Go STEAM

A Program in Review

2018 - 2024

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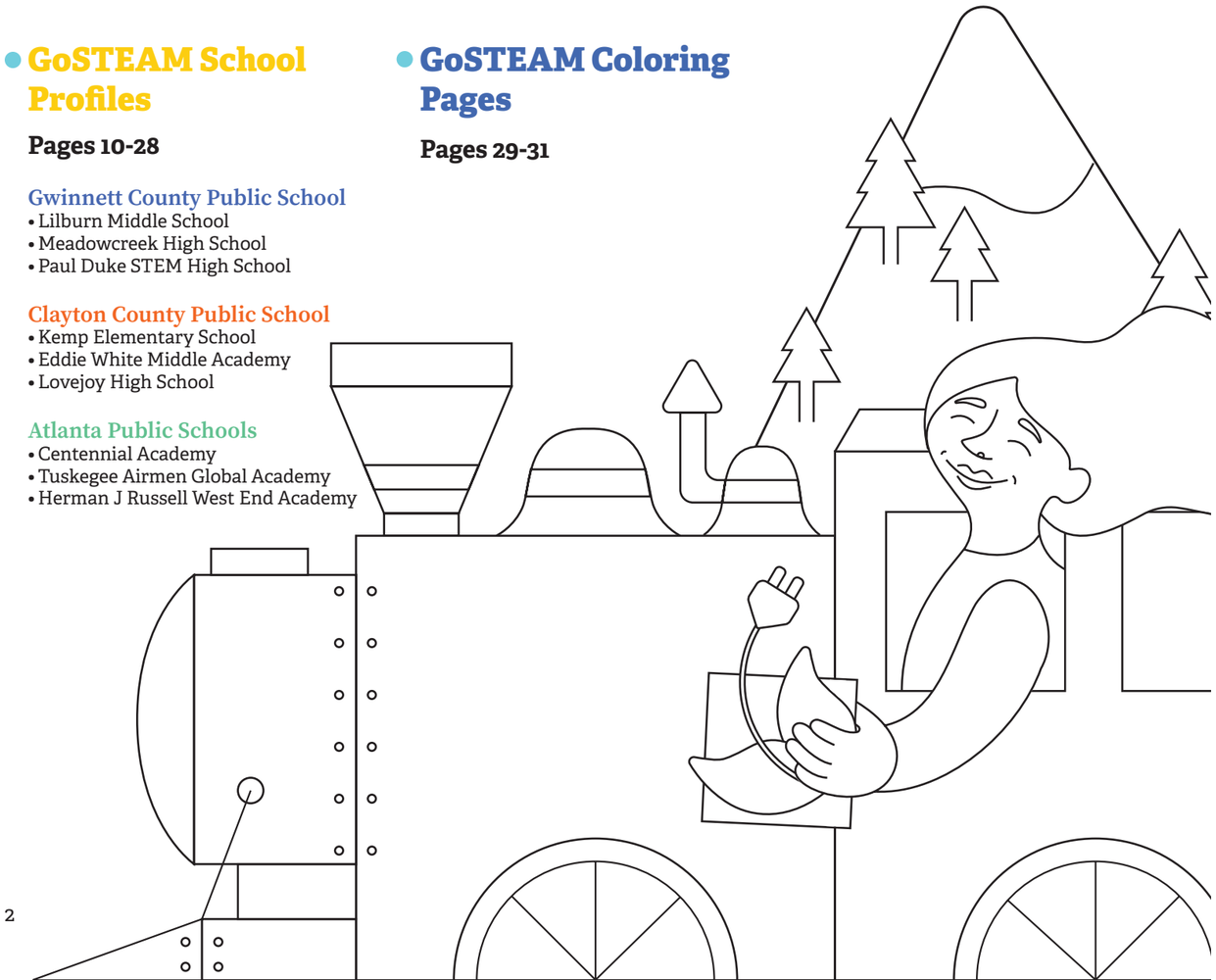


Note from Executive Director of CEISMC:

As we reach the conclusion of our six-year GoSTEAM project, I'd like to take a moment to reflect on the journey we've taken to bring innovative STEAM experiences to metro-Atlanta schools, teachers, and students. GoSTEAM began as a simple idea: What if we created a space where STEM teachers could collaborate and learn alongside arts teachers? Could this collaboration empower educators to develop creative solutions to complex educational challenges?

From this idea, the mission of GoSTEAM was born: to create sustainable, school-based programs that integrate the arts into Computer Science, Engineering, and Invention & Entrepreneurship education in authentic and compelling ways.

Over the course of the grant, we partnered with three districts, 13 schools, 27 Innovators-in-Residence, and 70 teachers—impacting more than 5,000 students. Our goal was to promote a positive STEAM identity through innovative lesson plans and engaging student programming. Each summer for the past six years, teacher teams from STEM and the arts at elementary, middle, and high schools in Clayton County, Gwinnett County, and Atlanta Public Schools collaborated with CEISMC coaches and Innovators-in-Residence to develop creative, interdisciplinary lessons for use during the school year. The Innovators and Coaches were key to fostering a culture of collaboration, offering technical and pedagogical support that helped make this program successful.

GoSTEAM actively involved the broader community as well, hosting events where students showcased their work and connected with professionals from diverse fields. These events demonstrated the talent and innovation our students brought to the table. Over the past six years, more than 100 Georgia Tech faculty, students, and staff have been involved in GoSTEAM. We've welcomed 700 students to campus for field trips and awarded 200 summer camp scholarships for STEM and arts programs hosted by many of our advisory board organizations

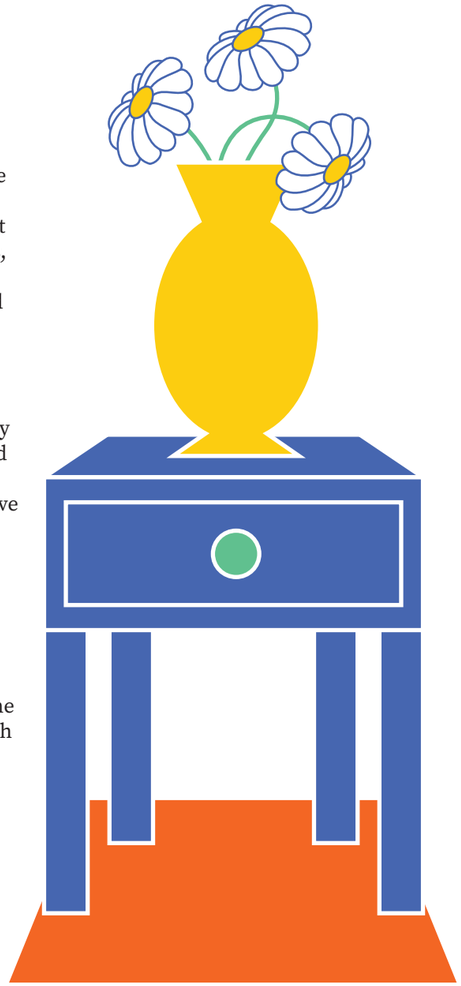
A key goal of the GoSTEAM initiative was to contribute to the growing body of research on STEAM education. Our Research and Evaluation Team worked closely with program leadership to assess the impact of STEAM on teachers, schools, and students. Their findings have provided valuable insights into effective STEAM teacher training and its benefits for professional development. These insights have been shared in 54 conference and professional development presentations and featured in six peer-reviewed publications.

Six years later, we have seen the transformative power of removing boundaries between disciplines. Teachers are imagining learning experiences that broaden students' horizons, and students are engaging with STEAM in authentic, meaningful ways. This magazine celebrates the stories of STEAM in action and the magic that unfolded at nine schools during the GoSTEAM grant period, along with highlights of our most impactful programming.

Warm Regards,

Dr. Lizanne DeStefano

Lizanne DeStefano Ph.D, Executive Director of CEISMC, Principal Investigator, and Professor of Psychology



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GoSTEAM by The Numbers

5,000+ Student Participants

54 Conferences, Teacher PD Workshops, and Presentations

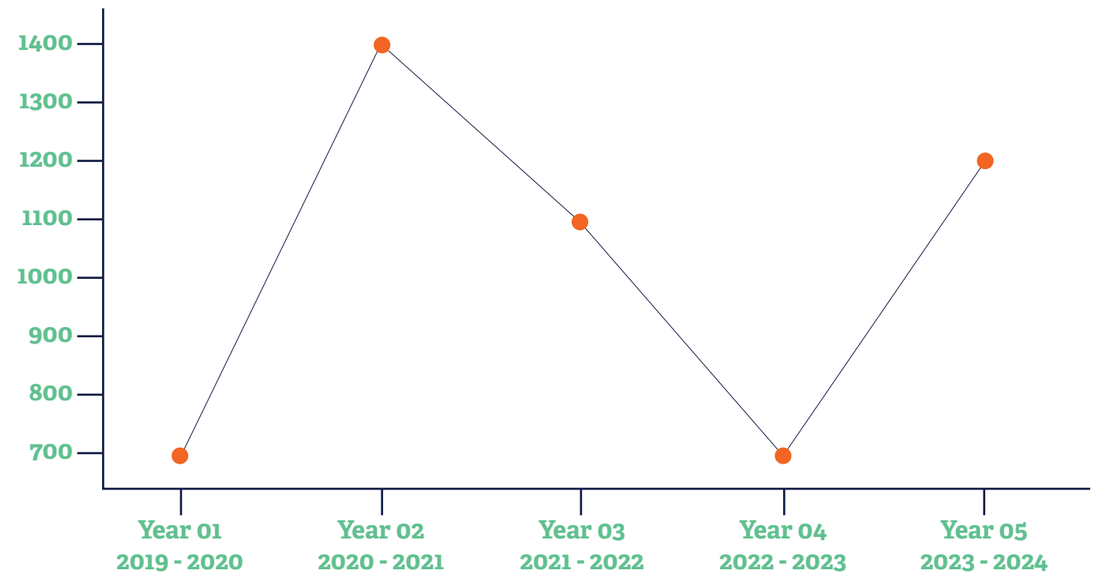
700+ students attended field trips at Georgia Tech

70 Teachers Involved

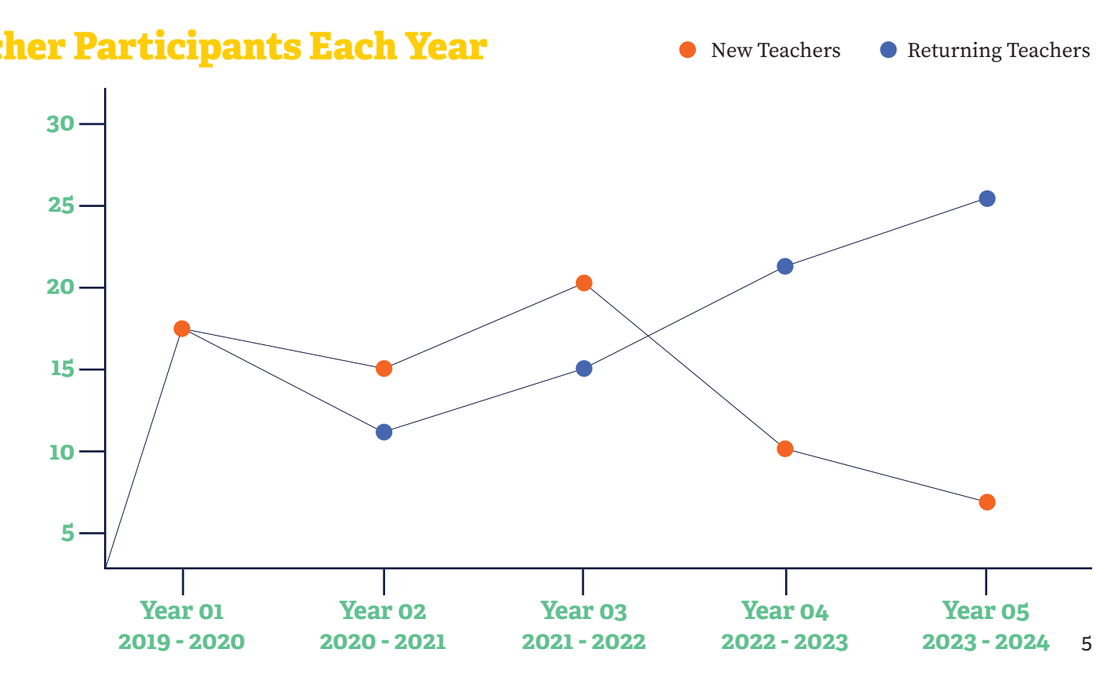
13 Participating Schools

3 Districts

Student Participants Each Year



Teacher Participants Each Year



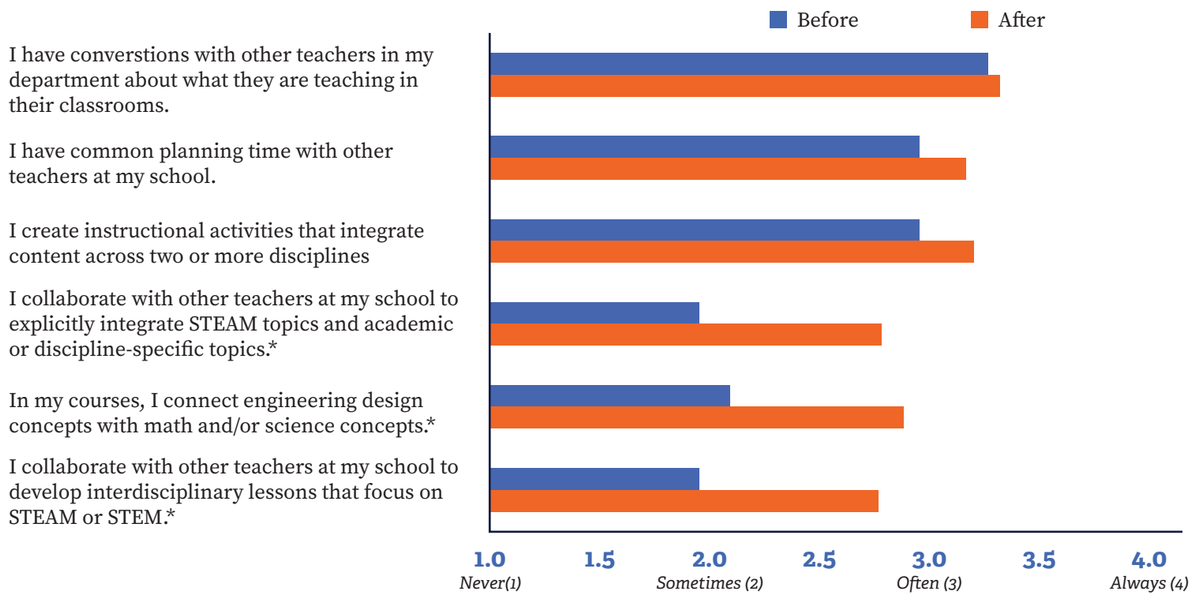
Note from Evaluation

Through ongoing research and evaluation, we documented the impacts of participation on teachers, students, and schools.

Teachers described:

- A deeper understanding of STEAM integration
- Collaborative STEAM networks within and beyond their schools
- High student engagement in STEAM lessons and activities

GoSTEAM teachers showed significant gains in the average frequency of collaborative, integrated STEAM practices (*p<.001).



Students described:

- Pride in the creation of final projects or productions
- The development of academic and 21st century skills (e.g., collaboration, communication)
- Exposure to innovative STEM careers

School administrators described:

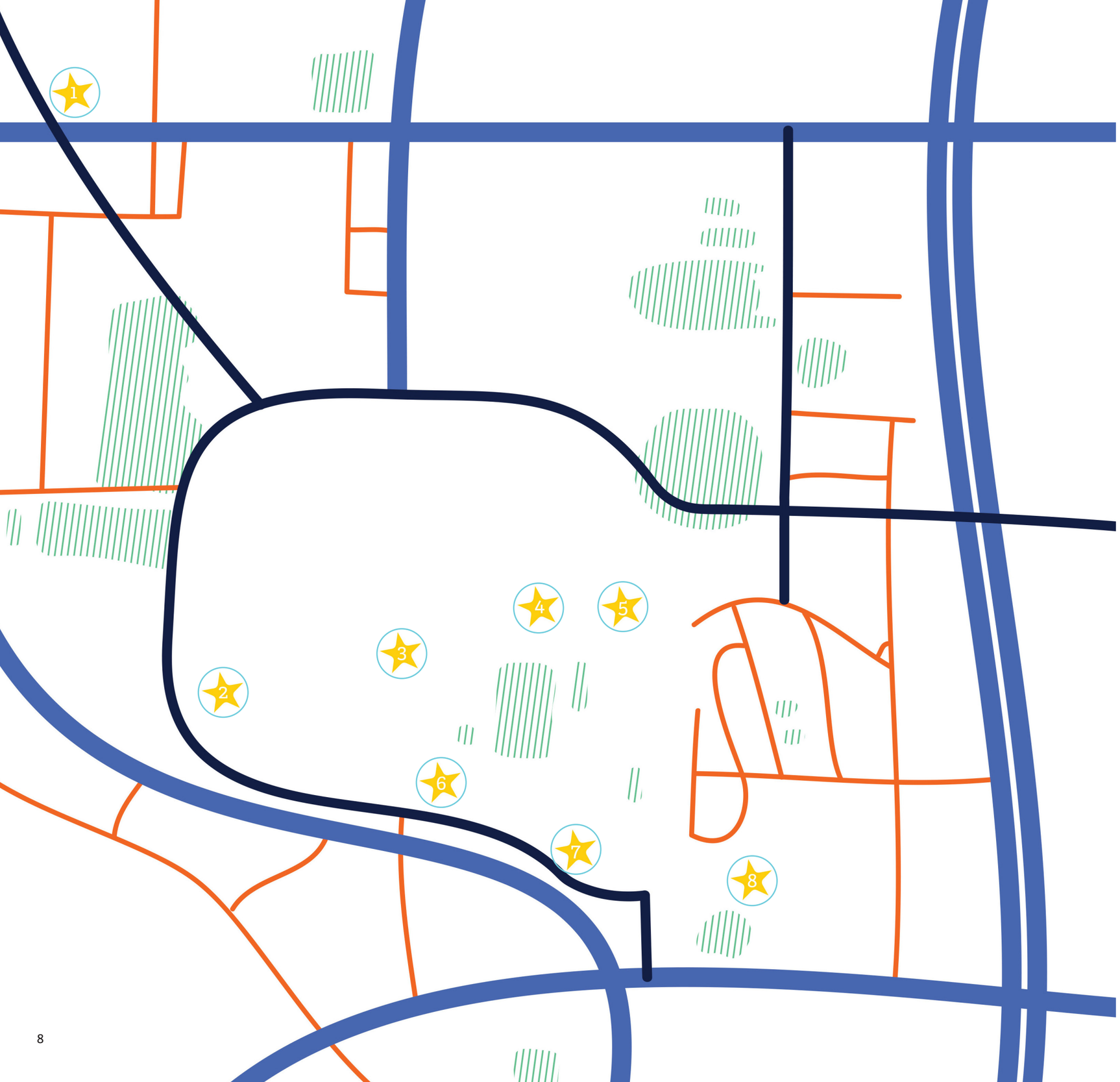
- The formation of lasting STEAM partnerships
- The value of the Innovator role for inspiring teachers and students
- New resources to support continued STEAM efforts

Research and evaluation findings have been shared widely, allowing others to continue to benefit from the lessons learned from GoSTEAM for years to come. GoSTEAM researchers and staff have presented over 35 conference presentations, collaborating with Innovators and teachers to share STEAM lessons and practices. Five GoSTEAM articles have been published to date in open-access, peer-reviewed journals, amassing more than 40 citations and over 10,000 views. The Research & Evaluation team continues to disseminate findings through additional journal publications, white papers, and conference presentations.

You can access our freely available articles and white papers on the GoSTEAM Research & Evaluation website: https://steam.ceismc.gatech.edu/research-and-evaluation/.

GoSTEAM Learning - Curriculum Assets:

- **Paper Piano**
  Music - Engineering - Coding
  6th - 8th Grade
- **Conserving The 1%**
  Music - Physical Science - Coding
  6th - 8th Grade
- **Visualizing Equivalent Fractions**
  Engineering - Math - Visual Arts
  4th - 8th Grade
- **Art+CODE: Draw Bots**
  Engineering - Coding - Visual Arts
  6th - 12th Grade
- **Technical Theater: Glowing LED Clock**
  Theater Arts - Mechatronics - Coding
  9th - 12th Grade
- **African Mask Project**
  Math - Modeling/Visualization
  Visual Arts
  6th - 12th Grade
- **Your Voice is Power: EarSketch**
  Music - Coding Invention/ Entrepreneurship
  6th - 12th Grade
- **Sneaker Design 101**
  Visual Art Invention/ Entrepreneurship Making Construction
  6th - 8th Grade
- **Technical Theater: She Kills Monsters**
  Technical Theater - Music Technology Engineering
  9th - 12th Grade
- **Technical Theater: Charlotte's Web**
  Theater Arts - Creative Design - Engineering
  9th - 12th Grade
- **STEM School Gardens**
  Physical Science/ Creative Design Making/ Construction
  4th - 8th Grade
- **How to Integrate AI into Art**
  Creative Design/ Media Arts
  9th - 12th Grade
- **Chymehammer: Music & Mechatronics**
  Music - Mechatronics Making/ Construction
  9th - 12th Grade
- **Cosplay and Electronics**
  Theater Arts - Mechatronics Engineering
  9th - 12th Grade
- **Tiny House Project**
  Mathematics - Engineering - Visual Arts
  4th - 5th Grade
- **Community Project: STEAM in K-2 Classes**
  Physical Science - Creative Design Making/Construction
  K - 2nd Grade
- **Studio Models in the Engineering Classroom**
  Engineering - Making/Construction Creative Design
  9th - 12th Grade
- **Animatronics Projects**
  Mechatronics - Theater Arts Music Technology
  9th - 12th Grade



1. CEISMC	GoSTEAM Staff Offices/Professional Development Locations
2. Exhibition Hall	GoSTEAM Middle School Innovation Day - workshops, demos, and presentations for middle school students from Gwinnett County, Clayton County, and Atlanta Public Schools
3. Ferst Center for the Arts	Guthman Musical Intrument Competition - Students attend the show after GoSTEAM Innovation Day
4. The Hive Makerspace	GoSTEAM Middle/High School Innovation Tour GoSTEAM Teacher Professional Development Tour and Lunch Discussion with students from the Hive and teachers/administrators from Gwinnett, Clayton, and APS
5. School of Industrial Design - College of Design	Student Radio Crafter Workshop - creating radios with micro:bits Teacher Radio Crafter Workshop - Professional Development Field Trips for Gwinett County Schools GoSTEAM Teacher Professional Development - Tours of classrooms and students projects during GoSTEAM Middle School Innovation Day - Tours of classrooms and student projects during middle school innovation day Gwinnett County, Clayton County, and Atlanta Public Schools
6. John Lewis Student Center and Stamps Commons	GoSTEAM High School Innovation Day Lunch and Tour GoSTEAM Middle School Innovation Day Tour
7. Aero Maker Space	GoSTEAM Teacher Professional Development Tour
8. The Bill Moore Student Success Center	GoSTEAM High School Innovation Day - workshops, demos, and presentations for high school students from Gwinnett County, Clayton County, and Atlanta Public Schools

CEISMC initiative empowers teachers through collaborative thinking spaces in STEAM

By Joëlle Walls

GoSTEAM, a multidimensional, school-based initiative began as a seed of an idea and has grown into a sustainable model that empowers teachers through collaborative thinking spaces in STEAM.

“GoSTEAM has transformed the way we approach education by integrating the arts into STEM subjects, creating a more holistic and engaging learning experience for students,” said CEISMC Program Director Sabrina Grossman. “This initiative has not only empowered teachers with innovative tools and collaborative spaces but has also paved the way for a future where education is more inclusive, dynamic, and reflective of real-world challenges.”

The GoSTEAM model was developed around having an innovation team set up at each school. The team includes technology and/or STEM teachers interacting with art and/or music teachers to create STEAM-focused projects using a project-based learning framework. CEISMC staff serve as coaches who check in on a recurring basis, but the linchpin to the implementation of plans comes from part-time innovators-in-residence, local community members or Georgia Tech students with STEAM backgrounds.

In six years, GoSTEAM impacted 13 schools in three school districts, involving 70 teachers and more than 5,000 K-12 students. Over 700 students have toured STEAM-inspired spaces at Georgia Tech. Annual STEAM Innovation Days, hosted on campus to coincide with Tech’s Guthman Musical Instrument Competition, brought more than 500 students and teachers.

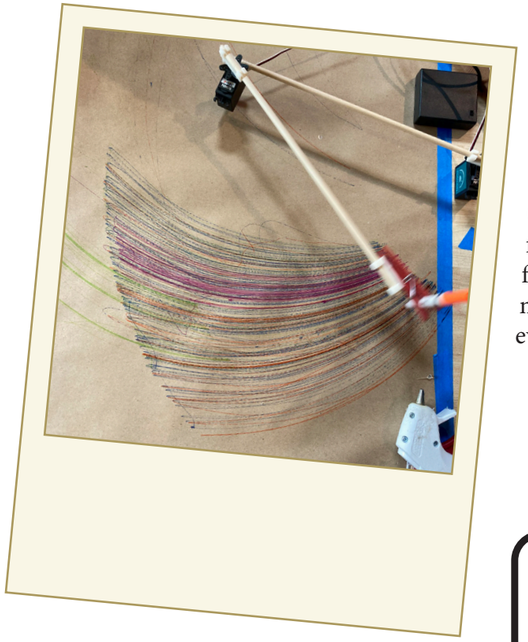
The following vignettes illustrate how GoSTEAM has empowered students and educators to push the boundaries of learning and imagination.

Lilburn Middle School – Direct Interactions with STEAM Professionals

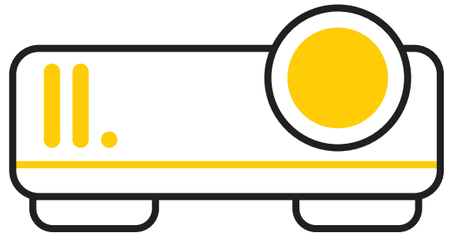
Lilburn Middle School students have engaged with CEISMC programming over the years, thanks to former language arts teacher Michael Doyne. Since 2009, he has served as the parent instructional coordinator, ensuring parents stay informed about their children’s education in various ways such as online school communications and parent learning events.

Doyne’s journey with Georgia Tech began over a decade ago through the GoSTEM program, an outreach initiative dedicated to promoting STEM academic achievement and college attendance among Latino and other cultural and linguistic minority K-12 students. “When Tech reached out to Gwinnett County, specifically targeting the Meadowcreek Cluster schools, parent instructional coordinators were chosen as liaisons,” he explained. “My initial involvement with GoSTEM naturally evolved into a deeper engagement with GoSTEAM.”

Doyne noted that a significant benefit for the middle schoolers in the GoSTEAM program has been the direct interaction with the Georgia Tech community, while learning about STEM and music/arts integration. In fact, they had the unique opportunity to participate in REMEZCLA, a National Science Foundation-funded collaborative research project between Tech and the University of Puerto Rico–Río Piedras (Award #2005791). During an academic year after-school program and a one-week summer camp, the students learned computer science concepts through a culturally relevant curriculum based around EarSketch, a Tech-developed, web-based digital audio workstation.



“One of the most unforgettable moments was during the summer camp showcase when our kids performed their heartfelt songs in front of their families and distinguished guests,” he said. “This magical evening, held at Georgia Tech, overlooking the football field, was topped off with a delightful, fancy, catered meal, making it a truly memorable and impactful experience for everyone involved.”

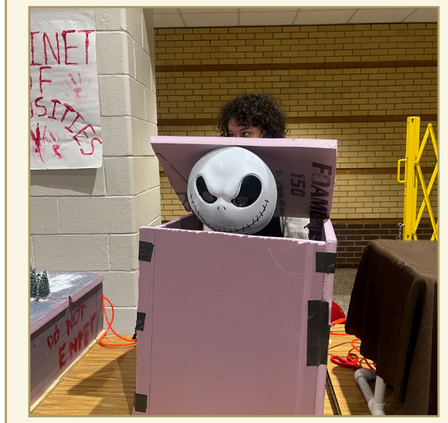


STEAM Innovation Days were another source of impactful experiences for the students. For example, in spring 2024, Grammy-winning artist and producer Bosco Kante gave the keynote address and demonstrated the ElectroSpit mobile talkbox he invented, which won First Place and the People's Choice Awards at Tech's Guthman Musical Instrument Competition in 2020.

"Those days at Georgia Tech, one of the top engineering schools in the world, were incredible for our kids," Doyne recalled. "For many, it was their first time on a college campus, and they left inspired by professionals and Georgia Tech staff, returning to school with renewed determination to work hard on their dreams that were sparked by these experiences."

Overall, partnering with Georgia Tech for many years was a great boost to the school, enabling them to bring hundreds of students to campus. "GoSTEAM opens possibilities that our students might never have imagined," Doyne said. "Many of our students come from families who aren't originally from the U.S., so seeing the potential to study at Georgia Tech or other top universities is invaluable. By incorporating STEM education with arts integration now, while they're in middle school, we ensure they become more marketable to future employers."

Meadowcreek High School – Student Inquiry in STEAM



For music technology teacher Marcus Budner, each year of participating in GoSTEAM fueled his quest for deeper understanding and integration of arts in STEM. "I shifted from an instruction-focused class to an inquiry-based class," he said. "Before, it was all about sticking to the plan. Now, when authentic learning moments arise, I'm willing to deviate and explore different topics as they come up naturally through student questions and inquiry."

Throughout his four years of participation, students completed projects that included elements of coding, ranging from block coding to Python programming. One of the first coding projects in his classroom focused on creating a robotic orchestra.

"With Aaron Artrip as our innovator-in-residence, we learned about simple machines, mechanics, and percussion instruments, including the sounds they produce and how to actuate those sounds," he said. "Then, the students designed mechanical machines to replicate those simple machine actions. We used an interactive microcontroller, coded to actuate the motors, to move the levers and create a drumbeat."

Budner began collaborating with Sara Konecny when she joined Meadowcreek High School as a mechatronics teacher. She had previously served as an innovator-in-residence at Paul Duke STEM High School. "GoSTEAM was important to me as an innovator because I was able to combine two of my passions, costume design and STEM, and show students that it is possible to engage your right and left brain together to accomplish great things," she said. "Now as a teacher routinely implementing STEAM project-based learning in my classroom, I see how important arts engagement can be. Reinforcing manufacturing technologies concepts through art-inspired projects pull in students that a traditional STEM curriculum may not reach."

One of their first collaborations, which included theater teacher John King, involved sound design for the play "Our Shining Lives," where time and clocks were key themes. "This project served as a great sound design unit. The theater students communicated their needs, and our students figured out how to best meet those needs based on their capabilities," Budner said. "All the disciplines came together for a truly powerful performance. The mechatronics and music technology elements added a lot to the production."

Last fall, Budner and Konecny teamed up again for a Halloween-themed project which involved building a pneumatic haunted chest complete with scary sound effects. "Students were able to express their creativity by customizing their animatronics, and every student received hands-on experience assembling, measuring, and calculating various pressure values of the pneumatic circuit," Konecny said. "The payoff was worth it. When we put our final display in the cafeteria, everyone was amazed at the hard work the students had put it."

Paul Duke STEM High School – The Interdisciplinary Nature of STEAM

Mechatronics teacher Stephen Cochran had always been interested in the intersection of engineering and other subjects, having earned a master's degree in biomedical engineering from Georgia Tech. The premise of the GoSTEAM program piqued his interest when Paul Duke STEM High School was invited to participate.

"I was interested in exploring how we might use mechatronics in relation to other fields. When the opportunity arose to combine mechatronics with another discipline and collaborate with an art teacher, I was excited about the potential for interdisciplinary studies," Cochran said. "I actively seek applications outside of engineering, aiming to engage students who may not be traditional engineering students. These students are not solely interested in engineering but want to see its applications in various fields."

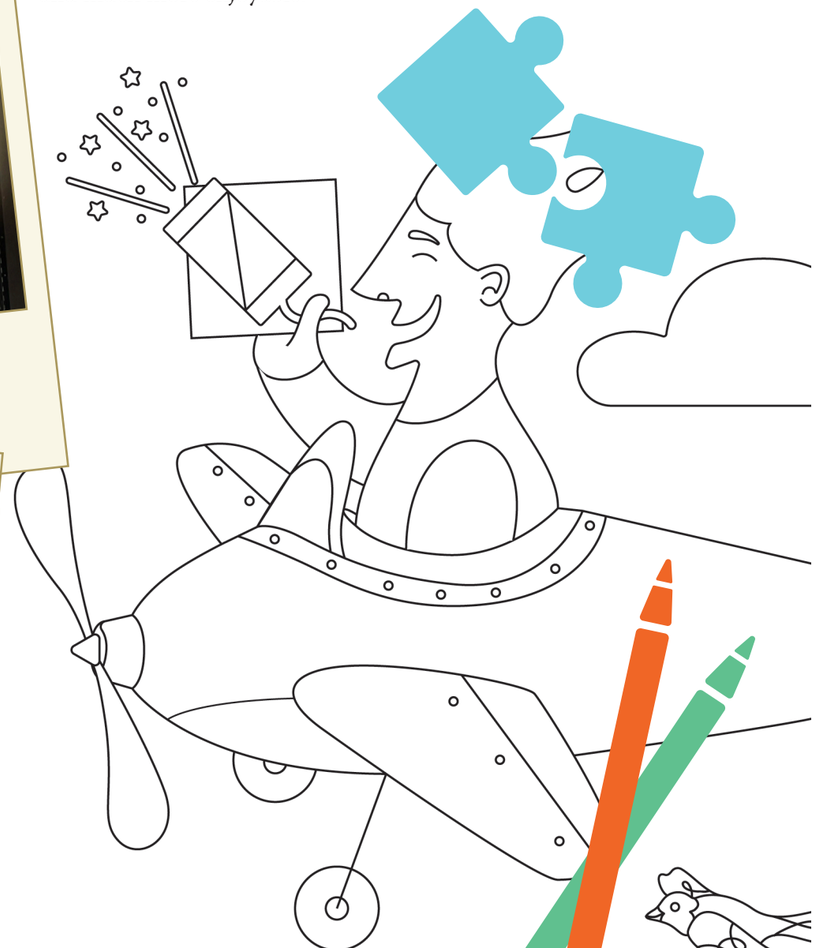
With support from GoSTEAM, the school has developed a highly successful technical theater program that involves the teachers and students in engineering, video and film, dance and drama. For one of the productions, "A Ghost for Rosanda," a student film documented the collaboration between departments and was named a finalist in the 2021 All American High School Film Festival in New York City.

After successful collaborations with fine arts teachers over the past few years, Cochran began integrating the arts into his own classroom. He guided two students in constructing their own version of a beat organ, known as the chyme hammer, as a functioning mechanical object. The students demonstrated their unique instrument at the Guthman Music, Art, and Technology Fair during the 2023 Guthman Musical Instrument Competition. They were the only high school team participating and received enthusiastic feedback for their work.

"The students had a great time, and it changed their perspectives. After putting in a lot of effort and showing perseverance, they realized they could achieve great things," Cochran said. "It was amazing to see them find their sense of self and value, knowing they can create impactful work."

Visual arts teacher Payton Hirschmann collaborated with Cochran during the final year of the program. He assisted her in developing a lesson plan for a paper circuits project, where students integrated circuitry, specifically LED lights, into their artwork to create dynamic and interactive pieces. “The GoSTEAM mindset has been incredibly beneficial for me. By engaging with other content areas and connecting with local Atlanta artists, my understanding of art has broadened, making it easier to implement in the classroom,” she said.

Hirschmann also emphasized the importance of the interdisciplinary learning vision that GoSTEAM promotes for the future of education in the U.S. “As society progresses, the boundaries between art, science, writing, and technology have increasingly blurred,” she explained. “Many contemporary artists use technology and engineering in their artwork to such an extent that it is hard to separate the two. The professional world values creative problem-solvers, and an interdisciplinary teaching approach enhances students’ understanding of individual subjects and demonstrates how the real world operates. It makes learning personal, practical, and much more enjoyable.”



Edwin S. Kemp Elementary School – Student Engagement in STEAM

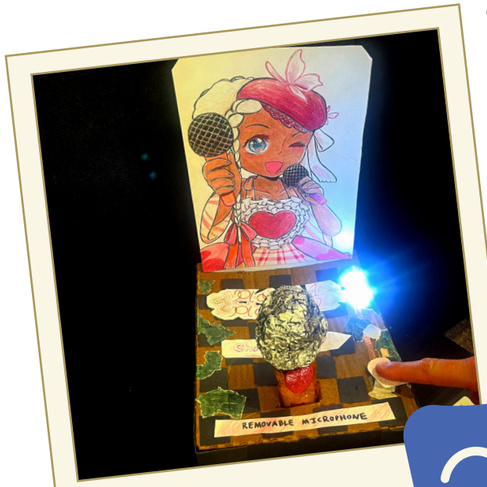
The upper elementary classrooms at Edwin S. Kemp Elementary School embarked on a tiny house design challenge idea in year two of the school’s GoSTEAM participation, which evolved into a project-based learning unit, integrating various aspects of STEAM instruction.

For example, fourth graders used persuasive language and informational writing to create online ads for the homes. Fifth graders enhanced the tiny home models built by incorporating smart technology, including LED lights that responded to songs all the students coded using EarSketch.

Fourth grade teacher Justin Watts and fifth grade teacher Nicole Sanders found the project fun and engaging, resulting in sustained student engagement throughout the process.

“All the students, including the English language learners, eagerly built the smart homes from kits we purchased,” said Watts, who teaches reading and social studies. “They chose their teams, defined roles, and collaborated effectively, becoming classroom leaders and helping other groups troubleshoot issues.”

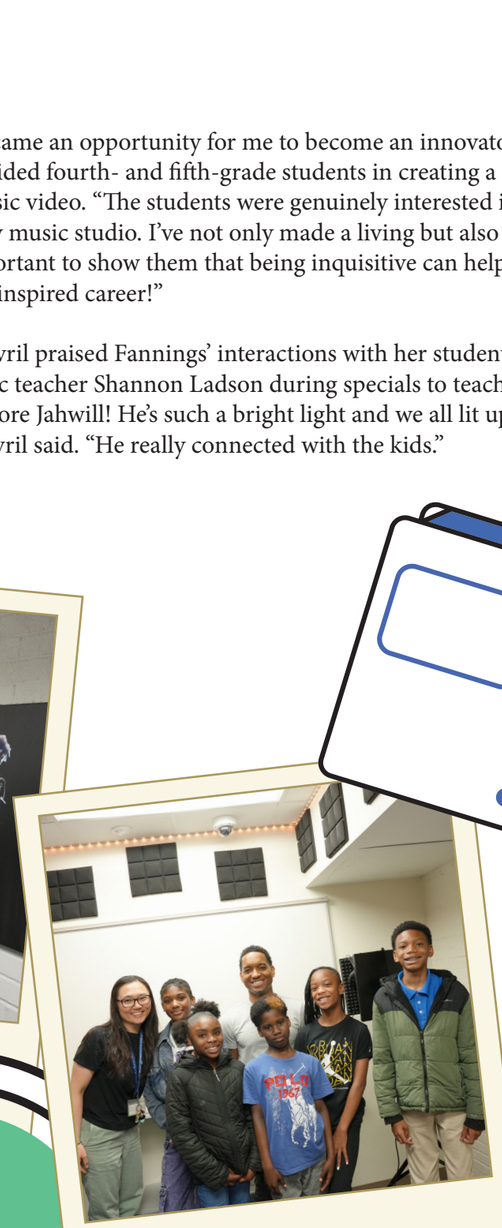
“For teachers, it’s about student engagement. Incorporating STEAM into the classroom is essential to grab their attention and ensure they grasp the concepts,” added Sanders, who teaches math and science. “We’re preparing students for future jobs that do not exist yet by teaching them to think critically now in every area.”

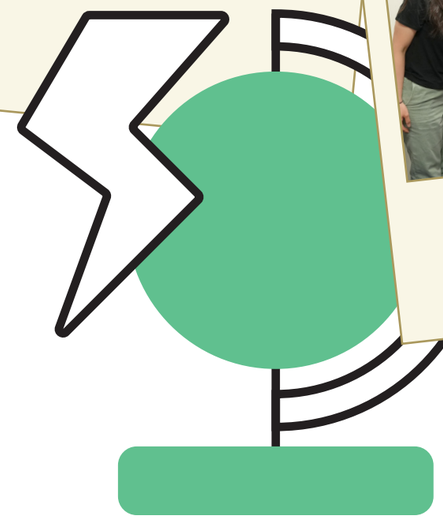


Over the last year, Georgia Tech undergraduate Jahwill Fannings served as the innovator-in-residence at Kemp Elementary. Fannings, a business administration and management major, became familiar with GoSTEAM after presenting at STEAM Innovation Day in 2023. As a self-employed music mixing engineer, he demonstrated to over 250 students how to produce music on mobile devices and compose lyrics using artificial intelligence.

"My role as a workshop host became an opportunity for me to become an innovator later on," said Fannings, who guided fourth- and fifth-grade students in creating a song for the school's annual music video. "The students were genuinely interested in my journey and success with my music studio. I've not only made a living but also pursued my passion. It was important to show them that being inquisitive can help turn their talent into a STEAM-inspired career!"

Fourth grade teacher Jasmine Avril praised Fannings' interactions with her students when he collaborated with music teacher Shannon Ladson during specials to teach music theory. "We absolutely adore Jahwill! He's such a bright light and we all lit up when he was in the building," Avril said. "He really connected with the kids."





Eddie White Middle Academy – Student Voice and Choice in STEAM

Georgia Tech computer science alumnus Jed Paz first heard about GoSTEAM when the team was hiring the initial cohort of innovators-in-residence for fall 2019. "I considered a job as an innovator because it felt like the next step, closely related to my work at a local after school program," he said. "The role offered the freedom to explore diverse projects, and I wanted a space where I could merge my expertise in computer science with my passion for the arts, like music."

Serving as an innovator at Eddie White Middle Academy, Paz noted that the "Paper Piano" activity was a recurring project each semester, illustrating the fusion of computer science, technology and music. He collaborated with computer science teacher Macoyia Bates to improve the activity every year. Students constructed paper pianos and used an interactive microcontroller and code to add basic musical scales.

"Many middle school students have a deep interest in music, often seen with their headphones on. However, they lack opportunities to engage with music creatively because they are either not in band class, don't own a musical instrument, or don't know how to play," he explained. "Projects like the 'Paper Piano' and remixing music via EarSketch give them a chance to explore their musical ideas, discover their talents, and engage with music on a deeper level."

Another impact project was the school garden, which became the primary focus for integrating life science with the arts and technology from 2022 onward. The school's GoSTEAM Club took the lead in transforming a courtyard into a sustainable vegetable garden. Paz and science teacher Brigitte Warde advised students as they researched and selected plants for the garden beds. The students took charge of the care and maintenance, documenting their work extensively in the first year to ensure future students could continue and help the garden thrive. "Giving students more input on the aesthetics and layout of these green spaces was a top priority," he said. "This idea gained strong administrative support because it engaged students in maintaining and improving the spaces."

Over the last couple of years, Paz transitioned into a full-time position as a STEAM Innovation Facilitator at CEISMC, where his role expanded as a GoSTEAM coach. “The GoSTEAM program has allowed me to grow significantly in education and learning. Working closely with teachers and the GoSTEAM team in this space has helped me discover my passions,” he said. “The experience of collaborating with teachers and students in this unique way has shaped my interests, both professionally and creatively.”

Pamela Hill, a sixth-grade earth science teacher who has been with GoSTEAM for the last three years, summarized the initiative’s impact. “STEAM education is a holistic, interdisciplinary approach to learning that combines science with other content areas,” she said. “I believe students benefit from exposure to STEAM education as it will build creative problem-solving and critical thinking skills students will need in the 21st-century workforce.”

Lovejoy High School – The Intersection of AI and STEAM

Lovejoy High School teachers Naseera Chong and Franklin Goodwin viewed GoSTEAM as an opportunity to deepen their understanding of STEAM instruction and enhance their teaching practices.

“It opened my mind to new possibilities in my classroom, moving beyond structured labs with predictable outcomes. This shift made science more exciting for my students, sparking their interest and growth,” said Chong, who teaches biology and serves as the science department chair. “GoSTEAM was so impactful that it inspired both my professional and personal growth. Now, through my involvement in curriculum writing, I can share these valuable ideas with other teachers and help them grow.”

“Participating in GoSTEAM was probably the best thing I’ve done because it opened my eyes to what teaching should be. It allowed me to get more creative with lessons, moving beyond just integrating technology,” Goodwin said. “As a social studies teacher, I found ways to make my teaching more interactive, deepening learning and creating authentic connections to the material. The program also fostered a sense of community and collaboration within our school—we truly became GoSTEAM inside the school.”

The school’s project-based learning initiative has focused on developing a mobile app highlighting Atlanta’s cultural renaissance mirroring the Harlem Renaissance—a 1920s movement celebrating African American art, music, and literature in Harlem, New York City.

This past year, first-time GoSTEAM innovator Jeremiah Long spearheaded a new focus on artificial intelligence (AI) in art, culminating in an art showcase with AI-generated pieces that included video montages, images for print, physical paintings, and branded items.

With a background in computer science, art, and film and TV production, Long specializes in next-generation educational programming on emerging technology through his non-profit organization. “Our project aimed

to integrate various forms of expression—music, photos, video, dance, artistry, and graphic design—with emerging technology and AI," Long said. "With many juniors and seniors participating, we connected these art mediums to career paths that the students explored through their individual projects ranging from AI animation and graphic design to art and fashion."

As part of their research, the students learned about documenting art and technology from their visits to Peter's Street Station, a multi-use art and community space in downtown Atlanta. Long noted the progression of one student's aha moment after the field trip. "At our initial meeting, one student asked about AI and its purpose in our project. By the second session, he had piloted a fashion brand and created mock-up assets, including T-shirt designs and a company logo," Long said. "His interest in generative AI tools like Adobe Express led him to explore career paths blending creativity and technology. This experience not only sparked his passion for AI but also set him on a path to a promising career, showcasing the transformative power of combining art and technology."

Centennial Academy – Accommodating All Learning Styles

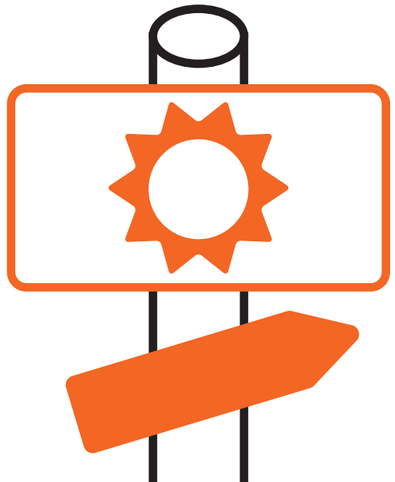
STEAM Specialist Summer Blackmon has been with the GoSTEAM initiative since its inception and has witnessed Centennial Academy's remarkable journey in STEAM education. She noted that while the K-8 school already offered STEAM instruction, the GoSTEAM initiative provided an enhanced foundation that significantly advanced its efforts. With the support of CEISMC staff, including Program Director Sabrina Grossman, Centennial Academy achieved STEM certification in 2022 from Cognia, a nonprofit organization that accredits primary and secondary schools both nationally and internationally.

"GoSTEAM has provided our school with a multitude of opportunities through its framework of professional development, innovators, and coaches," Blackmon said. "I truly believe that our school has grown in its overall understanding of STEAM instruction which led to our certification."

Blackmon described the first year in GoSTEAM as a pivotal moment when the school relaunched its project showcase. "We featured several arts-integrated projects that included tableaus about pollution and projects that used Earsketch, a music coding platform, to create pieces around social injustices," Blackmon said. "Parents, teachers, and community stakeholders shared their excitement about the projects rooted in authenticity and the scholars' ability to speak to their products in meaningful ways."

Over the past year, GoSTEAM innovator-in-residence Eric Mack collaborated with Blackmon to create lessons that aligned with state standards and focused on visual arts, natural science, and engineering. Mack brought his expertise as an elementary educator, visual artist, painter, and gardener to second, sixth, and eighth graders in unique ways.

With second graders, Mack led seed germination projects where students documented their seedlings' growth in STEAM journals, comparing indoor and outdoor success rates. They also transplanted classroom-grown seeds to the school garden and maintained it on a rotation basis.



"Many students were familiar with gardening through their families, but some had never experienced it. They were incredibly inspired and motivated. Gardening is truly magical because it embodies life itself; it teaches patience, nurturing, and the profound joy of watching something grow from a tiny seed," Mack said. "For example, in the second week of the project, the second graders were bursting with excitement, even those whose seeds didn't sprout. It became a powerful teachable moment for problem-solving and resilience."

During Centennial Academy's STEAM Fridays, Mack guided sixth- and eighth-grade students through the design thinking process to create their own sneaker designs using 3D modeling software Tinkercad and air-dry clay for prototypes. "GoSTEAM is important because it offers multiple entry points for each lesson, accommodating all learning styles, from visual to kinesthetic," he said. "This variety of methods ensures essential engagement for every type of learner. The impact on students is profound, fostering creativity, critical thinking, and a love for learning."

Tuskegee Airmen Global Academy – STEAM Lessons with "Green" Problem-Solving

Artist, business owner, and gardener Jazmine McBride served as a first-time innovator-in-residence at Tuskegee Airmen Global Academy this past year. She worked with kindergarten students on creating a healthy garden and taught second-grade students about the benefits of community green spaces.

"I believe it's important to have innovators on site for teachers, who don't have time to activate innovative technologies in their own classrooms, ensuring children experience an impactful learning environment," McBride said. "Working with those two grade levels was an absolute joy. Their enthusiasm and curiosity were truly inspiring."

One of McBride's memorable experiences with the kindergarteners was teaching them vocabulary words such as biodiversity, photosynthesis, nutrition, decomposers, and compost. "It had been a while since I taught them all these words. It was probably after spring break, and I reviewed some of the words like biodiversity, writing it on the board. They recalled the word with ease, which made me so proud," she said. "Witnessing children at that age grasping such complex terms, and some even understanding photosynthesis, was truly remarkable."

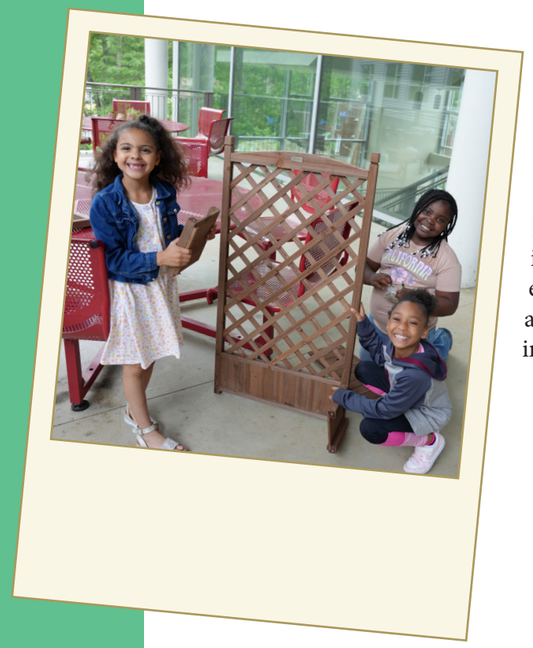
Kindergarten teacher Aisha Bryant said that McBride was very popular with her students and hit the ground running, focusing on how they could use shapes, art, and music to create a school garden of vegetables and herbs. "GoSTEAM has been extremely beneficial in student engagement. Being able to incorporate STEAM into all subjects gives students a hands-on personal experience when learning," she said. "I have witnessed many students understanding a topic more through an art form. They are excited to share their creative process."

For the green spaces project, second-grade teacher Michelle Denson led her students on a community tour, showcasing homes with gardens, flowers and trees, as well as abandoned homes for comparison. They also visited two different grocery stores to learn about the prices and differences in fruits and

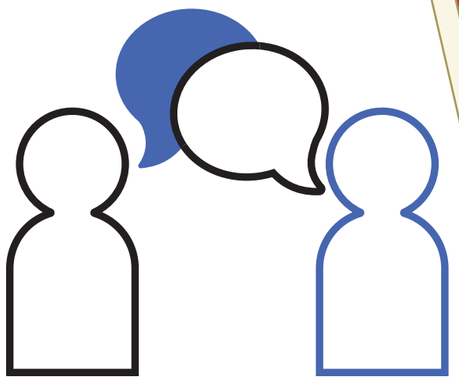
vegetables at each location. Denson described McBride as an invaluable addition to the classroom during that time, particularly since she was the general education teacher.

"GoSTEAM is essential for teachers to ensure STEM is incorporated into their activities, as STEM is becoming increasingly significant in our students' future career opportunities," Denson said. "With arts integration, students can be innovative and creative, think outside the box, enhance their work, and become problem-solvers."

In her role, McBride introduced the students to landscape design, which led to the creation of mobile green spaces. They planted microgreens on raised grow beds with wheels and a trellis, providing a thriving environment for their class pet, Sweetie the sweet potato.



"I guided the students through the design process, which included building models of their envisioned garden beds," McBride explained. "I encouraged them to think critically about why we would grow certain plants in specific locations. My goal was for them to understand how different seeds grow, what is edible, and the importance of pollinators versus non-pollinators, especially considering students with bee allergies. This activity was important for fostering inventiveness and resourcefulness."



Herman J. Russell West End Academy – Developing Meaningful Connections in STEAM

Sixth-grade science teacher Latoya Rivers had just moved to Georgia and started teaching at Herman J. Russell West End Academy when she first encountered the GoSTEAM team. "Through GoSTEAM, I met so many amazing, open-minded educators and innovators. Hearing their ideas and making meaningful connections renewed my belief in the importance of STEAM in everyday education," Rivers said. "It's not just a separate elective class or club, but a vital part of our daily learning. The experience gave me countless new ideas to implement, making a profound impact on my approach to teaching."

Rivers is most proud of her first project-based learning unit, "Save the 1%," which achieved the highest student engagement she had ever witnessed. Using the coding platform EarSketch, students created songs about the importance of conserving water and the different methods to do so.

"For the first time that year, I achieved the highest level of engagement with 100% compliance from every student for two consecutive weeks," she said. "Students created beats using coding skills they learned from our Georgia Tech innovator. They consistently revisited and improved their work, applying the engineering design process to tweak and enhance their beats and lyrics. Beyond the stellar engagement, my students desired to learn more about coding and the development of music, that ultimately sparked their interest in new career paths."

The interest in music engineering careers stemmed from the involvement of Justin Crowder, the school's STEAM master teacher lead and a professional musician. He helped the students record their songs at the school's industry-quality music studio he installed for such purposes. "The students completed the music production in EarSketch, focusing on the coding aspect rather than elaborate production. Given the speed and quality of their work, I aimed to elevate their experience," he explained. "We took a group at a time, and these kids, with no prior experience, recorded during class. I gave them a few pointers, and they just jumped in. The results were incredible."

Similarly, seventh-grade math teacher April Robinson led a project that brought geometry principles to life through the students' own creation of African masks. "The aha moment came when the children realized they were more than their circumstances. I believe in the power of my students," said Robinson. "When they saw themselves as inventors and creators, they started to believe in themselves. They became more than they ever saw. That is how we will change the world."

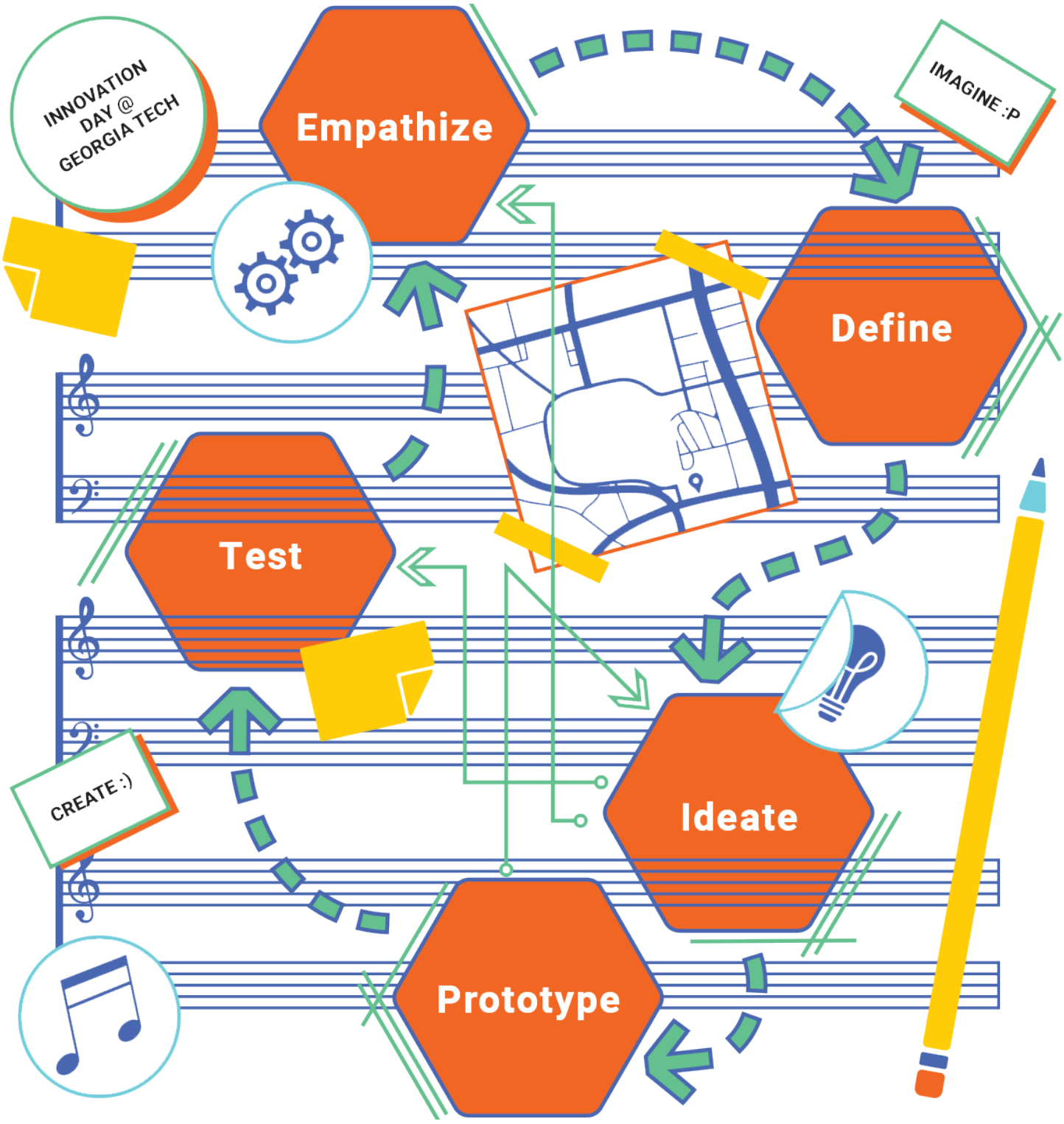
The students first visited the Carlos Museum at Emory University to explore the African art exhibit to gain a better understanding of the cultural aspects of the project. Then the students designed the masks using 3D modeling software Tinkercad before every mask was 3D-printed, painted and displayed at a school-wide exhibition where many attendees wanted to purchase the masks.

Sarah Yoo, the school's STEAM coach, and GoSTEAM innovator Ed Gnatiuk provided crucial support on these projects. Yoo noted that during her first year at the school, Gnatiuk's established presence through GoSTEAM helped her acclimate. "Known as Mr. G, he has been a beloved member of our school community. The kids all know him and ask for him when he's not around," Yoo said. "Mr. G. understands the challenges teachers face, gets to know them well, and provides just the right balance of support and freedom. His multitude of contributions, including his technology and STEAM expertise, have greatly enriched our school."

Gnatiuk, who first started as an innovator and now works full-time at CEISMC, has seen significant changes and impacts at the school. "The changes in the school are fascinating. There are so many projects happening now that I can't keep track of them all," he said. "The goal of GoSTEAM was to offer the support and guidance needed to help the school fully embrace STEAM integration. We've built the capacity and provided the kickstart; now, they are taking it to the next level and excelling, which makes me proud."

Innovate

CREATE



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