C-STEM

STATE OF STEM EDUCATION STAKEHOLDER REPORT

A 23-YEAR JOURNEY MEASURING HOW STUDENTS AND TEACHERS PERCEIVE STEM

JUNE 6 , 2025

Cool Cities, Bright Futures: A Student Lens on Heat and Water Justice cover art designed by Reagan Flowers, PhD using AI generated graphics

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> **Let's help them see themselves as greater so that they can see the world as they are and always have a future to look forward to.**

-Reagan Flowers, PhD
Founder, C-STEM Teacher and Student Support Services, Inc. and State of STEM Education Stakeholder Report

Acknowledgments

The 23rd C-STEM Report would not be possible without the teachers and students who participate in the organization's PreK–20 programs—including teacher training, camps, competitions, showcases, and college/university internships. These individuals generously share their perceptions, attitudes, confidence levels, and experiences related to STEM teaching, learning, programming, participation, performance, and interest. This report exists because of their voices, insights, and willingness to engage.

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EXECUTIVE SUMMARY

This 10-page report synthesizes a decade of C-STEM data (2016-2025) with national and Texas education trends, student survey results, and policy research. The data C-STEM has captured over two decades reflect hundreds of examples of how targeted programming shifts student outcomes over time. The stories of this quantitative and qualitative data present the transformative impact of C-STEM programming, benchmarked against national and state indicators, and offer an evidence-based blueprint for expanding equitable STEM education.

INTRODUCTION

During the 2024-2025 academic year, C-STEM students across elementary, middle, and high school levels engaged in immersive, interdisciplinary learning experiences focused on the real-world sustainability theme: Resiliency—Addressing the Heat Island Effect and Water Management. This theme was selected in response to growing climate challenges facing urban communities, particularly those disproportionately affecting underserved populations.

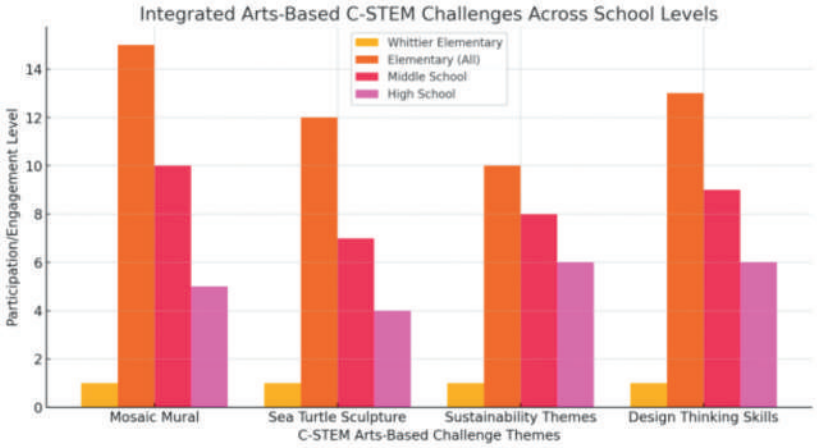
Throughout the year, students worked in collaborative teams to explore the science behind rising urban temperatures, impermeable surfaces, stormwater runoff, and localized flooding. Using C-STEM's signature toolkits—including the **Sea Turtle Sculpture**, **Mosaic Mural**, **Innovation, Robotics, and Photography Challenges**—learners connected environmental science with art, engineering, and coding. Guided by teacher coaches and community-based learning models, students conducted field research, built scale models, programmed sensors, and designed nature-based solutions such as rain gardens, green roofs, permeable pavement systems, and cooler pocket parks.

This hands-on work culminated with **C-STEM Challenge Showcases and Competitions**, where students presented prototypes, data visualizations, and artistic interpretations of their sustainability solutions to judges, peers, educators, community volunteers, and civic leaders. Hundreds of students participated across Houston Independent School District, Sheldon Independent School District, and DC Public Schools, with projects informed by regional climate data, local infrastructure issues, and input from professionals in sustainability and civil engineering.

INTRODUCTION Continued

The program deepened students' STEM literacy and environmental awareness and fostered critical thinking, teamwork, and communication skills. Most importantly, it empowered students—many from Title I schools and underrepresented backgrounds—to see themselves as innovators, problem solvers, and thought leaders capable of driving change in their communities.

This year's sustainability theme exemplifies C-STEM's commitment to project-based learning that bridges classroom learning with real-world relevance, inspiring the next generation of resilient, STEM-capable citizens.



> *"We learned how to save sea turtles while learning art and science together!"*
> — Whittier 5th Grader

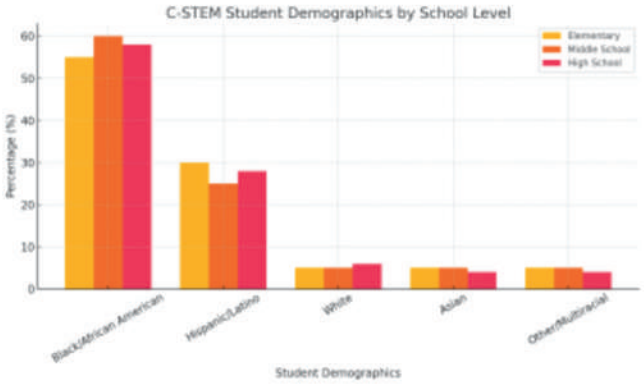
POLICY AND SYSTEM-LEVEL IMPLICATIONS

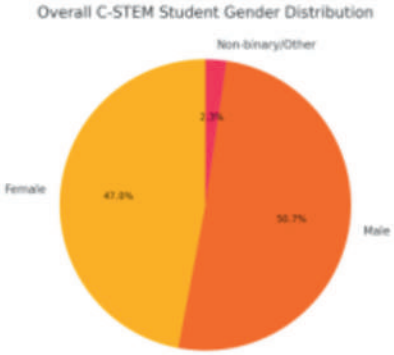
The data and outcomes presented in this report underscore not only the effectiveness of the C-STEM model but also the urgent need for broader structural and systemic change. As Texas and the nation continue to confront persistent achievement gaps, underfunded schools, and workforce disparities, the lessons from C-STEM's 23-year track record offer a blueprint for policy and system-level transformation. In this climate, it is critical to monitor legislative shifts that will shape the future of education. In Texas, proposals expanding **school voucher programs**, debates around the **ESSER funding sunset**, and changes to **HB 1605**—which redefines instructional materials and teacher flexibility—stand to impact resource equity and public school partnerships. Federally, the reauthorization of the **Perkins V Career and Technical Education Act**, shifts in **Title I funding allocations**, and efforts to update the **Every Student Succeeds Act (ESSA)** will influence how schools prioritize STEM, workforce readiness, and community collaboration. Leaders across education, philanthropy, and industry must act intentionally to scale meaningful progress. The following recommendations highlight actionable steps that can help institutionalize equity, expand access, and align education systems with the evolving demands of the 21st-century STEM economy:

- Expand funding for after-school and out-of-school STEM programming.
- Integrate culturally responsive curriculum in state and national frameworks.
- Support community-driven and nonprofit STEM partners in public school ecosystems.
- Build public-private partnerships to address workforce pipeline disparities.
- Incorporate longitudinal data tracking into state assessments for STEM success.

TRENDS IN STEM EDUCATION

Texas continues to face significant challenges in STEM education equity, particularly for its Black and Hispanic student populations. The Texas Education Agency has consistently reported achievement gaps in math and science proficiency, with Black and Hispanic students scoring **15 to 25 percentage points lower** than their White peers on STAAR assessments. According to the Texas Higher Education Coordinating Board (2023), **only 28% of all Texas high school graduates** are deemed college-ready in both math and science—a figure that drops significantly for students in economically disadvantaged districts. Additionally, girls in Texas represent less than 35% of students enrolled in advanced STEM courses like physics and computer science by the time they graduate from high school.





In contrast, C-STEM's Black, Hispanic, and Title I student populations demonstrates higher-than-average engagement, interest, and sustained participation in STEM, with nearly **90% expressing interest in continued STEM involvement** and over **85% reporting college aspirations**. Furthermore, a 2024 report by the Kinder Institute revealed that **73% of Texas school districts are underfunded**, exacerbating disparities in access to qualified STEM educators, lab equipment, and afterschool programs. C-STEM's scalable, community-rooted model helps fill these systemic gaps by leveraging cross-sector partnerships with corporations, school systems, and nonprofits to deliver high-quality, hands-on STEM learning to students who might otherwise be left behind. C-STEM's outcomes compare favorably with national STEM organizations and achieves competitive or stronger performance while serving a broader and more inclusive population. Students with consistent C-STEM engagement show higher confidence and clarity about their STEM future.

"My students were so engaged, they wanted to stay after class to work more."
— Middle School Teacher

TRENDS IN STEM EDUCATION Continued

Peer Comparison: Other STEM Organizations Serving High School Students

Organization	Estimated STEM Career Interest	Comparison to C-STEM
Project Lead the Way (PLTW)	55–58%	C-STEM exceeds by 2–5 points
Girls Who Code (female-only)	40–45% sustained into postsecondary	C-STEM maintains broader field diversity
FIRST Robotics	65% among long-term members	Comparable but often serves selective STEM-oriented schools
Code.org	52% of surveyed high schoolers nationally	C-STEM cohort outperforms

National Comparison: STEM Teacher Training & Support

Organization / Study	Program Scope	Key Training Support Metrics
NASA Endeavor STEM Teacher Certificate	National, online grad cert	Avg. 2–3 courses/year
National Math + Science Initiative (NMSI)	National, AP-focused	85% teacher satisfaction
Code.org Facilitator Programs	CS/STEM PD for teachers	93% teacher satisfaction
Texas Regional Collaboratives for Excellence	State-level (TEA-funded)	~2,000 STEM teachers/year
C-STEM	Targeted, integrated K–12	73–76% satisfaction, toolkit utility; high weekly usage

CASE STUDY: EQUITY IN ACTION

Out-of-school-time (OST) and summer STEM programs are proven drivers of educational equity, especially for underrepresented students who often lack access to enrichment opportunities. According to the **Afterschool Alliance (2021)**, only 30% of families nationwide report access to quality after-school STEM learning—underscoring a critical gap that C-STEM helps close. In Texas, the Texas Education Agency **(TEA, 2023)** notes that less than a quarter of STEM extracurriculars reach early learners, despite research showing that STEM identity and career aspirations begin forming as early as elementary school. A **RAND study (2018)** found that high-quality summer learning can reduce learning loss by up to one-third of a grade level.

C-STEM's partnership with YMCA Houston in Summer 2024 exemplifies this impact: 75% of students reported more STEM engagement during camp than the school year, 62% expressed interest in a STEM career, and 89% of participants were Hispanic/Latino. With flexible, art-integrated programming reaching students once a week for just an hour, C-STEM demonstrates how culturally relevant, community-embedded models can elevate achievement and expand the STEM pipeline beyond traditional classrooms.

C-STEM is a powerful equity model that intentionally designs programs that reach underserved, underrepresented, and Title I-designated student populations beyond traditional classrooms.

CASE STUDY: EQUITY IN ACTION Continued

In 2024, C-STEM's YMCA Houston summer camp serving Houston Independent School District Sunrise Centers, served an **89% Hispanic/Latino** cohort, with nearly half identifying as **female**, and 100% enrolled in **Houston ISD Title I schools**. Nationally, these groups remain underserved in STEM education—only **15% of STEM bachelor's degrees** are awarded to Hispanic students and just **2% to Black women**, according to the National Science Foundation (NSF, 2023). C-STEM bridges these disparities by embedding hands-on, culturally relevant STEM into community spaces, where students may otherwise lack access.

This performance illustrates C-STEM's commitment to inclusive, scalable innovation and its role in expanding equity-driven access to future-ready skills.

Program Model and Scalability

C-STEM is a national innovation proof point, demonstrating that thoughtfully designed, culturally responsive STEM education can drive meaningful engagement, learning, and identity development across varied instructional formats. The 2024 YMCA Houston summer program—delivering just one hour of C-STEM programming per student per week over eight weeks—yielded outcomes typically associated with full-year initiatives.

At the other end of the engagement spectrum, C-STEM Challenge coaches deliver high-frequency afterschool programs over 16 weeks, meeting 3-4 days a week for two hours per day, totaling approximately **96-128 hours of STEM instruction per student**.

This level of commitment far exceeds the national average for informal STEM learning time. It aligns with what Texas and national education scholars suggest is necessary for deep, sustained STEM engagement: at least **70-100 hours** annually in project-based, hands-on experiences to foster academic growth and career interest.

This range, from low-frequency summer enrichment to high-intensity afterschool engagement, demonstrates the flexibility and impact of C-STEM's modular toolkits and real-world learning approach. The success of this model underscores that innovation in education is not solely about technology or duration—it's about relevance, access, and intention. C-STEM's adaptable framework proves that high-quality STEM learning can thrive in afterschool clubs, summer camps, and community centers, effectively reaching students in ways traditional formats often miss and building critical pathways to future success.

Unlike isolated pilot programs or one-off summer efforts, C-STEM's longitudinal approach demonstrates how sustained, culturally relevant programming builds enduring interest in STEM. These insights validate the organization's reach and effectiveness and position C-STEM as a replicable model for school districts, funders, and policymakers seeking high-impact STEM education across the calendar year.

CASE STUDY: EQUITY IN ACTION Continued

Evidence of Impact

C-STEM's consistent collection and analysis of student and teacher data across academic year and summer programs creates a unique throughline that strengthens the case for long-term impact. From PreK-12 school-year initiatives like the C-STEM Challenge programs to seasonal offerings like the YMCA Houston summer camp, C-STEM tracks attitudes toward STEM, career interest, engagement, and instructional quality.

This **data continuity** allows for meaningful comparisons across time, geography, and program formats —revealing trends such as persistently high STEM career interest (exceeding 60% across age groups), increasing confidence among students of color, and measurable educator satisfaction with C-STEM toolkits.

SUSTAINED STUDENT SUCCESS: C-STEM LONGITUDINAL TRENDS

The 2016-2025 C-STEM longitudinal data trends reveal powerful truths about student motivation and the value of sustained STEM engagement. First, early exposure to STEM continues to prove effective, affirming that students develop strong career interests when given the opportunity, and dispelling the myth that STEM disinterest is inherent. High college aspirations were observed across all demographics, directly challenging deficit-thinking narratives about students from underserved communities. Moreover, students expressed a clear desire for deeper, ongoing STEM learning experiences, underscoring that one-time events or token initiatives are insufficient. Perhaps most significantly, parental support emerged as a consistent strength, reaffirming families as essential partners in student success and countering the false assumption that parents, particularly in historically marginalized communities, lack interest or engagement in STEM education.

Over 700 students from elementary through high school were surveyed over ten years. C-STEM found consistent growth in:

Domain	C-STEM Trend	National Trend	What It Means
STEM Career Interest	75–83% interested	~50–60% interested	Stronger engagement, sustained interest
College Aspirations	85%+ annually	~70%	Higher ambition despite structural barriers
STEM Participation	85–90% want to continue	~30% access rate	More demand than national capacity
Parent Support	80–90% engagement	Limited resources/confidence reported	Effective family engagement strategies
Representation	Broad and inclusive	Persistent gaps, especially in AP and careers	C-STEM fills a national equity gap

STEM WORKFORCE PIPELINE

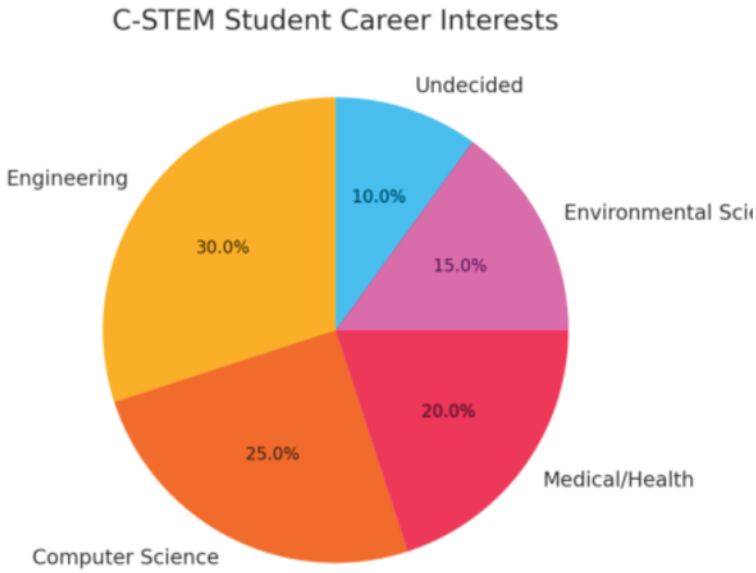
In a focused study of 45 C-STEM graduating seniors surveyed, 60% reported plans to enter the workforce in a STEM-related field which is **higher than Texas averages**, but **remarkably durable among Black, Hispanic, and first-generation college students**—a historically underserved population in Texas' STEM pipeline.

The **Texas Education Agency (2023) and Texas Higher Education Coordinating Board (THECB)** report:

- Roughly **43%** of Texas high school students are enrolled in a STEM or CTE-STEM course by graduation.
- Of those, **fewer than half** transition to a STEM major or job field.

The national benchmarks report 48–52% of U.S. high school seniors indicate interest in STEM careers, according to the latest data from ACT and Code.org. National interest in specific STEM careers shows a steep drop-off in **Title I schools**—a gap C-STEM is actively closing through early access and culturally relevant programming. C-STEM's 60% workforce intent rate is not only sparking early interest, but is sustaining that interest through graduation. It also highlights the value of multi-year student engagement, mentorship, and exposure to real-world STEM applications across disciplines such as environmental science, robotics, and marine biology.

C-STEM's **open-access, equity-driven model** consistently produces interest levels **on par with or above** more resourced, competition-based, or tech-specific programs.



"C-STEM helped me figure out I want to be a marine biologist." — 8th Grade Student

KEY FINDING FROM C-STEM TEACHERS

C-STEM trains, equips, supports, and sustains teachers and their STEM instruction throughout the academic year. With higher-than-average satisfaction in usability and weekly use, C-STEM stands out as a **high-impact model for scalable STEM teacher support**. The following analysis is based on self-reported data from teachers who participated in C-STEM programs and the Integrated C-STEM Training Institute (ICTI):

Metric	C-STEM Result
% of teachers rating ICTI navigation as user-friendly (4–5 stars)	76%
% indicating toolkits were adequate for instruction (4–5 stars)	73%
% using C-STEM lessons weekly	100%
% reporting 50%+ of instructional time in C-STEM	60%
% reporting students engaged with 50%+ of C-STEM modules	60%
Top grade levels served	K–5 and 6–8
Common teaching setting	Afterschool enrichment programs
Feedback sentiment	Mostly positive, citing "detailed" materials and excitement about STEM engagement

Texas Comparison

Texas STEM Teacher Data (from TEA & THECB reports):

- Most teacher PD is delivered through regional service centers or grant-funded summer programs.
- Only **34% of elementary teachers** report comfort delivering science/STEM beyond the core curriculum.
- Under **40% of Texas school districts** report adequate resources for STEM kit integration.

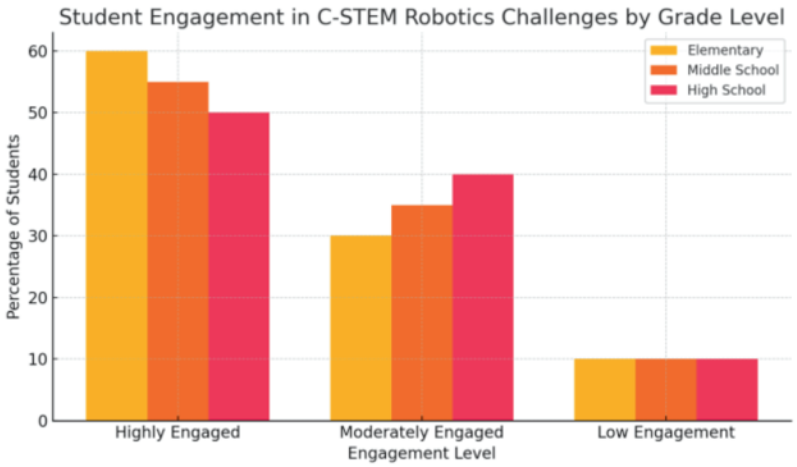
C-STEM's Differentiator in Texas:

- Provides both curriculum and toolkits with built-in training.
- Direct alignment with instructional time and student project application.
- Targets historically underserved schools with culturally responsive programming.

NATIONAL COMPARISON OF STEM INDICATORS

C-STEM's 2024-2025 program outcomes stand in sharp contrast to national STEM education trends, reaffirming the organization's impact in closing opportunity gaps and redefining what's possible for underserved students. While many programs struggle to engage students long-term or reflect the diversity of the communities they serve, C-STEM demonstrates consistent success in cultivating interest, access, and achievement, especially among Black, Hispanic, Title I, and female students. The following comparisons underscore how C-STEM outperforms national averages in key areas, from STEM engagement and college aspirations to teacher support and demographic representation:

- According to Code.org, fewer than **60% of students nationwide** express interest in STEM. C-STEM's students exceed that benchmark by **over 20 points**.
- The Afterschool Alliance reports only **30% of students** have access to STEM programs outside of school—compared to **85-90% ongoing interest** from C-STEM students.
- NCES reports **70% of high school students** nationally plan to attend college, while **85%+ of C-STEM** students indicate postsecondary aspirations.
- **Only 9% of the STEM workforce is Black**, and **8% is Hispanic**, despite these groups making up a much larger portion of the school-age population(NSF, 2023).
- Girls make up **only ~28% of the STEM workforce**. Middle school is often the drop-off point (AAUW, 2020; NSF, 2023). **C-STEM maintains nearly 50% female participation**, sustaining interest across grade levels.
- **Less than 50%** of public schools report having enough qualified STEM teachers (U.S. Dept. of Education). C-STEM combats this by **equipping 398,000+ educators and students** with practical toolkits and training, improving classroom capacity and confidence.
- Students in high-poverty schools are **less likely to have access to calculus, physics, or computer science** (CRDC, 2021). C-STEM fills this gap through **out-of-school enrichment, hands-on learning, and culturally responsive content**.



"I felt like a real engineer when I programmed the robot." — Middle School Student

CONCLUSION

Diverse, flexible, and year-round STEM programming is essential to closing equity gaps and preparing all students to lead in a tech-driven future. C-STEM's decade of success in OST settings proves that when learning extends into the community, impact multiplies. This evidence base strongly supports continued investment in non-traditional, inclusive learning environments.

Navigating the Crossroads of Policy, Equity, and Community Action

As C-STEM celebrates over a decade of impact, this milestone report is published at a critical inflection point for Texas and the United States public education. Budget cuts at the federal and state levels—combined with the expansion of school voucher programs—are reshaping the education landscape, often to the detriment of the very students and communities C-STEM is designed to serve.

Public schools, particularly those serving economically disadvantaged populations, face intensified financial strain. **Title I funding, Head Start programs**, and **free and reduced lunch services** are being curtailed in some districts, while after-school and out-of-school-time (OST) programs lose essential support.

Non-profit partners like C-STEM, which help fill these gaps with high-impact, equity-driven programming, are increasingly relied upon to sustain enrichment, workforce readiness, and STEM identity development, but with fewer resources. These conditions put students at risk of losing access to the very experiences—hands-on STEM, mentorship, real-world problem solving—that build resiliency, opportunity, and long-term success. Students of color, English learners, and low-income families stand to be most affected.

To counter these trends, community stakeholders must take action:

- **Philanthropic foundations** can invest in proven, scalable models like C-STEM that bridge in-school and OST learning for underrepresented youth.
- **Corporate partners** can align ESG goals with targeted support for STEM education and non-profit partnerships in underserved communities.
- **School districts** can deepen collaboration with community-based organizations to extend access and capacity without duplicating effort.
- **Policymakers** can prioritize funding for programs that provide measurable, equitable learning outcomes, especially in STEM, literacy, and early childhood education.
- **Parents, alumni, and civic leaders** can advocate for protecting and expanding public education investments that directly impact historically marginalized students.

C-STEM's story is a powerful reminder that when we invest in students, especially those furthest from opportunity, they rise. Now more than ever, collective action is needed to ensure these opportunities are preserved and expanded.

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