of Educational Progress Achievement Levels[14]	
Basic	A student shows partial mastery of the knowledge and skills that are fundamental for proficient work at a given grade.
Proficient	A student shows solid academic performance for the given grade level and competency over challenging subject matter including subject-matter knowledge, application of such knowledge to real world situations, and analytical skills appropriate to the subject matter.
Advanced	A student shows mastery of both the NAEP Basic and NAEP Proficient levels and represents superior academic performance.

[13] The Overview of the Nation's Report Card FAQ: Is participation in NAEP voluntary?
[14] NAEP Technical Documentation Achievement Levels. National Center for Education Statistics, 2023.
[15] Methods for NAEP standards setting

Texas boasts high rankings in certain student populations, but actual achievement levels remain low.

States look at NAEP results to see how their students' performance compares to students in other states, celebrate performance increases, and identify areas of concern. Rankings are based on average scaled scores on the assessments. Texas currently ranks No. 14 in fourth-grade math and No. 25 in eighth-grade math overall.[17] For some specific student populations, however, Texas ranks higher than most states.

Texas ranks in the top 10 states for Black, Hispanic, and economically disadvantaged students in both fourth- and eighth-grade math.[18] Texas ranks highest in the nation for Black students in math and has the smallest achievement gap between white and Black students.[19]

But simply comparing state-by-state student performance can hide the large number of students who are being left behind. This gives state leaders and policymakers a false sense of comfort and distracts from the fact that millions of Texas children are not receiving the education and support that they need to achieve their full academic potential.

NAEP assessment results for mathematics at grades 4 and 8 are reported as average scores on a 0-500 scale. These scale scores, derived from student responses to assessment questions, summarize the overall level of performance attained by that student. Scale scores for individual students are not reported, but summary statistics describing scale scores for groups of students (demographic, gender, race/ethnicity, etc.) are reported.[16]

Student Group	Grade Level	National Rank
Black	4th Grade	1st
	8th Grade	1st
Hispanic	4th Grade	4th
	8th Grade	7th
Economically Disadvantaged	4th Grade	6th
	8th Grade	9th
White	4th Grade	2nd
	8th Grade	24th

While Texas ranks first in the nation for Black student performance,

only 11%

of Black students in Texas achieve at or above Proficient in eighth-grade math

Texas can tout being No. 1 in the nation for Black students, but the reality is that **only 11% of Black students in Texas achieve at or above Proficient in eighth-grade math[20]** and less than half of Black students scored at or above Basic. Comparatively, white eighth graders were testing at 72% at or above Basic and 36% at or above Proficient.[21] That Texas ranks No. 1 in Black student performance with its current outcomes should be a wake-up call for a national conversation about improving math performance.

[16] Scale Scores and NAEP Achievement Levels, NAEP
[17] 2022 TEA Annual Report
[18] 2022 TEA Annual Report
[19] Nation's Report Card Shows Texas is Recovering from the Pandemic in Reading, Much Work Remains in Math, TEA (2022).
[20] 2022 Texas 8th Grade NAEP Snapshot
[21] 2022 Texas 8th Grade NAEP Snapshot

The disconnect between state rankings and proficiency is further demonstrated by examining the average scaled scores for each student demographic group. A state may rank higher in Black or Hispanic student performance than white student performance, even though Black and Hispanic students have lower scores. This is particularly pronounced in eighth-grade where Texas ranks No. 1 in the nation for the average score of Black students, but the average score is below the threshold for Basic. Hispanic students, which make up half of all students in the Texas public education system, rank in the top 10 but score around 20 points — the equivalent of roughly two years of learning — below their white peers in both fourth and eighth grade. Meanwhile, Texas ranks 24th in the nation for white students, whose average score is well above the threshold for Basic.

Texas Performance Relative to U.S. (2022)

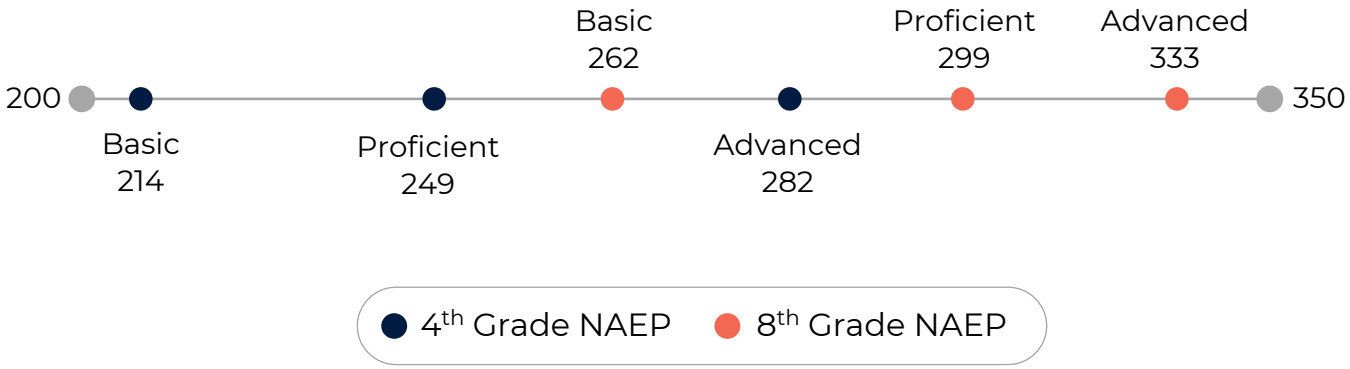
4th Grade Math

Student Group	Rank	Avg Score
Black	1st	236
Hispanic	4th	231
White	2nd	252

8th Grade Math

Student Group	Rank	Avg Score
Black	1st	260
Hispanic	7th	265
White	24th	284

NAEP Score Guide



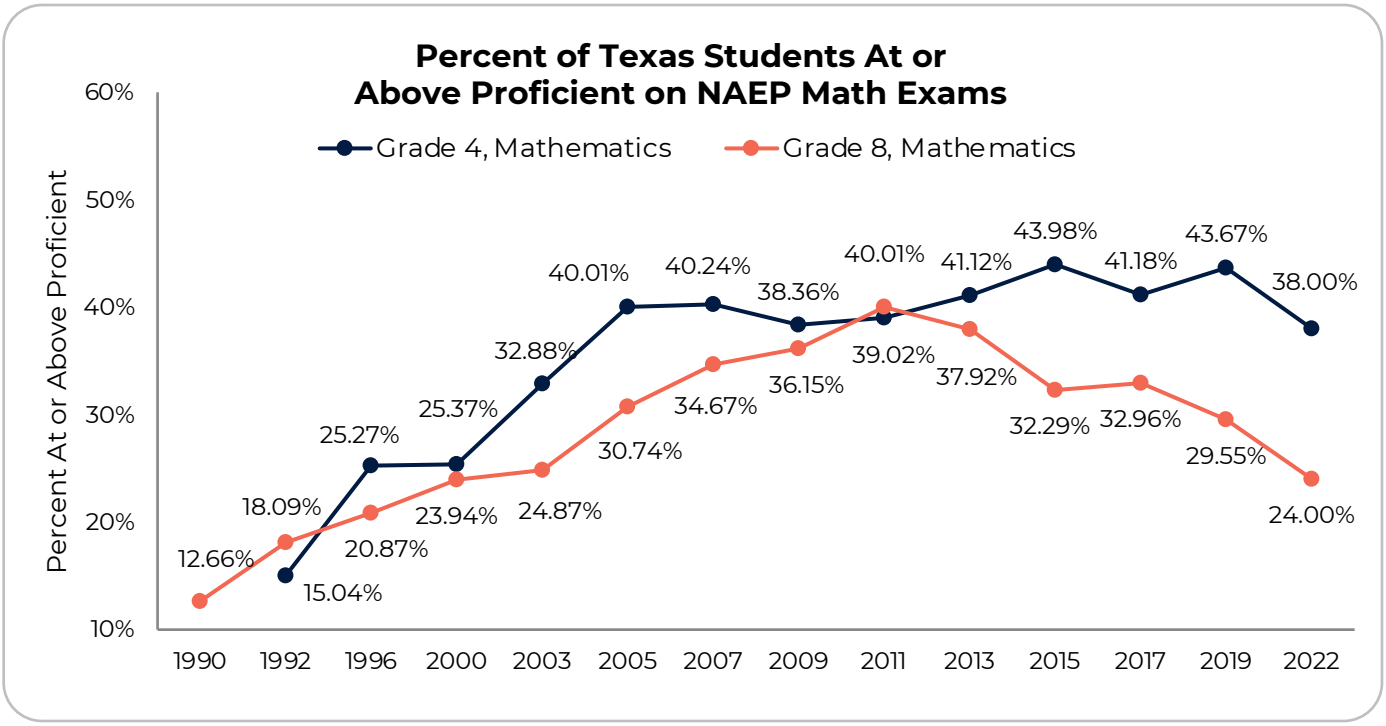
Texas eighth grade mathematics achievement has been declining for over a decade.

NAEP also shows that Texas eighth graders' decline in math achievement began long before the COVID-19 pandemic. The percentage of students performing "at or above Basic" in eighth grade peaked in 2011, at 81%. Since then, Texas experienced consistent declines in the percentage of students performing at or above Basic in eighth-grade, **dropping 21 percentage points since 2011**.[22] While national trends in math scores follow a similar pattern, only Delaware experienced a steeper decline over the same period. The fourth grade achievement, in contrast, remained relatively stable with more than 80% of fourth graders at or above Basic between 2003 and 2019. This fell to only 78% in 2022.

Less than one-fourth of Texas eighth graders are Proficient in math.

Nationally, the percentage of students performing at-or-above Basic is consistently higher in the fourth grade than in the eighth grade. The last time any state had more eighth graders performing at or above Basic compared to their fourth graders occurred in the year 2000.[23]

The percentage of eighth grade students performing at or above Proficient has seen substantial declines as well. This percentage fell roughly 10.5 points between 2011 and 2019, with an additional 5.5 point decline after COVID.[24] This means that a lower percentage of eighth graders are proficient in math today than were proficient almost two decades ago. Less than one-fourth of Texas eighth graders are Proficient in math.



[22] NAEP Texas State Profile
[23] Texas 2036 Analysis of NAEP Results, NAEP Data Pull
[24] Texas 2036 Analysis of NAEP Results, NAEP Data Pull

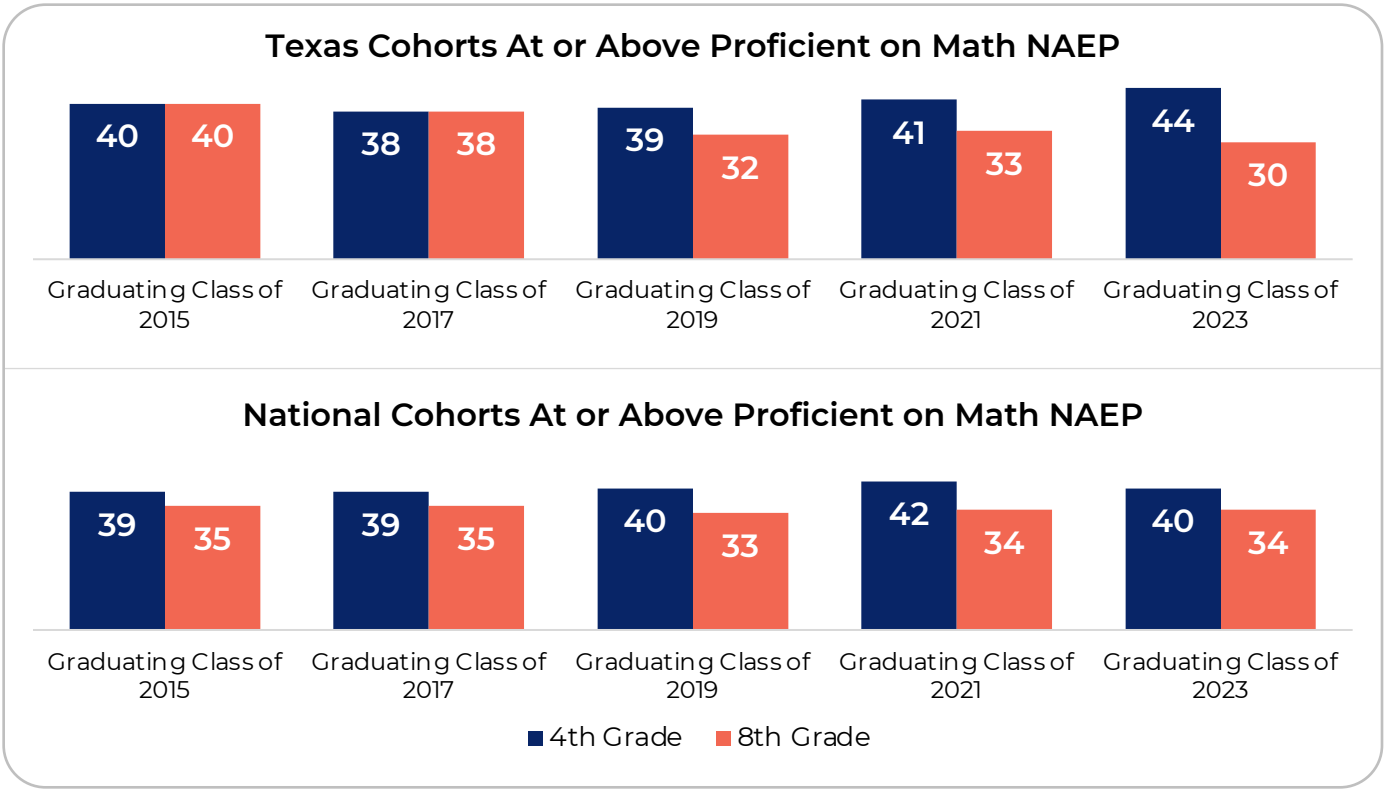
Cohort analysis indicates a turning point after fourth grade.

Cohort analysis of NAEP scores shows that student achievement at or above the Proficient level is declining at an increasing rate between their fourth-and eighth-grade years. Nationally, there is a general decline in the number of students scoring at the Proficient level between fourth and eighth grade, but the declines in Texas have begun to outpace the national average. The percentage of Texas students in the classes of 2019, 2021 and 2023 who scored in the Proficient level declined by 7, 8, and 14 percentage points, respectively.

Texas students in the class of 2023 experienced the greatest decline in students scoring Proficient of any state in the nation.[25]

All Declines in these Cohorts Occurred Prior to the Pandemic

Cohort	4th Grade Test Administration	8th Grade Test Administration
Class of 2023	Spring 2015	Spring 2019
Class of 2021	Spring 2013	Spring 2017
Class of 2019	Spring 2011	Spring 2015
Class of 2017	Spring 2009	Spring 2013
Class of 2015	Spring 2007	Spring 2011



[25] Texas 2036 Analysis of NEAP Results, NAEP Data Pull

Texas students have seen declines in almost all math content areas.

The NAEP tests students in five different areas of mathematics in both fourth and eighth grade:

+ Number Properties and Operations
+ Measurement
+ Geometry
+ Data Analysis, Statistics and Probability
+ Algebra

This content-specific math data from the last decade reinforce the fact that Texas students' problems with math were present long before the pandemic.

From 2011 to 2019, Texas fourth grade students experienced a decline in performance in two areas, measurement and geometry, by 1 and 5 points, respectively. In contrast to their older peers, fourth graders saw an 8-point increase in their scores for number properties and operations.[26] The majority of their decline occurred between 2019 and 2022.

4th Grade

Texas

Content Area	2011 Score	2019 Score	2022 Score	Change Before Pandemic	Change After Pandemic	Total Change
Number Properties & Operations	239	247	243	+8	-4	**+4**
Measurement	242	241	235	-1	-6	**-7**
Geometry	243	238	232	-5	-6	**-11**
Data Analysis, Statistics & Probability	239	240	236	+1	-4	**-3**
Algebra	244	245	241	+1	-4	**-3**

United States

Content Area	2011 Score	2019 Score	2022 Score	Change Before Pandemic	Change After Pandemic	Total Change
Number Properties & Operations	240	**243**	**239**	**+3**	**-4**	-1
Measurement	238	239	235	+1	-4	**-3**
Geometry	241	234	230	-7	-4	**-11**
Data Analysis, Statistics & Probability	243	237	233	-6	-4	**-10**
Algebra	244	243	239	-1	-4	**-5**

[26] NAEP Data Pull

Even prior to the pandemic, Texas eighth graders saw declines across all five mathematics areas, with average scale scores dropping anywhere from 6 to 17 points between 2011 to 2019. Nationally, eighth graders saw decreases in only three of the five areas at a much smaller magnitude (see chart below).

Eighth graders lost more than two years' worth of learning in data analysis, statistics, and probability since 2011

While NAEP levels do not equate to state grade-level standards, education researchers often view a shift of roughly 10 points on the NAEP to a gain or loss of one year's worth of learning.[27]

Between 2019 and 2022, Texas students saw additional declines across all math content areas. These declines were greater than the national average in all five content areas. Since 2011, Texas saw the sharpest declines in data analysis, statistics, and probability, followed by geometry, with drops of 25 and 21 points, respectively.[28]

8th Grade

Texas

Content Area	2011 Score	2019 Score	2022 Score	Change Before Pandemic	Change After Pandemic	Total Change
Number Properties & Operations	285	274	269	-11	-5	**-16**
Measurement	290	279	271	-11	-8	**-19**
Geometry	292	278	271	-14	-7	**-21**
Data Analysis, Statistics & Probability	292	275	267	-17	-8	**-25**
Algebra	293	287	280	-6	-7	**-13**

United States

Content Area	2011 Score	2019 Score	2022 Score	Change Before Pandemic	Change After Pandemic	Total Change
Number Properties & Operations	281	279	271	-2	-8	**-10**
Measurement	280	280	272	0	-8	**-8**
Geometry	281	278	273	-3	-5	**-8**
Data Analysis, Statistics & Probability	286	279	269	-7	-10	**-17**
Algebra	289	289	281	0	-8	**-8**

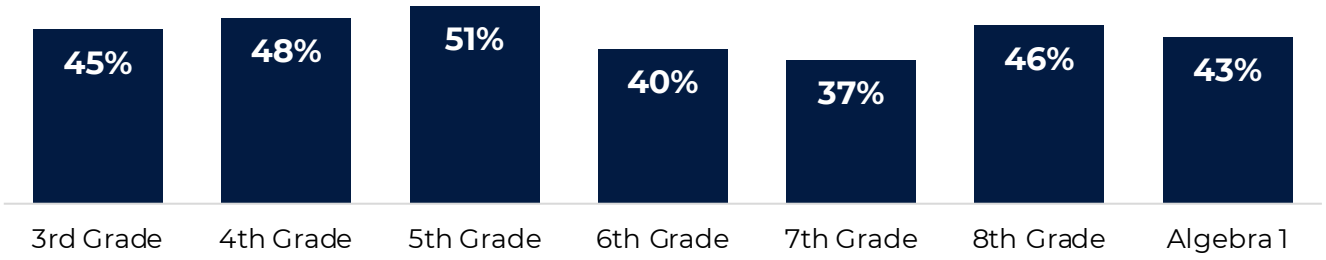
[27] Loveless, (2016 June 2). The NAEP proficiency myth, *Brookings*
[28] NAEP Data Pull

Texas student performance on a Texas test

On Texas' own assessment, student achievement remains low.

The majority of students in all grades but fifth grade did not meet grade level expectations in mathematics on the 2023 STAAR and EOC exams.[29] These results are particularly alarming since the STAAR test is directly tied to the state learning standard referred to as the Texas Essential Knowledge and Skills (TEKS). With so many students performing below grade level in math, teachers are faced with a near-impossible task. They must not only teach Texas students new content they are supposed to learn by the end of the year but also cover a significant portion of the previous year's material. As math concepts build on each other, and each student in the classroom could be starting the school year with unique learning gaps, the task of ensuring that every student has the math skills they need to be successful by the time they graduate is daunting.

Math Readiness in Texas



Readiness rates are based on the percentage of students in each grade meeting grade level expectations on the 2023 STAAR and EOC exams.

The State of Texas Assessments of Academic Readiness Achievement Levels[30]

Did Not Meet Grade Level	Students are unlikely to succeed in the next grade or course without significant, ongoing academic intervention. Students in this category do not demonstrate a sufficient understanding of the assessed knowledge and skills.
Approaches Grade Level	Students are likely to succeed in the next grade or course with targeted academic intervention. Students in this category generally demonstrate the ability to apply the assessed knowledge and skills in familiar contexts.
Meets Grade Level	Students have a high likelihood of success in the next grade or course but may still need some short-term, targeted academic intervention. Students in this category generally demonstrate the ability to think critically and apply the assessed knowledge and skills in familiar contexts.
Masters Grade Level	Students are expected to succeed in the next grade or course with little or no academic intervention. Students in this category demonstrate the ability to think critically and apply the assessed knowledge and skills in varied contexts, both familiar and unfamiliar.

[29] 2023 STAAR Results accessed via TAPR Statewide Report
[30] Texas Education Agency Performance Level Definitions

Comparing STAAR to NAEP

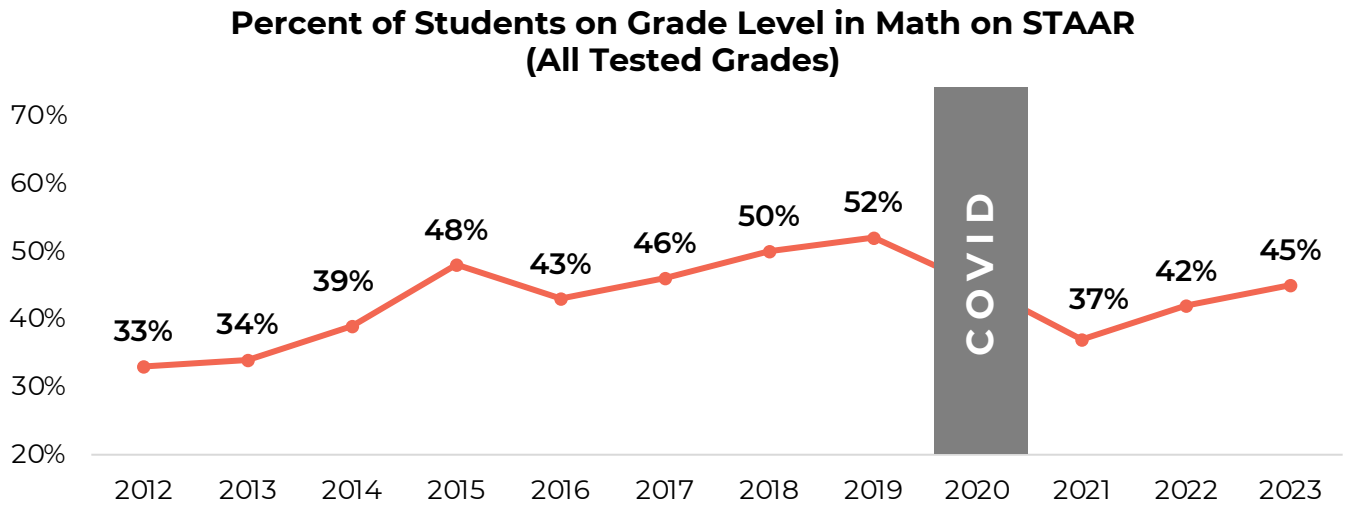
When examining where Texas's expectation for "Meets Grade Level" on the STAAR equates to on the NAEP for 4th grade, **Texas has rigorous expectations.**

Meets Grade Level on the STAAR is equivalent to scaled scores at the higher end of Basic, near the threshold for Proficient. **This places Texas 13th in the nation in terms of rigor of expectations for fourth graders.**[31] This likely contributes to our high ranking in fourth grade math.

Unfortunately, **the same level of analysis isn't available for eighth grade math** due to the inconsistent testing that exists for eighth graders in math in Texas.[32] With some students taking the eighth grade STAAR exam and others taking the Algebra 1 End of Course exam, **NAEP was unable to calculate the true expectations for Texas eighth graders in math for comparative analysis.**

COVID-19 exacerbated the problem.

At no point prior to the COVID-19 pandemic were more than 52% of Texas students performing on grade level in math, and the pandemic further exacerbated the problem. Between 2019 and 2021, Texas saw a drop in math proficiency of 15 percentage points.[33] And while the percentage of students across all tested grades in Texas rose year-over-year in math achievement, the state is still 7 percentage points behind pre-pandemic levels.

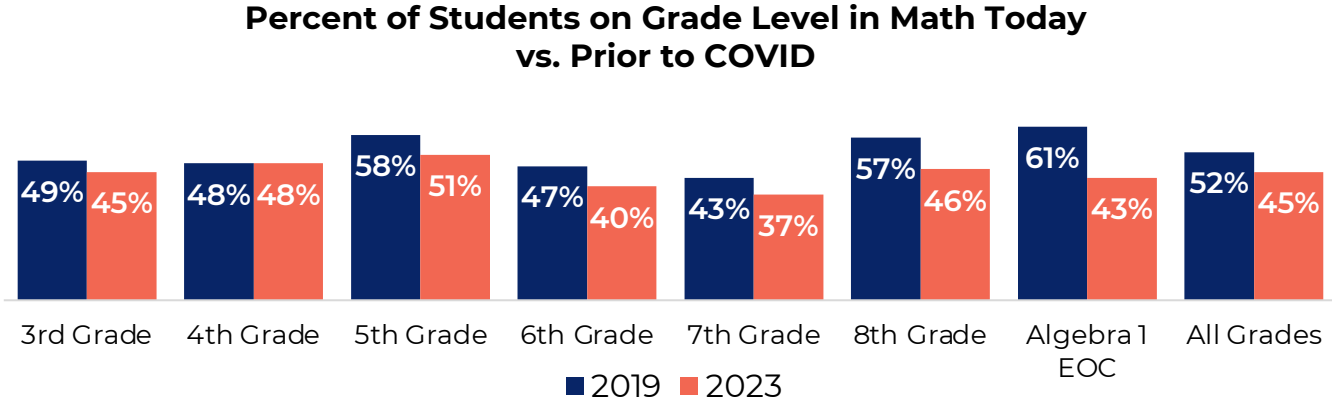


The percentage of students on grade level in math remains lower than pre-pandemic levels in nearly every grade

[31] Mapping State Proficiency Standards onto the NAEP Scales: Results from the 2019 NAEP Reading and Mathematics Assessments. National Center for Education Statistics (2021).
[32] Mapping State Proficiency Standards onto the NAEP Scales: Results from the 2019 NAEP Reading and Mathematics Assessments. National Center for Education Statistics (2021).
[33] 2013-2023 STAAR Results accessed via TAPR Statewide Report

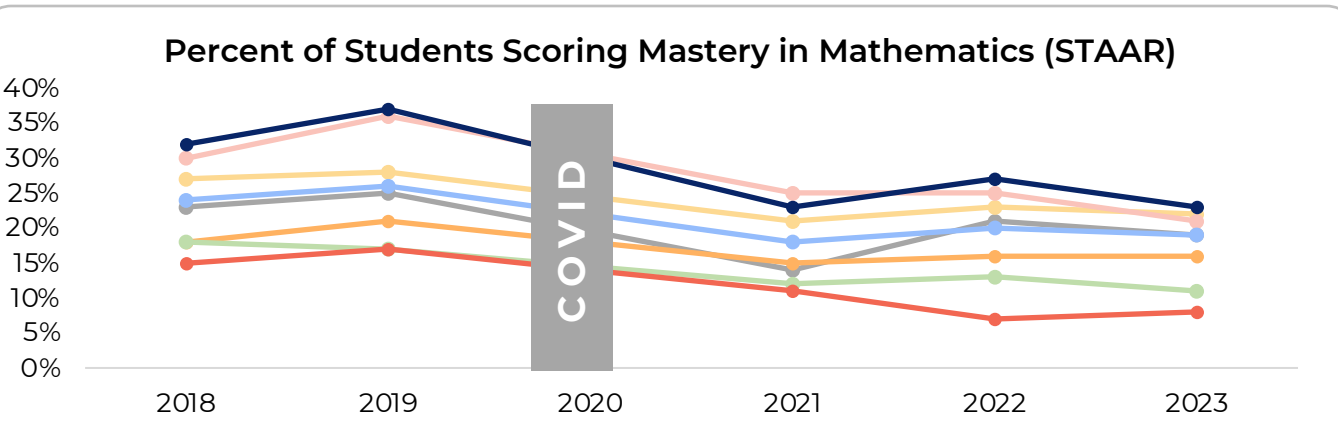
The percentage of students on grade level in math remains lower than pre-pandemic levels in nearly every grade.

In almost every grade, the percentage of students on grade level in mathematics is anywhere from 4 to 18 percentage points lower than pre-pandemic levels.[34] The most profound declines from 2019 to 2023 took place in eighth grade and Algebra 1. Forty-six percent of eighth-grade students performed on grade level in 2023, compared to 57% in 2019. Only 43% of Algebra 1 students met grade level expectations in 2023, compared to 61% in 2019. Statewide and across all tested grade levels, only 45% of students performed on grade level in 2023 — 7 percentage points lower than in 2019.



Mastery of mathematics continues to decline.

The COVID-19 pandemic has particularly impacted the percentage of students achieving at the highest level in mathematics. Between 2019 and 2023, every grade saw substantial decreases in the percentage of students scoring at Masters Grade Level on the STAAR. Student performance in both Algebra 1 and 5th grade math experienced the greatest decline, falling 14 and 15 percentage points respectively since 2019.[35] This raises concerns due to the steepness of the declines, but also because three-fourths of all tested grades experienced additional declines between 2022 and 2023.[36] Despite attempts to get students back to at least pre-pandemic levels, mastery of math is not improving.



Change Since 2019	3rd Grade	4th Grade	5th Grade	6th Grade	7th Grade	8th Grade	Algebra 1	All Grades
	-6	-6	-15	-5	-6	-9	-14	-7

[34] How are American Students Performing in Mathematics? National Center for Education Statistics (2022).
[35] 2018, 2019, 2021, 2022 and 2023 STAAR Results accessed via TAPR Statewide Report
[36] 2018, 2019, 2021, 2022 and 2023 STAAR Results accessed via TAPR Statewide Report

Rates of recovery for math after the pandemic are too slow to catch students up.

Since the COVID-19 pandemic, students have not rebounded in math as they have in reading. In 2023, only 45% of Texas students are on grade level in mathematics. Meanwhile, 52% are on grade level in reading.[38] As a complicating factor, while 55% of students are below grade level in math, less than half of those students will be eligible for the high-impact tutoring required by the Legislature through House Bill 1416 (88R).[39] Currently, the tutoring required by the state to help students make up for academic losses during the pandemic is only required for students that score at the lowest level ("Does Not Meet" grade level) and not for students that are below grade level but not technically failing in the state's accountability system ("Approaches" grade level).

Catching students up is no small task, and historically, few students catch up to perform on grade level once they have fallen behind. Analysis by The Commit Partnership found that among students who did not meet grade-level math expectations (Does Not Meet/Approaches) in third grade in 2019, only 13% caught up to perform at or above grade level (Meets/Masters) in three years. Compare that to economically disadvantaged students, where only 9% caught up.[40] This data reinforces the fact that not intervening will lead to further falling behind and that Texas needs to consider proven tools that other states are adopting to reverse this trend.

> Historically, **only 7% of students** who scored "Does not meet" on the third-grade math STAAR test caught up to grade level by fifth grade.[37]

STAAR data shows not enough students are growing in math year over year.

The STAAR exam provides data about the growth a student has made from year to year, known as the STAAR progress measure.[41] TEA reports out Annual Growth — the percentage of students that grew academically by at least one school year — as a part of these progress measures.[42] Examining Annual Growth data across multiple school years reveals a concerning trend in student growth post-COVID: a lower percentage of students is growing a full year in math post-COVID than prior to the pandemic.

Annual School Growth Percentage by Grade on Math STAAR and EOC Exams

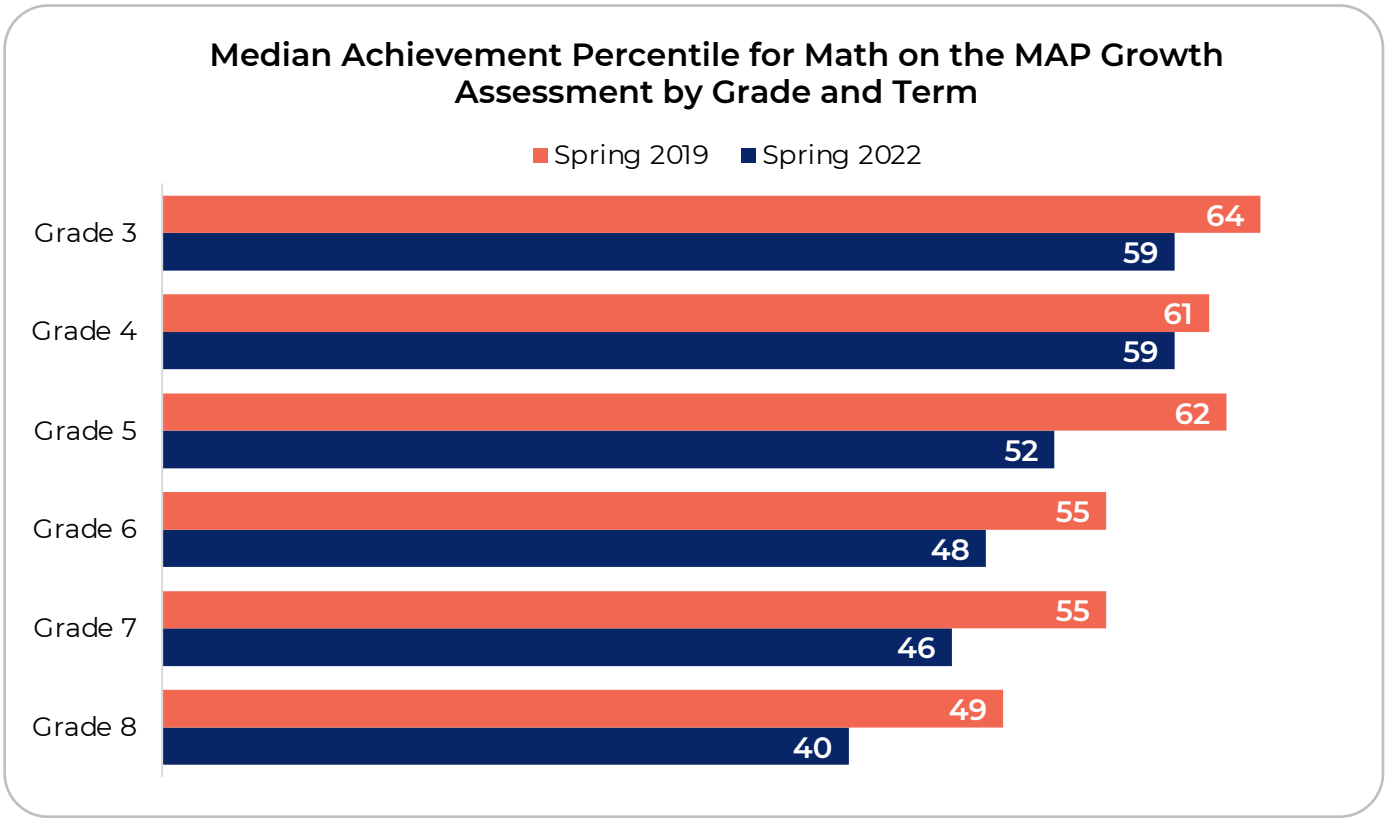
Year	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	Algebra 1
2017-18	65%	81%	56%	67%	81%	72%
2018-19	65%	83%	54%	62%	82%	75%
2019-20	COVID					
2020-21						
2021-22	74%	79%	61%	60%	74%	67%
2022-23	**63%**	**71%**	54%	**56%**	**74%**	**76%**

[37] TEA 2022 STAAR Statewide Summary Results
[38] 2023 STAAR Results accessed via TAPR Statewide Report
[39] 2023 STAAR Results accessed via TAPR Statewide Report
[40] [Commit Analysis, 2019-2022] Analysis built from student level data received from TEA through a PIR and reflects only Spring first time testers with a unique scrambled ID found in all three years and single grade year to year progression. Economically disadvantaged students are identified by their 2019 designation.
[41] The STAAR progress measure is not available for the 2020-2021 and 2019-2020 school years due to the inability to administer the STAAR during the pandemic.
[42] Texas Academic Performance Report (TAPR) Glossary, Texas Education Agency, 2023.

For the most recent year of testing data, there was a notable decline in annual growth across most grades. After demonstrating an increase of 9 percentage points between 2019 and 2022, fourth-grade annual growth declined by 11 percentage points in 2023 (74% vs 63%). Fifth grade witnessed a substantial drop in annual growth from 83% of students growing a full academic year before the pandemic to 71% in 2023.[43] Sixth-grade annual growth increased by 7 percentage points between 2019 and 2022, but lost all gains by 2023. Seventh grade fell from 62% to 56% between 2019 and 2023, while eighth grade saw a reduction from an 82% growth rate to 74% during the same period.[44] Algebra 1 is the sole exception, with a 76% growth rate in 2023 (1 percentage point higher than in 2019), surpassing 67% from 2022.[45]

MAP Growth assessment data tells a similar story.

The Northwest Evaluation Association's (NWEA) MAP Growth assessment, a norm-referenced test administered across the nation, is an optional assessment used by many Texas school systems to assess student growth. Norm referenced tests measure students against the performance of all other tested students, rather than against cut scores and state grade level standards. Over 900,000 Texas students took the MAP Growth assessment in the Spring of 2022, representing roughly 24% of public kindergarten-eighth grade students in the state.[46] These tests are administered three times a year, in the fall, winter and spring.



[43] TEA 2022 STAAR Statewide Summary Results Texas Academic Performance Report (TAPR) Statewide Report (2019-2020, 2020-2021, 2021-2022, 2022-2023)

[44, 45] Ibid.

[46] This section compares student achievement changes between Spring of 2019 and Spring of 2022. 400,291 students took a MAP Growth math assessment in Spring of 2019 and 909,231 students took the assessment in Spring of 2022.

Nationally-normed tests confirm declines evidenced by the STAAR exam.

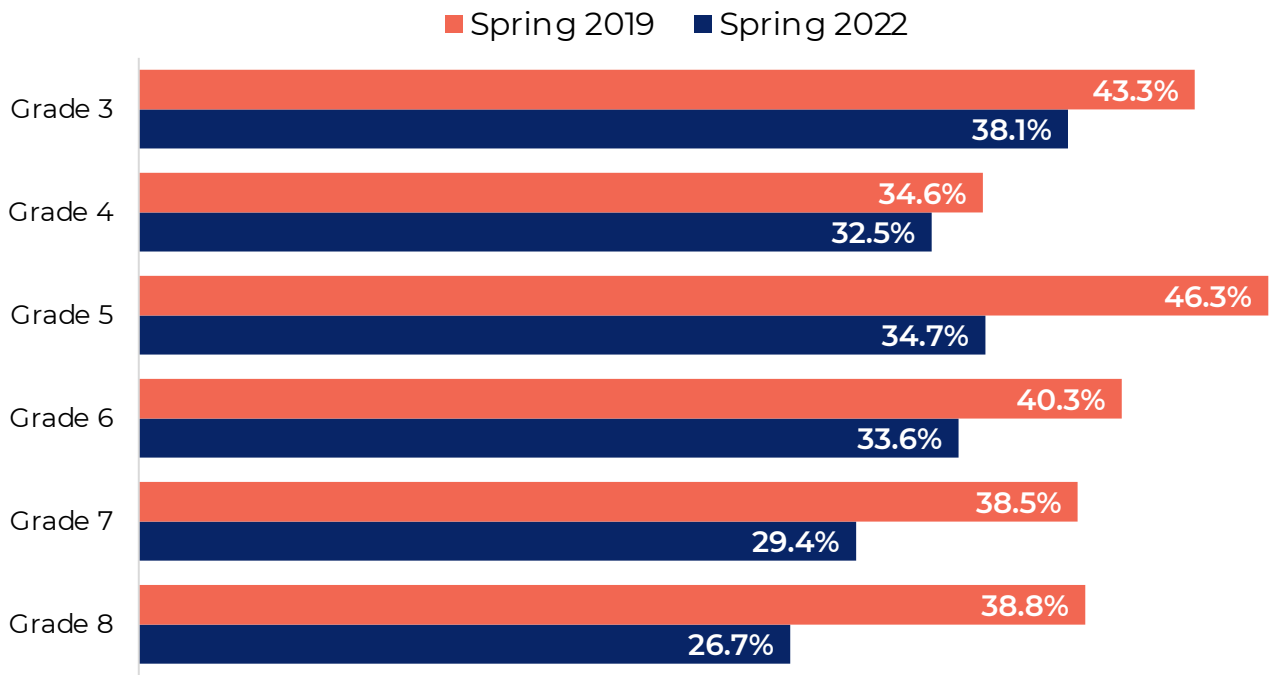
The MAP Growth assessment shows Texas students performed at lower rates across every grade level in 2022 compared to 2019.[47] These gaps are more pronounced in later grades, highlighting the fact that math instruction builds on itself. MAP Growth data also indicates that Texas students are declining compared to the rest of the nation in the later grades, as evidenced by the median achievement percentiles dropping well below the 2020 national norm (50% mark).[48]

MAP data reflects gaps seen on the STAAR exam.

School systems can use the MAP Growth exam to predict end-of-year performance on the STAAR exams.[49] A smaller percentage of 2022 students were projected to be proficient at the end-of-year STAAR exam than compared to 2019. Across all grades, the percentage of students projected to be proficient declined by 7.6 percentage points, with the most pronounced declines in the fifth, seventh, and eighth grades.[50] This data shows similar pre- and post-pandemic achievement gaps were seen on the actual STAAR exams in these grades for these years.

Since the MAP Growth assessment is a nationally-normed test, **students are placed in percentiles of growth and achievement relative to tested students around the county.** This provides students and parents an understanding of where they fall relative to other students in the same grade level on a curve.

Percentage of Students Projected to be Proficient on End-of-Year Math Assessments based on the MAP Growth Assessment



[47] NWEA Exploring the Educational Impacts of COVID-19 Dashboard Accessed Jan. 2023
[48] NWEA Exploring the Educational Impacts of COVID-19 Dashboard Accessed Jan. 2023
[49] https://www.nwea.org/uploads/2020/07/TX-3-8-MAP-Growth-Linking-Study-Report-2020-07-23.pdf
[50] True achievement scores on the STAAR exam reflect these gaps, but a direct comparison cannot be made statewide due to the limited sampling for students taking the MAP Growth exam.

College readiness exams are clear — the majority of Texas students aren't ready.

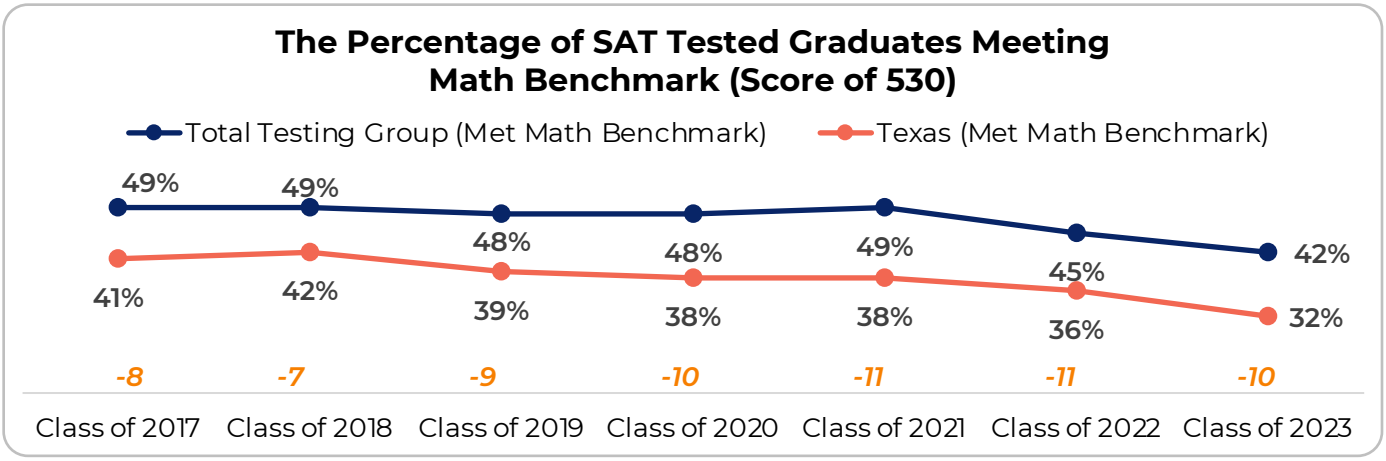
Texas uses a variety of college readiness and entrance exams for a number of metrics across its K-12 and higher education systems as a part of the Texas Success Initiative (TSI). The Texas Education Agency uses readiness benchmarks on the TSIA, SAT and ACT as a measure of whether a student is College, Career, or Military Ready (CCMR) in the states' school accountability system as well as in determining CCMR Outcomes bonus eligibility.[51] Colleges in Texas use these same scores to determine if students are ready for entry-level college coursework.

Of the 368,683 Texas public high school graduates in the class of 2022, a total of 263,505 (71.5%) took the SAT, the ACT, or both examinations.[52] Among these students, only 33.8% demonstrated college readiness for math on one or both exams.[53] The Texas Success Initiative Assessment (TSIA), an assessment that students can take to demonstrate college readiness if they haven't demonstrated readiness through other measures like the ACT or SAT, is taken by 60% of graduates. Only 18.8% of these students were able to demonstrate college readiness in mathematics.[54] The data from these assessments indicate that less than half (48.2%) of Texas public high school graduates met college readiness standards in mathematics.

What Qualifies as College Ready in Math in Texas?

SAT	ACT	TSIA (prior to Jan. 11, 2021)	TSIA 2.0 (after Jan. 11, 2021)
Minimum score of 530 on the mathematics test (possible range of 200–800).	For the class of 2022, a 19 on the math section was needed. For tests administered after Feb. 15, 2023, a score of 22 is required. (possible score of 1-36)	Mathematics: 350 or higher.	Math: College Readiness Classification of 950 or higher; OR College Readiness Classification of at least 949 and diagnostic score of 6.

Texas students underperform against national trends on the SAT.



[51] https://tea.texas.gov/academics/college-career-and-military-prep/the-tsia-texas-success-initiative-assessment and https://tea.texas.gov/texas-schools/accountability/academic-accountability/performance-reporting/ccmrobvsacctonepager.pdf

[52] TEA College Admissions Testing Results for Graduating Seniors in Texas Public Schools, Class of 2022. TEA reports out CCMR related data on a one-year lag, making the Class of 2022 the most available data. The SAT and ACT data discussed later in this chapter were pulled directly from the companies, which provide data for the Class of 2023.

[53] TEA College Admissions Testing Results for Graduating Seniors in Texas Public Schools, Class of 2022

[54] 2022-23 CCMR-Related Indicators via TAPR

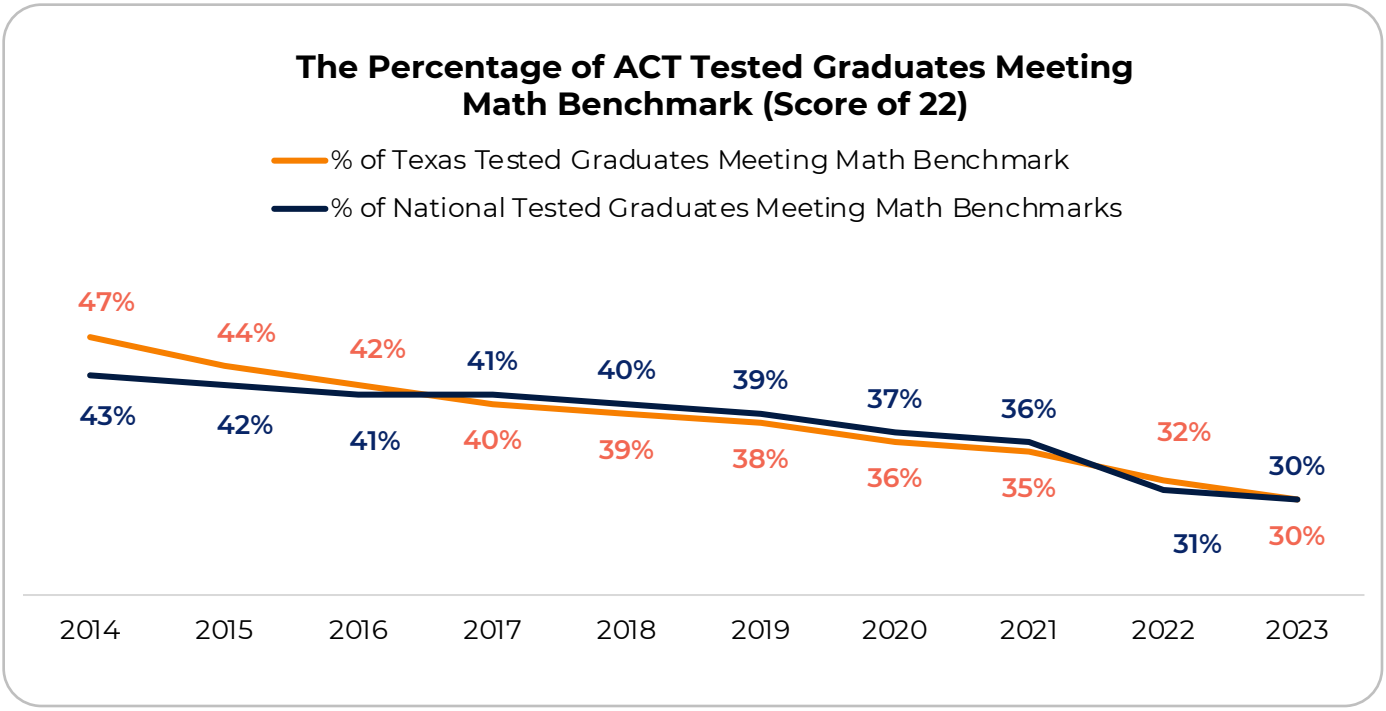
The performance of Texas students on the SAT math section has been steadily declining in recent years, dropping from 42% of test takers in the Class of 2018 meeting the SAT math benchmark to 32% for the Class of 2023. This 10-percentage point decline in overall Texas performance has been accompanied by a widening gap between the performance of Texas students and the national average on the assessment. What was once a single-digit gap between Texas and national performance for the graduating classes in 2017-2019 has grown into the 10-11% range in each of the last four years.

The decline in the number of Texas students meeting the math benchmark may be, at least in part, due to an increase in total Texas test takers. For the Class of 2017, a total of 204,409 students took the SAT. **By the Class of 2023, this figure had risen 36% to 278,151.** Further analysis is required to identify clear findings.

Number of SAT Test Takers in Texas	
Class of 2017	**204,409**
Class of 2018	226,374
Class of 2019	236,665
Class of 2020	252,019
Class of 2021	225,685
Class of 2022	243,410
Class of 2023	**278,151**

THE SAT COLLEGE READINESS BENCHMARK FOR MATHEMATICS IS 530. The SAT Math benchmark is the section score associated with a 75% chance of earning at least a C in first-semester, credit-bearing, college-level courses in algebra, statistics, precalculus, or calculus.[55]

The percentage of Texas graduates meeting math benchmarks on ACT continues to decline, following national trends.



[55] Understanding the SAT Scores and Benchmarks, College Board

The number of Texas graduates taking the ACT has declined by 40% since 2017. Meanwhile, the percentage of graduates meeting college readiness math benchmarks as established by the ACT has also been consistently declining — falling 17 percentage points since 2014.[56] While nationwide scores have also declined, the declines in Texas have outpaced the national rate. Until February 2023, Texas held its students to a lower standard by considering a score of 19 on the ACT as indicating college readiness in math. The ACT sets that benchmark at 22.[57]

THE ACT COLLEGE READINESS BENCHMARK FOR MATHEMATICS IS 22. Students who achieve this score on the ACT Mathematics Test have a 50% likelihood of achieving a B or better in a first-year College Algebra course at a typical college.[58]

Number of Texas Graduates Taking the ACT	
2014	**116,547**
2015	124,764
2016	142,877
2017	146,608
2018	141,253
2019	136,061
2020	131,292
2021	88,948
2022	84,822
2023	**88,670**

Whether you look at the STAAR, NAEP, SAT or ACT, all the available data points to the same conclusion: Texas students are not only underperforming in math, their performance is declining at critical stages in their education. Left unaddressed, this decline in math proficiency among Texas students threatens long-term problems for both the students and the state as a whole. Texas students with low math proficiency are less likely to succeed in postsecondary education; they are less likely to obtain high-earning, in-demand careers; and they are less likely to contribute to a secure and prosperous state economy.

[56] U.S. High School Graduating Class Trends ACT Data Tool
[57] Texas Administrative Code Rule §4.54
[58] ACT College & Career Readiness Standards: Mathematics 2022.

CHAPTER 2

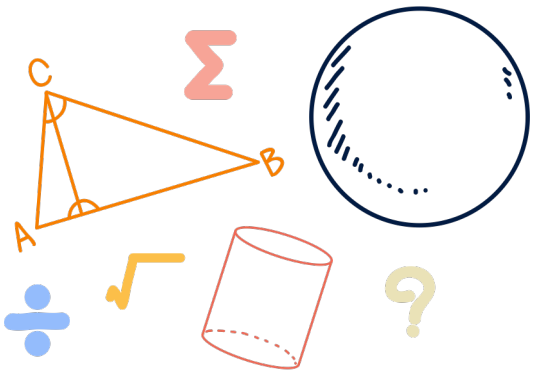
Math is a Key to Individual and State Economic Growth

- Texas students need math proficiency to compete for the jobs of the future.
- Greater math attainment is linked to better postsecondary outcomes.
- College majors with the highest mid-career median wage all require math.

CHAPTER 2

Math is a key to Individual and State Economic Growth

With more Fortune 500 companies than any other state in the nation, companies are flocking to Texas to take advantage of the state's fertile economic environment and high quality of life.[59] Texas is well positioned to continue as the No. 1 job creator in the country.[60] Competency in mathematics is key to a workforce that can produce innovation and GDP growth in the 21st century economy. Texas students will need math skills to compete for the jobs of the future.[61]



KEY TAKEAWAYS

- **Math skills are essential for the fastest growing industries.** STEM jobs are expected to grow by 8% by 2029, outpacing total job growth. This highly educated labor force holds degrees at a much higher rate than the total workforce. Although Texas leads the nation in job creation, the state is often importing workers with degrees from out-of-state.

- **Math performance correlates with postsecondary success.** Students that take a college aligned math course in high school earn postsecondary credentials at roughly three times the rate of their peers that only take courses up to Algebra 2.

- **Improving math performance will be a key economic development driver.** Preparing students with math knowledge and skills sets them up for long-term economic success. Recent labor market analysis from the Federal Reserve Bank of New York shows that college majors with mid-career median wages of $100,000 and above all rely on a strong understanding of mathematics. [62]

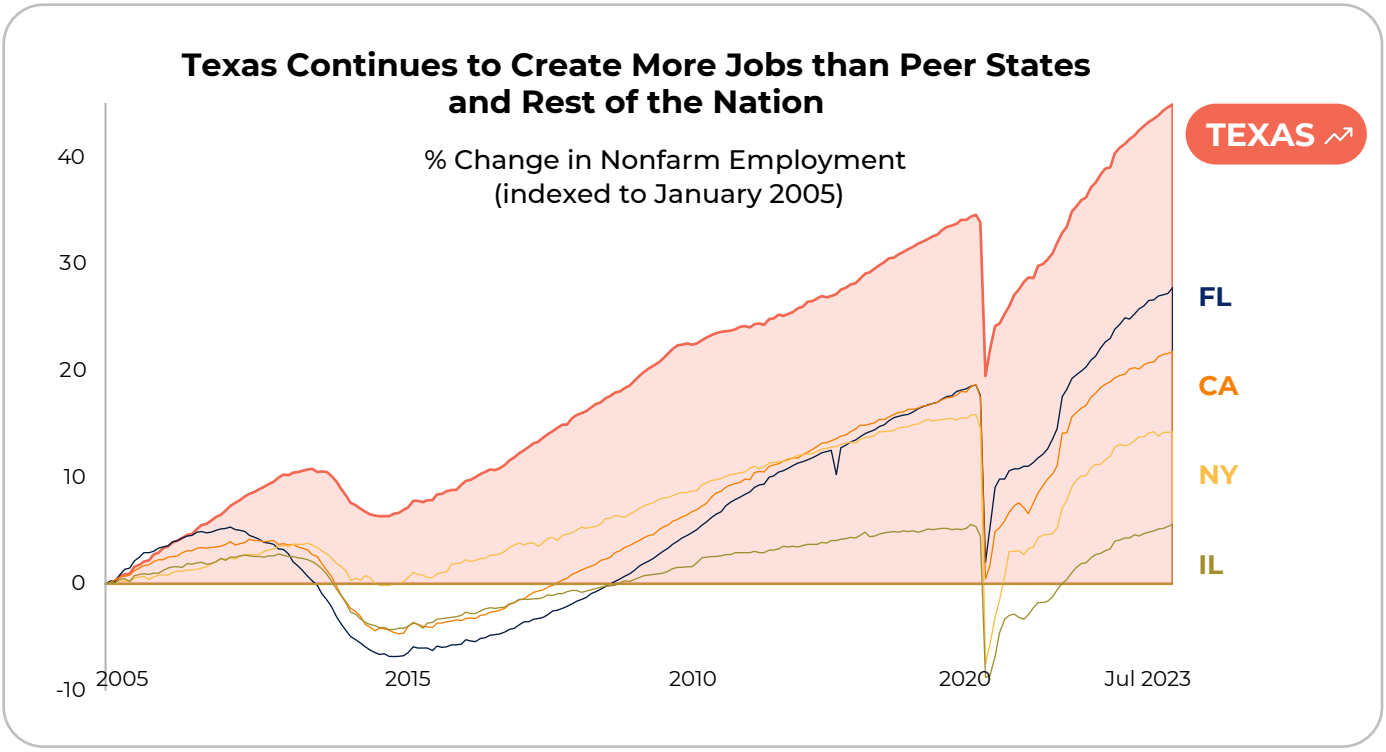
[59] 2023 Fortune 500 List
[60] Texas Adds More Jobs In 2023 Than Any Other State. Office of the Governor, Press Release: January 2023.
[61] The Effect of Average Scores in Reading, Mathematics and Science on Innovation and Income: A Quantitative Analysis for a Group of Countries. National Library of Medicine, 2023.
[62] Source: U.S. Census Bureau, American Community Survey (IPUMS). https://www.newyorkfed.org/research/college-labor-market#--:explore:outcomes-by-major

Texas students need math proficiency to compete for the jobs of the future.

As Texas prepares its students to meet future workforce demands and drive job creation, the state must reflect on what skills these jobs will require. Nationally, STEM jobs are expected to experience an 8% growth rate by 2029, significantly outpacing the projected total job growth of 3.7% across all occupations.[63] The level of educational attainment required of the STEM workforce is also greater than the national average. Currently, in the STEM workforce, 45% of employees hold a bachelor's degree or higher, which is notably higher than the 36% attainment level across the total U.S. workforce.

This gap underscores the necessity for today's students to attain higher levels of education to remain competitive in an increasingly STEM-driven economy.[64]

Texas stands out from other states for its exceptional job creation record, creating more jobs than peer states. In the chart below, the extent of this growth becomes clear.[65] Not only does Texas create more jobs, but the state creates more jobs at a much higher rate over a sustained period of time.



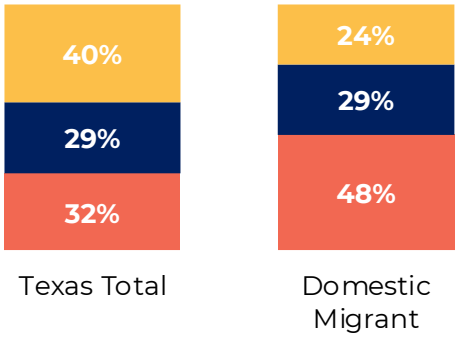
Facing a steadily rising demand for skilled workers, Texas employers have looked elsewhere to meet workforce needs. For the past decade, Texas has relied on an average annual net migration of 191,000 to buoy its workforce.[66] Notably, these newcomers to Texas are also more credentialed than the native Texas workforce, holding Bachelor's degrees or higher at a rate 1.5 times greater than the state average.[67]

[63] U.S. Bureau of Labor Statistics
[64] National Science Board Science and Engineering Indicators
[65] Bureau of Economic Analysis, Texas Comptroller
[66] Dallas Fed
[67] Geographic Mobility by Selected Characteristics in the United States, Dallas Fed, 2021.

For Texas students to compete for modern jobs, they must be equipped with the knowledge and skills to either directly enter the workforce or succeed in institutions of higher education. This includes a firm understanding and mastery of mathematics.

- High School or below
- Some College / Assoc.
- Bachelor's or higher

In-migrant educational attainment is substantially higher than the total workforce



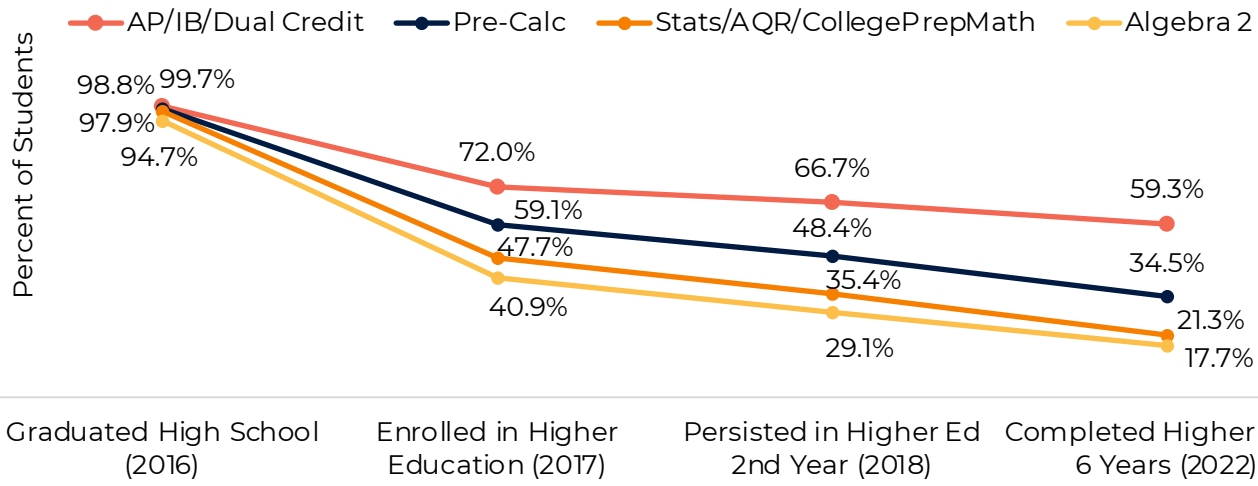
Domestic Migrants hold Bachelor's and higher degrees at **1.5x** the state average.

Greater math attainment is linked to better postsecondary outcomes.

Students with higher levels of math achievement enroll in and complete postsecondary education at a far higher rate than their peers. The rate of students persisting through their first year of postsecondary education increases from 26% for students performing at the NAEP Basic level in math to 58% at the NAEP Proficient level and 87% at the NAEP Advanced level.[68]

Whether AP Calculus or a dual credit math course, students taking college-level courses in high school have far better postsecondary outcomes than their peers. Texans who take two math courses after Algebra 2 in high school are three times more likely to graduate college than those who stop at Algebra 2.[69] Students taking even one additional college-aligned math course — Pre-Calculus — after Algebra 2 are twice as likely to graduate college.[70] While any additional math course is correlated to greater postsecondary outcomes for students, it is the college-aligned math courses (AP, IB, and Dual Credit) that yield the greatest outcomes for students.

Outcomes of Students in High School for 4 years, By Highest High School Math, By Math Pipeline, Texas



[68] Updated College Enrollment Benchmarks for the Grade 12 NAEP Mathematics Assessment, American Institutes for Research, 2023.
[69] Math Pathways | Middle School Math Profile, E3 Alliance
[70] Ibid.

College majors with the highest mid-career median wage all require math.

Math proficiency is not only linked to greater enrollment and completion in higher education — it also provides higher wages. Recent labor market analysis from the Federal Reserve Bank of New York shows that college majors with mid-career median wages of $100,000 and above all rely on a strong understanding of mathematics.

Recent labor market analysis from the Federal Reserve Bank of New York shows that college majors with mid-career median wages of

$100,000 and above

all rely on a strong understanding of mathematics.[71]

The same is true for all majors with early career median wages of $65,000 and above. In fact, bachelor degrees provide almost double the median wage of a high school diploma alone — $60,000 to $36,000.[72] A strong math foundation is not just vital to accessing higher education but also success in the majors that lead to careers with the highest wages.

Labor Market Outcomes Of College Graduates By Major
(Majors That Have A Median Wage Mid-career At-or-above $100,000)

Major	Unemployment Rate	Under employment Rate	Median Wage Early Career	Median Wage Mid-career	Share With Graduate Degree
Chemical Engineering	2.0%	17.8%	$79,000	$133,000	48.0%
Computer Engineering	2.3%	13.3%	$80,000	$125,000	38.8%
Aerospace Engineering	7.8%	17.9%	$74,000	$120,000	51.2%
Electrical Engineering	2.9%	20.9%	$72,000	$112,000	47.3%
Mechanical Engineering	1.5%	20.3%	$70,000	$111,000	39.6%
Computer Science	4.3%	16.7%	$78,000	$110,000	31.8%
Finance	2.7%	29.1%	$66,000	$104,000	30.2%
Miscellaneous Engineering	2.2%	26.2%	$68,000	$100,000	47.7%
Industrial Engineering	0.2%	24.6%	$71,000	$100,000	42.2%
General Engineering	3.1%	28.0%	$68,000	$100,000	39.5%
Economics	4.1%	34.9%	$65,000	$100,000	41.0%
Construction Services	0.4%	28.6%	$64,000	$100,000	9.2%
Civil Engineering	1.9%	15.9%	$65,000	$100,000	36.3%
Business Analytics	2.5%	28.5%	$65,000	$100,000	22.8%

[71] Source: U.S. Census Bureau, American Community Survey (IPUMS).
https://www.newyorkfed.org/research/college-labor-market#--:explore:outcomes-by-major
[72] Source: U.S. Census Bureau, American Community Survey (IPUMS).
https://www.newyorkfed.org/research/college-labor-market#--:explore:outcomes-by-major

States investing in mathematics proficiency will yield dividends in economic gains through a stronger workforce. In order to remain competitive in the future economy, Texas will need to maintain a competitive edge through a robust and highly-qualified workforce. As Texas competes with peer states for growing industries such as space and technology, improving math education becomes even more crucial to future economic growth.

As illustrated in the previous chapter, too many Texas students are graduating without the math skills necessary to compete for jobs or pursue higher education in STEM fields.

Without a strong foundation and understanding of mathematics,

Texas students will be relegated to the sidelines of the *21st century workforce.*

Notes for the Federal Reserve data on the previous page:
Figures are for 2022. Unemployment and underemployment rates are for recent college graduates (that is, those aged 22 to 27 with a bachelor's degree or higher), and median wages are for full-time workers with a bachelor's degree only. Early career graduates are those aged 22 to 27, and mid-career graduates are those aged 35 to 45. Graduate degree share is based on the adult working-age population (that is, those aged 25 to 65) with a bachelor's degree or higher. All figures exclude those currently enrolled in school. Data are updated annually at the beginning of each calendar year.
[73] 2023 TAPR Data

CHAPTER 3

Texas' Opportunities and Challenges

- Texas Mathematics Reforms and Opportunities for Expansion
- Ongoing challenges for math education in Texas
- **Texas Versus California**: Rival Approaches to Improving Advanced Math Access and Equity

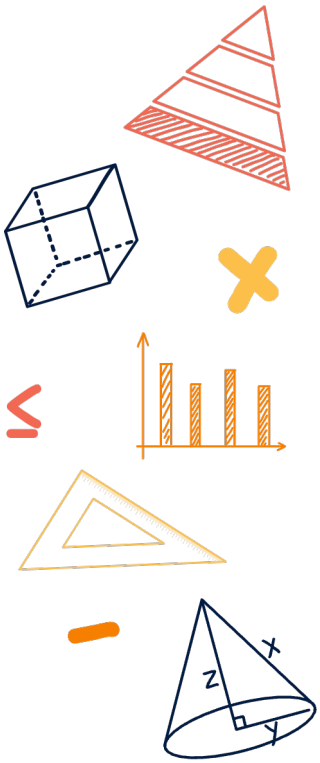
CHAPTER 3

Texas' Opportunities and Challenges

Texas educates over 5.5 million public school students in over 1,200 school systems. With a public education system this large, the stakes are high, and the impact can be great. The math data in Texas is disheartening. Texas has taken important steps to reverse these trends — all of which can be built upon in the upcoming legislative session. That said, there are specific issues with the state of Texas public education that continue to be an issue. Without addressing these obstacles, the reforms that we have enacted are going to be less impactful. Building on actions taken in recent years, Texas has opportunities to not only reverse the declines in math performance that Texas students have experienced over the past decade, but also to address ongoing and systemic challenges to student success.

KEY TAKEAWAYS

- **Math tutoring access is currently required for only a subset of students, leaving behind tens of thousands of students who aren't on grade level.** Texas has made significant investments in acceleration for students, but high-impact tutoring isn't required for over half of the students below grade level in math.
- **Parents are often unaware that their child is behind in math.** Only one in 10 parents believe that their child is academically behind in math despite data suggesting the reality is much higher.
- **Data quality issues may interfere with our ability to fully diagnose the state's challenges.** Texas lacks visibility into the math achievement or deficiencies in kindergarten through second grade and has limited insight into high school due to lack of early screeners and standard assessments. Additionally, the ability for policymakers to perform robust data analysis is limited due to a lack of transparency in the data and the placement of some students into advanced math pathways in middle school
- **Improving the state's teacher corps may yield benefits for math performance.** The majority of math teachers in Texas have less than 10 years of experience teaching the subject, with one-fourth having three years or less.



Texas Mathematics Reforms and Opportunities for Expansion

Texas has strong math education standards, but they must be fully leveraged by teachers.

The Texas Essential Knowledge and Skills are the state curriculum standards and expectations that the SBOE adopts for each grade and subject in Texas public school. The TEKS describe what students should know and be able to do at the end of each grade level or course. The Thomas B. Fordham Institute rated the Texas Essential Knowledge and Skills standards for mathematics as "Strong," concluding that "they form a strong foundation for a high-quality mathematics curriculum," and TEA also provides guidance for educators in the state on how to teach to these standards.[74] But a tool is only good if people use it, which highlights the need for teachers to have access to and use the entire suite of resources that are available to them. In 2023, the state took a significant step toward helping teachers better leverage the TEKS with **House Bill 1605**, which requires curriculum to include 100% of the TEKS in order to be considered high quality. This is a notable shift from the previous policy that only required curriculum to cover at least 50% of the TEKS for that grade and subject.

Texas has taken steps to address low math proficiency but has opportunities to make a greater impact.

To ensure that elementary math teachers are receiving high-quality professional development and training, the state created Math Academies for K-third grade teachers in 2015.[75] Similar Reading Academies were created to provide teachers training in the Science of Reading.[76] Unfortunately, Math Academies have not received the same level of investment from the Legislature. Unlike Reading Academies, teachers are not required to attend Math Academies. In 2021, the Legislature, in response to the COVID-19 pandemic, expanded access to the training for all math teachers and instructed the Texas Education Agency to study the effectiveness of the Math Academies. [77] This data is expected to be released by the end of 2024.

That same year, the Legislature also passed **House Bill 4545**, requiring that the students furthest behind in all subjects receive up to 30 hours of focused tutoring in a group of no more than three students, which has been shown to be highly effective in accelerating students.[78] However, students requiring intervention are not identified until the end of third grade. Moreover, only a fraction of the students who are below grade level are eligible for this tutoring as only the lowest performing students are eligible. For example, students who score in the "Approaches Grade Level" category on the STAAR are identified as below grade level but are not required to receive high-impact tutoring. This is not a small portion of students in Texas schools. Rather, it's 30% of students across all tested grades that pass the STAAR exam but are still below grade level expectations.[79]

In 2023, the Legislature passed **House Bill 1605,** which creates a new system and standard for the curriculum approval process and provides over $320 million to districts to increase access to high-quality instructional materials.[80] By providing teachers with high-quality curriculum aligned to TEKS standards, the state is taking

[74] The State of State Standards Post-Common Core (August 2018) Fordham Institute
[75] Mathematics Achievement Academies - Rider 61 Report Texas Education Agency
[76] HB 3 Reading Academies Texas Education Agency
[77] Senate Bill 1267 (87R)
[78] The requirements for high-impact tutoring created by House Bill 4545 (87R) were amended by House Bill 1416 (88R) to increase the tutor-student ratio to 1:4.
[79] 2023 TAPR Data
[80] TEA Presentation to the State Board of Education 8/20/23

steps to support rigorous grade-level instruction in math and ensuring that teachers have the tools needed to deliver this instruction effectively. The State Board of Education has prioritized mathematics curriculum for all grades in its first instructional review process to ensure that students and teachers have access to high-quality math materials as soon as possible. [81]

At the time of the publication of this report, it is anticipated that such materials will be in Texas classrooms by Fall 2025.[82] While Texas may not see the returns on this investment for many years, it is one of the strongest steps the state has taken to provide rigorous math instruction for all students.

Ongoing challenges for math education in Texas

Parents don't know that their child is behind in math — or they don't believe it.

While state and local school leaders have developed programs to support students who are behind, many eligible students do not take advantage of these offerings. Roughly three-quarters of middle school and elementary principals report that less than half of their struggling students participate in tutoring or seek help after school.[83]

A lack of parental understanding of their student's real academic performance appears to be one of the leading drivers of this disconnect. When asked about their child's academic performance, parents report that their child is at or above grade level at a higher rate than the data suggests is reality. Nationally, nine in 10 parents overall say their child is performing at or above grade level in math.[84] When the same question was asked in Texas, they found similar results. In Houston, 92% of parents believe their student is on grade level, but only 45% of HISD students performed at or above grade level on the STAAR that same year.[85]

This disconnect may be due in part to students who bring home A's and B's on report cards even while they struggle with grade level material on state exams. This is evidenced in the Houston data where 82% of parents report that their students receive mostly B's or above on their report card.[86] This occurs because report cards are based on non-uniform grading metrics, may factor in scores on assignments that are below grade level or may simply be participation based. This can leave parents misinformed about the reality of their child's level of education, limiting their ability to provide the support their child needs to get on grade level. Accurately informing parents is key to ensuring that they are advocating for their child to have high-quality instruction, supporting them in learning outside of school and at home, and prioritizing access to no-cost tutoring.[87]

STAAR middle school data quality creates issues for school leaders and policymakers.

Education builds on itself year over year so any disruption (or investment) will affect cohorts of students differently, depending on where they are in the education pipeline. Recent cohorts of Texas students appeared to experience significant declines in the percentage of students on grade level when they hit the sixth grade.

[81] TEA Presentation to the State Board of Education 8/20/23
[82] House Bill 1605 and IMRA
[83] Elementary and Middle School Opportunity Structures That Factor into Students' Math Learning: Findings from the American Mathematics Educator Study. RAND, 2024.
[84] Learning Heroes and Gallup - B-Flation (2023)
[85] Parents 2023: Go Beyond Grades, Learning Heroes March 2023 and 2023 Houston ISD TAPR Report.
[86] Parents 2023: Go Beyond Grades, Learning Heroes March 2023
[87] Elementary and Middle School Opportunity Structures That Factor into Students' Math Learning: Findings from the American Mathematics Educator Study. RAND, 2024.

Unfortunately, performing more extensive cohort analysis with STAAR data is limited due to a lack of transparency in the data and the placement of some students into advanced math pathways. Students in advanced math courses take the STAAR exam based on the content that they are learning, not the grade that they are in. This means that seventh graders in pre-algebra, typically the highest performing students in their grade, may end up taking their eighth grade STAAR exam, giving us muddled achievement data. Texas can expect this lack of cohort clarity in the data to only grow as more students are enrolled in advanced math pathways as a result of recent legislation.

However, this only explains possible declines in the seventh and eighth grade years. It does nothing to explain the decline in sixth grade performance. The cause of the sixth-grade slide remains a mystery that warrants further study. With greater attention and focus from the Legislature and stakeholders on middle school math performance, we can begin to unravel this mystery.

Without consistent end-of-course exams in high school, there is a lack of visibility into math achievement proficiency in high school.

In 2013, the 83rd Texas Legislature passed **House Bill 5**, which established a new high school graduation program, allowing students more time in their schedule to take Career and Technical Education (CTE) courses and explore their career and personal interest. This legislation also made significant changes to the assessment and accountability system in the state by greatly reducing the number of high school end-of-course (EOC) exams that a student needed to pass to graduate.[88] As a result, schools were no longer required to administer Geometry and Algebra 2 EOCs, limiting the amount of data that parents and teachers have on student performance in upper-level mathematics.

While state standardized assessments and the NAEP exam provide snapshots for how students in the early and middle grades are performing in mathematics, there is no standard math assessment given to Texas high school students. With the repeal of the Algebra 2 End of Course Assessment in Texas, the only view policymakers and state leaders have into high school math proficiency is the Algebra 1 EOC, which focuses on eighth-grade and ninth-grade student achievement. The best the state can do is look at college entrance tests to gauge college readiness in mathematics but is otherwise relatively blind to high school math proficiency.

With no standard assessments in high school, **achievement data is inconsistent** and there is little accountability for the material taught in high level math courses

As more students are taking Algebra 1 in eighth grade as **Senate Bill 2124** is implemented, fewer students will be taking an EOC in high school. This will only increase the data gap. While focusing on lower performing students and monitoring their progress is always important, the progress of higher performance students should not be neglected. The current reticence to test students on high school mathematics ultimately leads to vulnerabilities in the state's accountability and workforce systems.

While college entrance exam data can be useful, they provide an incomplete perspective. This is due to changes in testing populations and selection bias in student sampling as these tests are not taken by all students. Additionally, they are over-representative of higher achieving students planning to attend college.

[88] Technical Digest: Historical Overview of Assessment in Texas, Chapter One (2017-2018).

The majority of math teachers in Texas have less than 10 years of experience.

More than half of Texas math teachers have less than 10 years of experience, a trend that has been consistent over the past decade. In the 2023-24 school year, roughly 28% of Texas math teachers had three years or fewer of experience.[89] While concerning, it is in line with the statewide average for teachers across all subjects. Historically, these novice teachers disproportionally teach economically disadvantaged students.[90] Teachers have been shown to gain expertise and have more positive effects on student outcomes the longer they are in the classroom, particularly in the early years of their career.[91] With over one-fourth of Texas math teachers having three or fewer years of experience teaching math, this affects a large portion of Texas students.

Academic Year	< 10 Years Experience Teaching Math	Years of Experience Teaching Math (% of Total)									
		0	1	2	3	4	5	6	7	8	9
2023-24	54.51%	9.06%	7.48%	6.14%	5.39%	5.14%	4.63%	4.44%	4.14%	4.07%	4.02%
2022-23	54.9%	9.78%	6.75%	5.70%	5.58%	4.95%	4.87%	4.58%	4.37%	4.29%	4.01%
2021-22	54.25%	8.00%	6.06%	6.02%	5.46%	5.39%	5.12%	4.86%	4.76%	4.49%	4.05%
2020-21	53.51%	6.90%	6.59%	5.76%	5.79%	5.60%	5.30%	5.27%	4.88%	4.34%	3.09%
2019-20	53.48%	7.60%	6.10%	6.02%	5.93%	5.57%	5.59%	5.21%	4.63%	3.28%	3.53%
2018-19	53.51%	6.94%	6.63%	6.30%	6.16%	5.93%	5.74%	5.03%	3.41%	3.69%	3.69%
2017-18	54.87%	8.35%	6.58%	6.66%	6.40%	6.11%	5.30%	3.64%	3.93%	3.89%	4.02%
2016-17	55.42%	8.05%	7.06%	6.90%	6.52%	5.74%	3.89%	4.31%	4.17%	4.29%	4.51%
2015-16	56.31%	8.35%	7.54%	7.01%	5.97%	4.21%	4.58%	4.57%	4.64%	4.90%	4.55%
2014-15	56.74%	9.14%	7.61%	6.35%	4.41%	4.91%	4.73%	5.00%	5.27%	4.87%	4.45%

Texas elementary and middle school teachers are not always prepared to teach math.

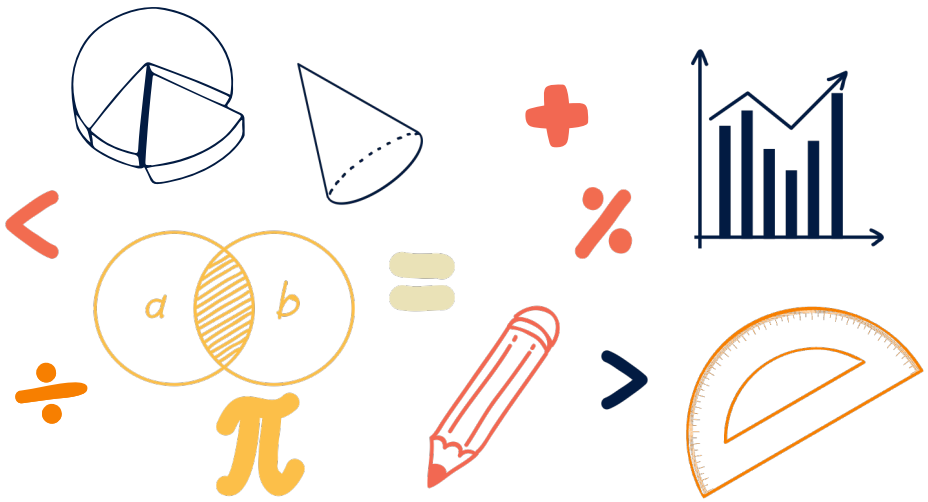
Elementary school teachers are certified with a general education certificate that includes mathematics but doesn't require them to demonstrate independent mastery of the subject. It is not until the later grades in middle school that teachers are required to earn single subject certifications.[92] Only 36% of elementary and middle school principals in Texas report that all or almost all of their math teachers demonstrate deep knowledge of math pedagogy, and only 41% have a deep knowledge of math content.[93]

[89] Access to High-Quality Instruction: Assessing the Distribution of Teacher and Principal Quality in Texas, Texas ERC, June 2018
[90] Experience of Mathematics and Science Teachers 2015-16 through 2023-24, Texas Education Agency
[91] Does Teaching Experience Increase Teacher Effectiveness?, Learning Policy Institute, 2016.
[92] Elementary and Middle School Opportunity Structures That Factor into Students' Math Learning: Findings from the American Mathematics Educator Study. RAND, 2024.
[93] Ibid

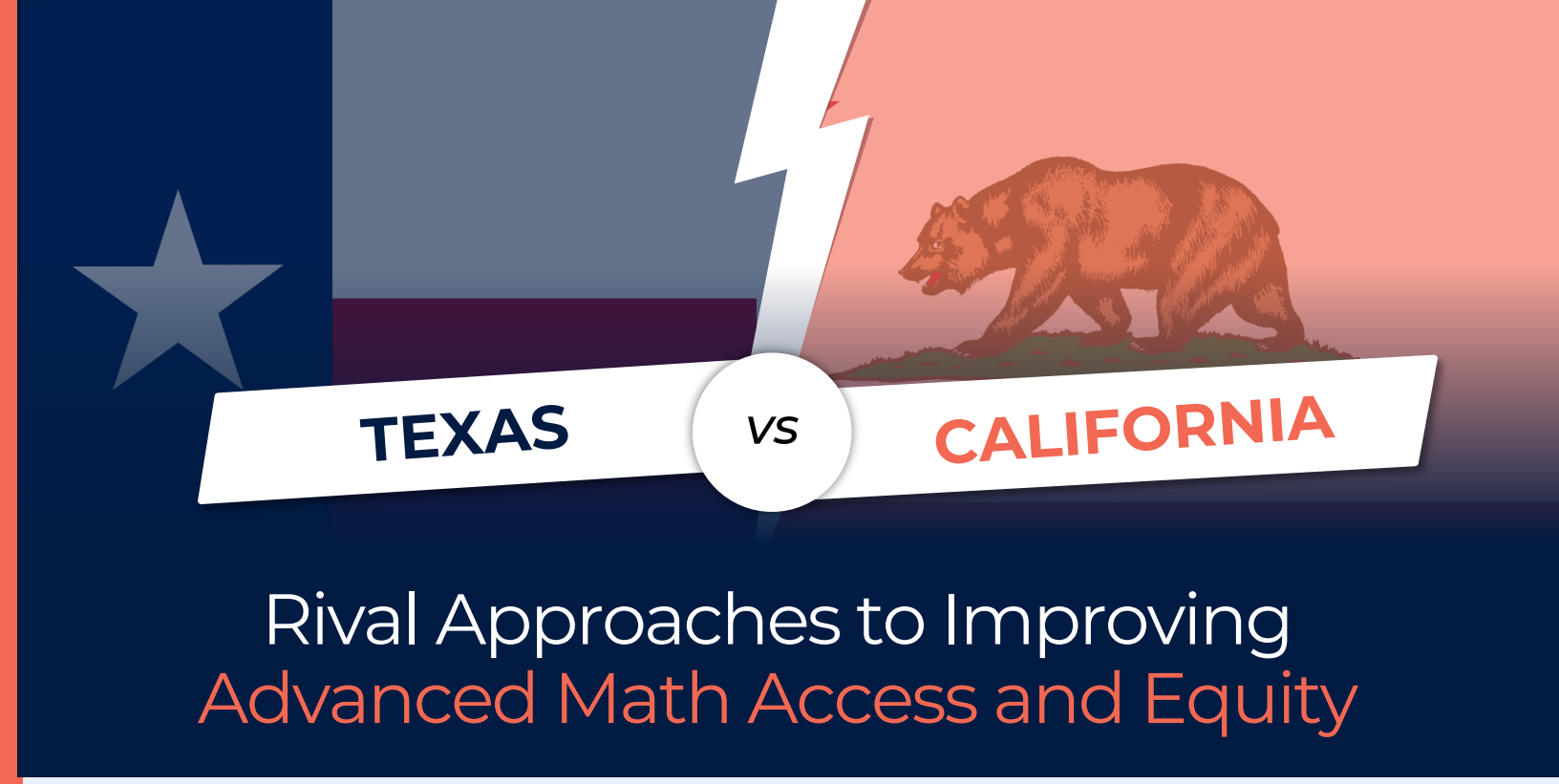
Nationally, principals are significantly more confident that their middle school math teachers understand math content and pedagogy. Only 28% of elementary principals believe that all or almost all of their math teachers demonstrate deep knowledge of math pedagogy, compared to 55% of middle school principals.[94] In terms of the actual material, just 33% of elementary principals believe that all or almost all of their math teachers demonstrate deep knowledge of math content compared to 64% of middle school principals.[95]

Pedagogy

The art, science, or profession of teaching. This encompasses teaching methods and strategies, learning activities, and assessment methods.



[94, 95] Elementary and Middle School Opportunity Structures That Factor into Students' Math Learning: Findings from the American Mathematics Educator Study. RAND, 2024.



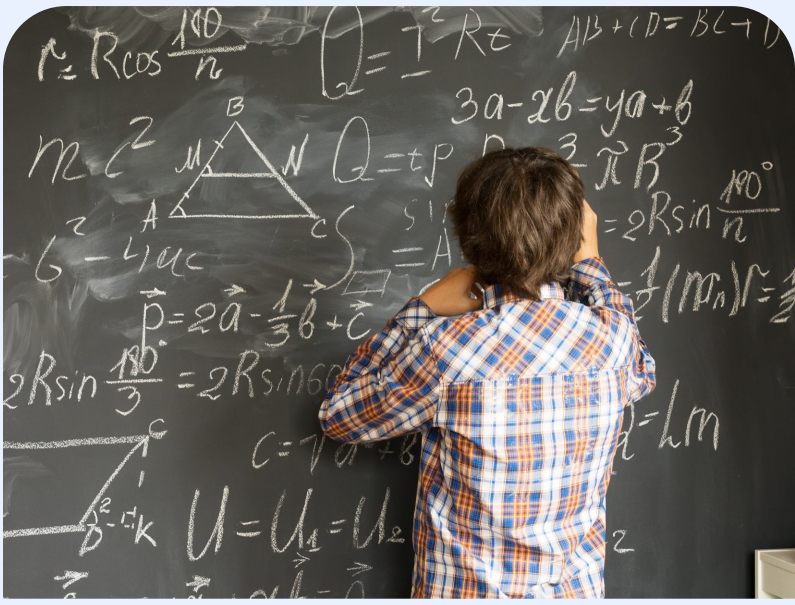
Rival Approaches to Improving Advanced Math Access and Equity

Racial and socioeconomic disparities in math achievement, including access to high-level math courses, have persisted across decades and across state lines.[96] In recent years, states have attempted to close these gaps in **substantially different ways**. California and Texas — the nation's two most populous and economically impactful states — provide clear examples of these emerging alternative pathways.

In Texas, new policies seek to enroll all qualified students in Algebra 1, while the California approach suggests delaying access to advanced math for most students in an attempt to promote equity. How these two states address the shared challenge — and the divergent approaches they pursue — may shape the nation's future growth.

KEY TAKEAWAYS

- **Texas and California have recently sought to address the same challenge — gaps in racial and geographic access to advanced math — with radically different strategies.**
- **The Texas approach seeks to enroll more minority students in advanced math pathways earlier in their education.**
- **California attempted to delay access to advanced math pathways for all children in an attempt to promote equity.**



[96] A Two Decade Examination of Historical Race/Ethnicity Disparities in Academic Achievement by Poverty Status. Journal of Youth and Adolescence, 2018.

THE TEXAS APPROACH:

Improving Math Equity By Increasing Enrollment in Advanced Math Pathways

Access to and enrollment in advanced middle school math courses in Texas have historically been inequitable both across the rural/urban divide and between racial demographics.[97] These inequities result in fewer rural and minority students pursuing math-focused majors as undergraduates. In Texas, 37% of school districts currently do not offer Algebra 1 to eighth graders.[98] This lack of course offerings primarily impacts the students located in rural Texas. In response, the Texas Legislature passed **Senate Bill 2124** in 2023. This new law will increase enrollment in high-level math courses by requiring districts to offer advanced math classes in middle school for high-achieving middle school students, regardless of their background or geographic location.

Senate Bill 2124 requires schools to **automatically enroll the top 40% of fifth graders** based on STAAR scores in advanced sixth grade math, putting them on a path to take Algebra 1 in eighth grade and college-level math (like Calculus) in high school.[99] This type of "opt-out policy" helps address the significant disparity in access to Algebra 1 in eighth grade and has been credited with increasing both total enrollment in advanced math and enrollment of traditionally underrepresented minorities in high-level mathematics.[100] With only roughly 30% of the state's students currently completing Algebra 1 in middle school, the state is expected to see over 50,000 more students per year completing this course as a result of this legislation.[101]

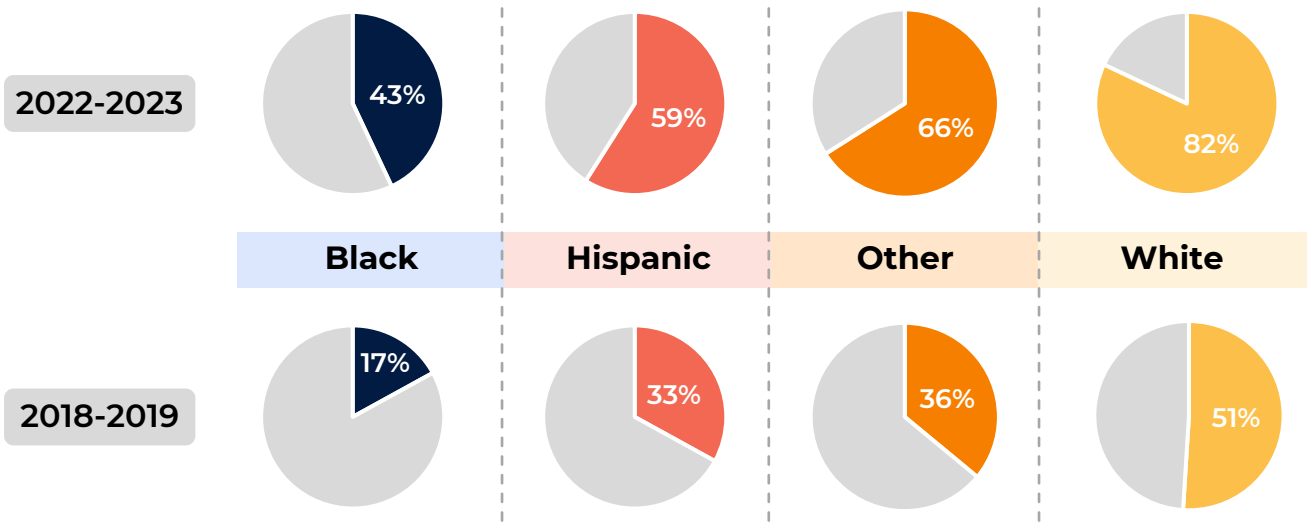
Even for Texas' highest achieving students, enrollment in these advanced courses has not been guaranteed. Only 62% of students that scored "Masters" on their fifth grade STAAR Math test end up taking Algebra 1 in eighth grade.[102] While enrollment rates for these students varied across demographics, Asian students had the highest percentage. Among Asian students who achieved Masters Grade Level on fifth grade STAAR Math, 84% subsequently took Algebra 1 in eighth grade.[103] For white students and students with two or more races, the percentages were 65% and 66%, respectively.[104] Greater gaps exist for African American, Hispanic and Economically Disadvantaged students, with enrollment rates of these high-achieving students at 55%, 56%, and 51%, respectively.[105] **After full implementation of Senate Bill 2124, all of these students would likely be enrolled in advanced math courses automatically.**

[97] Texas 2036 Advanced Course Taking Dashboard
[98] Texas 2036 Advanced Course Taking Dashboard
[99] Senate Bill 2124
[100] Dallas ISD's Opt-Out Policy Dramatically Boosts Diversity in Its Honors Classes (2023)
[101] Math Pathways, Middle School, Math Profile. E3 Alliance, 2022, 2022-23 Advanced Math Pathways State Report, 53,027 students scored Masters on the 5th Grade STAAR Math exam but did not complete the STAAR Math EOC in 8th grade in 2022.
[102] 2022-23 Advanced Math Pathways State Report via TPRS
[103, 104, 105] Ibid.

Districts like Dallas ISD (DISD) have previously implemented policies similar to this legislation and have seen enrollment in advanced math courses better reflect the diversity of the district. After implementing the policy that informed Senate Bill 2124, DISD saw the percentage of those enrolled in advanced math increase across multiple student groups. The percentage of Black students enrolling in sixth grade honors math more than doubled, rising from 17% to 43%.[106] Among Hispanic and white students, there were increases of 26 and 31 percentage points, respectively.[107]

Other Texas school systems, including East Central ISD in San Antonio, have implemented "Algebra for All" policies, which structure classes and curriculum so every student will take Algebra 1 in eighth grade, providing greater opportunity to take advanced math courses in high school. Coupled with the reforms made through Senate Bill 2124, districts implementing these types of reforms are positioning Texas as a leader in equitable advanced math access.

6th Grade Honors Math Enrollment
Dallas Independent School District



Source: Dallas Independent School District via The 74 Million

[106] Dallas ISD's Opt-Out Policy Dramatically Boosts Diversity in Its Honors Classes, The 74 Million, 2023
[107] Ibid.

THE CALIFORNIA APPROACH:

Limiting Access to Advanced Math in the Name of Equity

While Texas is working to enroll more middle school students in advanced math courses, California's State Board of Education has proposed limiting access to advanced math for all students.

The California State Board of Education began the process of updating its guidance for school districts, the *Mathematics Framework for California Public Schools: Kindergarten Through Grade Twelve (Mathematics Framework)*, in 2019.[108] A draft of the report released in early 2021 included language **pushing districts not to enroll any middle school students in Algebra 1**, recommending instead "that all students take the same, rich mathematics courses in K–8."[109] Almost immediately, these recommendations were met with resistance from both experts and parents concerned that this proposed direction "would hold back students who were ready for more advanced math, putting them at a disadvantage in applying for college with students from other states."[110] Over 1,200 mathematicians signed an open letter criticizing the approach as "foolish to intentionally hold back the intellectual growth of students by forcing them to waste time in unchallenging classes."[111] Parents and math experts view this as a move that limits opportunities for high-achieving students, and might discourage students from taking calculus in high school since it would require students to enroll in multiple math courses their senior year.[112]

The California State Board of Education backed down from this proposal, approving a version in mid-2023 that would provide more flexibility for students at different levels and acknowledging that some students will be ready for accelerated math classes.[113] However, even the adopted framework still suggests that most students take Algebra 1 in ninth grade.[114]

Doubts about the value of eighth grade Algebra 1 enrollment have plagued California for over a decade. In 2014, San Francisco Unified School District (SFUSD) independently adopted a policy requiring all students to wait until ninth grade to take Algebra 1, with the goal of increasing the number of minority and disadvantaged students in higher-level math classes.[115] However, a recent study found that the policy was largely unsuccessful in increasing the proportion of Black and Latino students enrolling in Advanced Placement math courses.[116] These results coupled with overwhelming pushback from parents and community members prompted the district to recently end this practice. On a ballot proposition in March 2024, just a month after SFUSD announced its plans to bring back Algebra 1 in eighth grade, over 80% voted to restore Algebra 1 access to middle schools.[117]

[108] California Mathematics Framework Revision Timeline
[109] California Mathematics Framework (First Field Draft) Chapter 9
[110] California Approves Math Overhaul to Help Struggling Students. Los Angeles Times, 2023
[111] Open Letter: Replace the Proposed New California Math Curriculum Framework, 2021
[112] California Approves Math Overhaul to Help Struggling Students. Los Angeles Times, 2023; California Adopts Controversial New Math Framework. Here's What's in It, EducationWeek, 2023; California revises new math framework to keep backlash at bay, EdSource, 2022
[113] California Adopts Controversial New Math Framework. Here's What's in It, EducationWeek, 2023.
[114] Ibid.
[115] Controversial math guidelines have had mixed results at San Francisco Unified, Cal Matters, 2021
[116] Ahead of the Game? Course-Taking Patterns under a Math Pathways Reform. Annenberg Brown University, 2023
[117] San Francisco, California, Proposition G, Declaration of Policy Urging San Francisco Unified School District to Offer Algebra 1 to Students by Eighth Grade Measure (March 2024); SFUSD to Offer Algebra 1 in 8th Grade Beginning in 2024-25 School Year, SFUSD Press Release Feb. 2024

The Texas Approach Represents a Bipartisan Consensus to Improve Outcomes

Ensuring students ready for advanced math are given the opportunity to access higher-level math received broad bipartisan support in the Texas Legislature. Senate Bill 2124 was authored by State Senator Brandon Creighton (R-Conroe) and sponsored by State Representative Donna Howard (D-Austin). The bill passed with unanimous support in both chambers before being signed by Governor Greg Abbott. [118]

At the time of this report, agency rulemaking to implement Senate Bill 2124 is ongoing. Progress monitoring and public awareness will be essential to ensure that the promise of this popular reform for Texas students is fully realized.

[118] Texas Senate Bill 2124 (88R)

CHAPTER 4

Efforts Around the Country

- Reforms in Parental Engagement
- Reforms in Student Support
- Reforms in Teacher and School Support

CHAPTER 4

Efforts Around the Country

In response to the COVID-19 pandemic, many states invested in high-quality math instruction, remediation, and acceleration to increase math achievement and reverse learning declines. Because it takes time for the effects of education reforms to appear following implementation, it is difficult to tell at this time which of these policies will bear fruit and which will fall flat. Regardless, because each year without proper instruction results in compounding challenges, Texas students don't have the luxury of waiting. The following examples of reforms adopted by other states provide Texas with options to consider in coming legislative sessions.

Reforms in Parental Engagement

Nationally, there is growing concern about parents overestimating their students' academic progress, as data shows that the vast majority of parents believe their child is performing at their grade level even when they are not.[119] Often referred to as the "parent perception gap," this is due to scores on a child's report card being inconsistent with their performance on standardized tests.[120] Parent notification laws and "train the parent" programs ensure parents are empowered with information about their child's academic needs and equipped with tools and resources to address those needs with school or community-based resources.

Parental engagement is a key driver in student achievement. Unfortunately, many parents are unaware or misinformed about whether their student is achieving and growing at the level they should be, dramatically limiting the opportunities to support the child's learning at home or through additional channels. To ensure parents receive timely feedback on their child's growth and proficiency in mathematics, states including Florida and West Virginia have started requiring timely notifications to parents whenever their student has been identified with deficiencies in mathematics. With quality assessment tools and screeners, these states are providing parents with the information they need to ensure that their students can get the help they need and participate in the intervention programs provided by schools. For example, Arkansas, as a part of the state's LEARNS Act, requires that each parent receive written notice when their child is enrolled in a math improvement plan and be updated on their

Arkansas

Requires that each parent receive notice when their child is enrolled in a math improvement plan and be updated on their child's progress.

[119] Study Shows Parents Overestimate Their Students' Academic Progress. PBS NewsHour, 2023.
[120] Ibid.

child's progress. These reports must include the student's strengths, deficiencies, and progress areas throughout the school year.[121]

It is not enough to provide parents with information about their child's achievement; parents also need the tools and resources to support their child's learning. Many parents themselves struggle with math. As teaching practices around math have changed over the years, many may find it hard to support their child's learning at home. States such as Florida and Colorado have started encouraging districts to adopt "train-the-parent" models for math instruction and to provide them with resources and curriculum for at-home instruction. Florida now requires these kinds of materials be provided to parents when students are given an individualized monitoring plan.[122] Colorado has created a grant program to create community learning centers that provide enrichment and support for students and increase parental involvement in education.[123]

Reforms in Student Support

Learning loss from the COVID-19 pandemic sparked targeted interventions to identify and address learning deficiencies as well as tailor curriculum to specific students. Though this is a common tool, standards for when individualized intervention plans should be created vary slightly state by state. Texas currently requires that only students in the lowest performance category on the STAAR exam receive an Accelerated Education Plan and only after failing to score in the "Approaches Grade Level" category or higher for two consecutive years in the same subject.[125] This is a scaled-down version of the previous policy that required formal meetings of a student's teacher, the student, their parent or guardian, and representatives of the district after just one year of poor performance.

Arkansas requires an individualized education intervention plan for students in grades 3-8 after only one year of performing below grade level on state exams. Additionally, Arkansas requires intervention plans to be overseen by teachers designated as top quartile math instructors or be taught by instructors who hold a high ranking in the state's Teacher Excellence and Support System or are designated a Master Professional Educator. While Arkansas does not require high-impact tutoring (HIT) like Texas does, the state does provide grant funding to districts that develop plans to offer HIT.[126]

Colorado provides additional instructional support for ninth grade students, including content-specific academic interventions and tutoring through an expansion of their Ninth Grade Success Grant.[127] This program prioritizes schools with lower math achievement as well as those schools focusing on the implementation of evidence-informed mathematics programming to support students who are performing below grade level.

West Virginia

Requires the state board to develop an "appropriate list of literacy and numeracy screening tools," that are required to be administered to K-3 students. They must be given in the first 30 days of the school year then repeated at mid-year and end-of-year.[124]

[121] Arkansas Senate Bill 294. 94th General Assembly, Engrossed: March 14th, 2023.
[122] Florida HB 7039/SB 1425 Enrolled. Committee on Education Pre-K- 12, 2023.
[123] Colorado HB 23-1231 Engrossed. The Colorado Legislature, 2023.
[124] HB 3035. West Virginia Legislature: Enrolled, March 11, 2024.
[125] Frequently Asked Questions: HB 1416 (88R). Texas Education Agency, 2023.
[126] Tutoring Programs Overview. LEARNS ACT: Commissioner's Memo, 2023; Arkansas Senate Bill 294. 94th General Assembly, Engrossed: March 14th, 2023.
[127] Colorado HB 23-1231 Engrossed. The Colorado Legislature, 2023.

These reforms all have one thing in common: They begin by identifying students who are struggling with mathematics.

Without a clear understanding of which students need help, no targeted intervention can be effective.

Math deficiencies hold many students back, but schools often don't screen for them. Thirty-seven states have adopted universal screeners for early literacy but, until recently, less than 10 have passed similar legislation to utilize math screeners.[128] This is changing as states recognize the importance of foundational math skills and the impact detecting math deficiencies early on can have on later outcomes.

Research recommends screening for math deficiencies as early as possible so that targeted interventions can get students on track for success.[129] To this end, states like West Virginia and Alabama have opted into providing districts with a list of approved numeracy screeners to choose from, which are required to be administered to students throughout the year.[130]

[128] Comprehensive Early Literacy Policy. ExcelinEd, 2024;
Schools Prioritize Reading intervention. But What About Math? Education Week, 2024.
[129] What is a Math Screener, and How Can They Help Young Students? Education Week, 2024.
[130] HB 3035. West Virginia Legislature: Enrolled, March 11, 2024; The Alabama Numeracy Act.
The Alabama State Legislature: Enrolled March 30, 2022.

Reforms in Teacher and School Support

TEACHER PREPARATION

Educator preparation programs begin an individual's journey into becoming a licensed professional classroom teacher. These programs include training in evidence-informed practices in mathematics, interventions to help students struggling at or below grade-level in math, and strategies for working with children with specific learning disabilities. Ensuring all aspiring educators have access to quality teacher preparation programs can foster preparedness, effectiveness and retention.[131] States that have included new measures to ensure high quality teacher preparation is available to educators in the last few years include Arkansas, Colorado, Florida, Virginia and West Virginia.

TEACHER PROFESSIONAL DEVELOPMENT

Many states have called for teacher professional development to include grade-level-appropriate strategies for teaching early numeracy. Mathematics professional development can include recognizing characteristics of dyslexia and dyscalculia, how to administer screeners, implementing high-quality instructional materials, and interpreting student data to create detailed intervention plans for students identified as struggling in early numeracy or literacy. State guidance for professional development in numeracy and literacy has been implemented through legislation in Louisiana, Colorado, Arkansas and West Virginia.

TEACHER COACHING

Teachers are the No. 1 in-school factor for a child's education success. To help teachers apply research-based methods in the classroom, Alabama, Mississippi, Tennessee, Colorado, Louisiana and West Virginia have all implemented state mandated math coaches in their public-school systems. Elementary math coaches possess a deep understanding of mathematics and effective teaching methods, and work alongside teachers to improve student learning outcomes by supporting teachers in implementing curriculum.[132]

Coaches select specific lessons and adapt their focus to meet individual teacher needs. They can drive teacher improvement by providing resources and collaboration and one-on-one work with teachers and administrators.[133]

ALABAMA

Passed the 2022 Numeracy Act, which invested heavily in math coaching in elementary school with the goal of having a math coach in every K-5 campus by school year 2027-28 [134]

[131] Florida HB 7039/SB 1425 Enrolled. Committee on Education Pre-K- 12, 2023.
[132] Y23-2019 The Alabama Numeracy Act Memo
[133] Practice Based Coaching for Project Based Learning. Teaching and Teacher Education: An International Journal of Research and Studies, 2023.
[134] Supporting Teacher Learning During Modeled Mathematics Instruction: Findings from one Coach-Teacher Dyad. Journal of Mathematics Education at Teachers College (2023) and Mathematics Coaching for Conceptual Understanding. Education Evaluation and Policy Analysis (2020)

CHAPTER 5

Data Provides a Path Forward

- Texas needs greater visibility into math ability and achievement in the early and later grades.
- Teachers are the No. 1 in-school factor in a child's education — they need to be trained and invested in.
- There are schools in Texas worth studying.

CHAPTER 5

Data Provides a Path Forward

The data is clear: math proficiency in Texas needs improvement. If state and school leaders expect students to succeed in college and the workforce, they must be equipped with the skills that a strong foundation in mathematics gives them access to — problem solving, critical thinking and analytical skills.

Texas needs greater visibility into math ability and achievement in the early and later grades.

POLICY OPPORTUNITIES

- Increase access to numeracy screeners in K-2 to more quickly provide students with needed supports before they fall further behind.
- Provide parents with actionable information and resources to support tailored "math-at-home" instruction.
- Improve data quality in grades 7-9 to better track system progress.
- Consider additional assessments for higher level math in high school.

In order to address the learning needs of our students, Texas needs more and better data about student math proficiency. With no requirement for districts to use available tools and assessments to identify the math skills of students in grades K-2, Texas teachers, parents, and policymakers are left without the information needed to ensure students have a strong foundation in mathematics. Parents need to know what gaps exist for their students in math, and resources to support effective acceleration at home.

An opportunity also exists for Texas to refine its data reporting for seventh, eighth, and ninth grade math achievement, and to explore ways to improve visibility into higher level math achievement in high school. Without clear and transparent data, the state cannot effectively identify gaps that exist and allocate resources to support solutions. State leaders should work to ensure that the mathematics curriculum and expectations in secondary education are aligned with requirements for high-value college programs and long-term workforce needs.

Teachers are the No. 1 in-school factor in a child's education — they need to be trained and invested in.

POLICY OPPORTUNITIES

+ Invest in teachers, particularly through pay raises that keep the most effective teachers in the classroom.
+ Implement meaningful professional development aligned to best-practices in mathematics instruction.
+ Ensure educator preparation programs include rigorous training regarding math pedagogy.

Many math teachers, particularly in the early grades, lack mathematics content and pedagogical knowledge.[135] While many are new to the profession and are still honing their skills, every "learning year" for a teacher impacts the outcome of the students that they are teaching.

The path forward for Texas must include strengthening the teacher workforce pipeline and teacher professional development. Opportunities exist for increased investments in programs like teacher residencies, which allow teachers to enter the classroom with more hands-on experience, so they start strong on day one. Policies like increasing base pay and merit-based pay increases are strong tools to ensure that the best teachers remain in the classroom.

There are good ways to teach mathematics and there are less effective ways. Professional development and teacher preparation programs are key to ensure that teachers have the tools to effectively teach mathematics. Texas has seen success with the reforms that it has made to reading professional development. Learning from this program should be used to create meaningful learning opportunities for teachers, and if necessary, equip them through required professional development. This not only means meaningful training outside of the classroom, but high-quality coaching and training during the school day.

There are schools in Texas worth studying.

POLICY OPPORTUNITIES

+ Study Texas-specific bright spots for math performance to identify scalable solutions.

Despite the broad challenges facing Texas students, there are bright spots around the state where teachers and school leaders faced with the task of getting students on grade level in mathematics in the post-COVID period have thrived. Researchers and policymakers should study these schools to understand what is making them so successful and use those insights to improve math education statewide. This will require monetary and political investment from the Legislature, but if done well, it can help scale promising practices from Texas classrooms in future years.

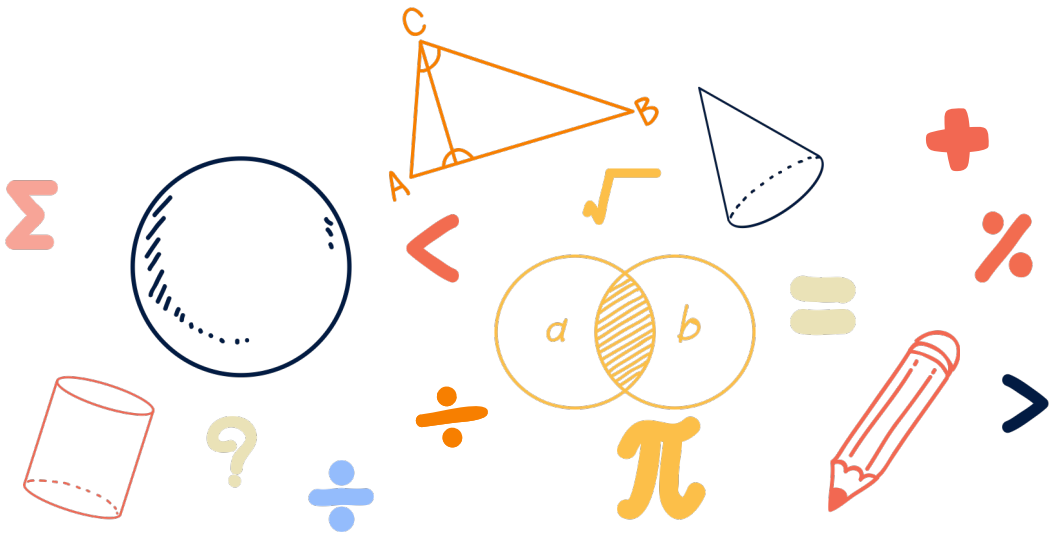
[135] Kaufman, Julia H., Lauren Covelli, and Pierrce Holmes, Elementary and Middle School Opportunity Structures That Factor into Students' Math Learning: Findings from the American Mathematics Educator Study. Santa Monica, CA: RAND Corporation, 2024. https://www.rand.org/pubs/research_reports/RRA2836-2.html.

There are schools in Texas worth studying

Schools	ISD	% Economically Disadvantaged	% on Grade Level in Math
1. Florence J. Scott Elementary	*Roma ISD*	86%	93%
2. Hudson PEP Elementary School	*Longview ISD*	64.2%	95%
3. J.A. Kawas Elementary	*Laredo ISD*	97.4%	98%
4. Kerr High School	*Alief ISD*	70.1%	82%
5. Maedgen Elementary School	*Lubbock ISD*	90.7%	83%
6. Markham Elementary	*Tidehaven ISD*	61%	87%
7. Palo Pinto Elementary School	*Palo Pinto ISD*	53.6%	86%
8. Pittsburg Intermediate School	*Pittsburg ISD*	83.8%	79%
9. Vista Hills Elementary	*Ysleta ISD*	73.3%	83%

Conclusion

Texas has long been a place of promise for many Americans who see it as the best place to live, work and raise a family. As Texas continues to attract businesses and families to the state, education leaders must ensure that our students are equipped with the knowledge and skills in mathematics necessary to succeed. Texas students deserve an education that equips them with the critical thinking and reasoning skills that mathematics provides, preparing them for success in life and the 21st century economy. To achieve this goal, Texans should embrace data-informed reforms and commit to a multi-year process, allowing investments in teachers, curriculum, training and targeted interventions to build on each other and guide student performance in a positive trajectory. With a shared focus on improving student outcomes, and the accompanying dedication and investments, Texas can achieve its long-term goals: preparing its students for the jobs of tomorrow and its economy for continued growth.



Appendix

Change in Percent of Students on or above Basic on NAEP in Math between 2011 and 2022 in 4th Grade (Ranked)

Percentage Point Change Between 2011 and 2022 (4th Grade)					
Jurisdiction	**At or Above Basic**	**Jurisdiction**	**At or Above Basic**	**Jurisdiction**	**At or Above Basic**
Maryland	-21	Pennsylvania	-11	Utah	-7
Delaware	-20	Minnesota	-10	Montana	-6
Kansas	-15	Rhode Island	-10	South Dakota	-6
New Mexico	-15	Ohio	-10	Iowa	-5
Vermont	-15	Nevada	-10	South Carolina	-5
New York	-14	Kentucky	-10	Wyoming	-4
Massachusetts	-13	Washington	-10	Louisiana	-4
North Carolina	-13	Colorado	-8	Illinois	-4
Alaska	-13	North Dakota	-8	Georgia	-4
New Hampshire	-13	Indiana	-8	Hawaii	-4
Virginia	-12	Connecticut	-8	Alabama	-4
Oklahoma	-12	Michigan	-8	District of Columbia	-3
New Jersey	-12	NATIONAL	-7	Florida	-2
Maine	-12	Arizona	-7	Nebraska	-2
Arkansas	-11	Wisconsin	-7	Tennessee	+1
Missouri	-11	Idaho	-7	Mississippi	+2
Oregon	-11	California	-7		
West Virginia	-11	**Texas**	**-7**		

Change in Percent of Students on or above Basic on NAEP in Math between 2011 and 2022 in 8th Grade (Ranked)

Percentage Point Change Between 2011 and 2022 (8th Grade)					
Jurisdiction	**At or Above Basic**	**Jurisdiction**	**At or Above Basic**	**Jurisdiction**	**At or Above Basic**
Delaware	-22	Arkansas	-15	New York	-10
Texas	**-21**	Minnesota	-15	Louisiana	-10
Maryland	-20	Ohio	-14	Hawaii	-10
Oklahoma	-20	South Carolina	-14	Florida	-10
Kansas	-19	North Carolina	-14	Iowa	-10
New Mexico	-19	Washington	-13	Georgia	-10
Maine	-18	Connecticut	-12	Wisconsin	-9
Colorado	-17	Virginia	-12	Wyoming	-9
West Virginia	-17	Pennsylvania	-12	Alabama	-8
North Dakota	-16	New Hampshire	-12	Nebraska	-6
Rhode Island	-15	Missouri	-12	Idaho	-6
Massachusetts	-15	NATIONAL	-12	California	-6
Alaska	-15	Illinois	-11	Mississippi	-4
Vermont	-15	Michigan	-11	Tennessee	-4
Montana	-15	Nevada	-11	Utah	-3
New Jersey	-15	South Dakota	-10	District of Columbia	-2
Kentucky	-15	Indiana	-10		
Oregon	-15	Arizona	-10		

TEXAS 2036