

## CASE STUDY

# Bringing the Science of Teaching and Learning to a Public School District's Teachers and Administrators



THE CENTER *for* TRANSFORMATIVE  
TEACHING & LEARNING™  
AT ST. ANDREW'S EPISCOPAL SCHOOL



**The Center for Transformative Teaching and Learning at St. Andrew's Episcopal School and Frederick County Public Schools (MD) collaborated to produce this case study to provide a replicable model of how the science of teaching and learning is changing educator practice at a large scale, and in a school system that shares many of the challenges of other public school districts throughout the United States.**

Laila Watkins is a 10-year veteran teacher specialist and a former middle school math teacher with Frederick County Public Schools, Maryland (FCPS). But, until three years ago, she had had no formal training to understand the most important tool in the learning process -- the brain.

"How you can use strategies to help that brain work to retain that information, to learn that information...how a student feels in a classroom correlates to what they learn. Those are big things that I didn't know," Watkins explained.

Watkins was among the first in FCPS to receive dedicated training on Mind, Brain, and Education Science (MBE). Also commonly referred to as the "science of learning" or "educational neuroscience," MBE is a multidisciplinary field of study that combines promising research and strategies from education, psychology and neuroscience to elevate teacher effectiveness, student achievement, and the whole child's school experience.

For Watkins, and many others throughout Maryland's 7th largest school district, that training has been critical to her work as an educator.

"It makes a huge impact in the way you structure your training, the way you structure your classrooms, the way you structure everything if you have an idea of how the brain works [for] a student in your classroom," Watkins said.

The approach to becoming MBE practitioners has been intentional and deliberately organic, a word used often by FCPS leadership. Because of the role they play within each school, teacher specialists like Laila Watkins were identified as a core group for which MBE Science training was a focus. Curriculum specialists incorporate MBE into all curriculum development throughout the district, and the use of MBE language and strategies are even applied to the design and facilitation of leadership meetings.

"Teachers are seeing other teachers be more successful because they are using Mind, Brain, Education strategies," said Dr. Michael "Mike" Markoe, FCPS Interim Superintendent. "They want to know what those teachers are doing that they may not be doing, and it has a contagious, organic impact within our schools."

## The District

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Frederick County sits in the northern part of Maryland and is approximately 50 miles north of Washington, D.C., and 50 miles west of Baltimore with a population of almost 260,000. It is the largest county in the state at 664 square miles. FCPS serves more than 45,000 students and 6,100 employees across 68 schools, including 38 elementary schools, 13 middle schools, 10 high schools, and 3 public charter schools.

Dr. Markoe oversees curriculum instruction and innovation, in addition to the accelerating achievement and equity department, the organizational development department, and the system accountability and school administration team. He was first introduced to The Center for Transformative Teaching & Learning (CTTL) in 2017, and said he was immediately drawn to the center's work in translating Mind, Brain, and Education Science (MBE) research because of the research-informed practices that were going to quickly result in improved student learning. For Dr. Markoe, the work connected the dots between what the research states and how that information can impact learning.

"It's not one of those new education initiatives," Dr. Markoe said. "It is just common sense backed up with research. I thought it was something that we could easily and organically grow in our system and start introducing it to the teachers naturally instead of saying 'here's another initiative we're going to throw on your plate,' which we know is often met with resentment. We've been very strategic about introducing it to both teachers and leaders. We've had that organic growth within the system."

Margaret "Meg" Lee, FCPS Director of Organizational Development, was an early advocate for the district to invest in MBE. She recalled the challenge the district was facing -- like so many others across the country -- to close the achievement gap.

"We had, as most districts do, an achievement gap that we were attacking from many different directions, and we weren't seeing significant progress. I think sometimes we have to change what the teachers are thinking and what they know. They're doing the best they know how. We might need to change what they know," Lee explained.

The investment Frederick County has made in its school system has yielded great results. According to their website, FCPS surpassed the state average SAT score in 2019, and students in the 2020 graduating class received a combined \$53 million in scholarship offers. The graduation rate for the Class of 2021 was 6.5% higher than the state's graduation rate, and the dropout rate was one of the lowest in the state.

## The Spark

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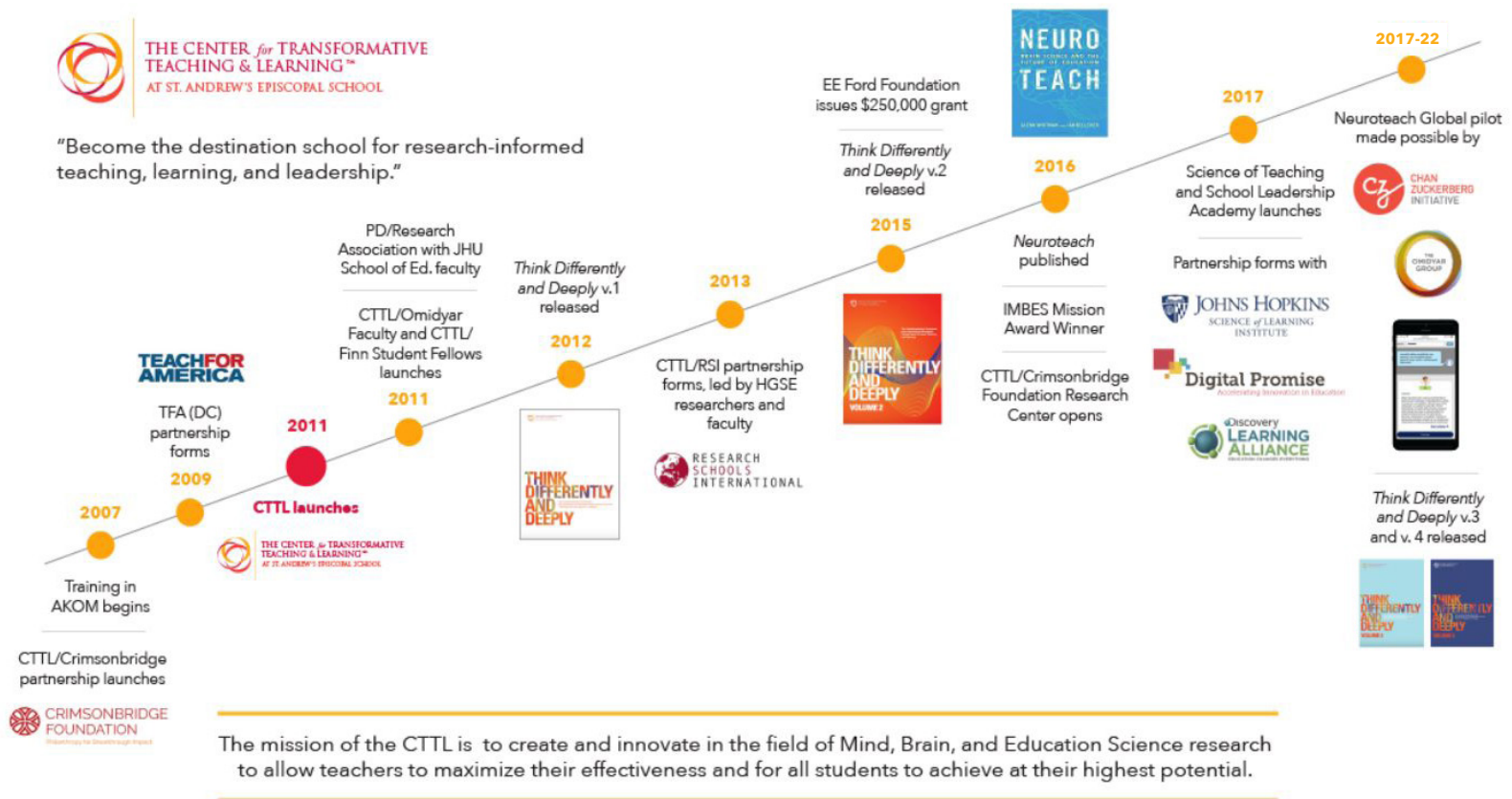
Like most great partnerships, this one started with a simple introduction and a common interest. Glenn Whitman, Executive Director of the CTTL, and Dr. Ian Kelleher, Associate Director and Dreyfuss Family Chair for Research at the CTTL, were introduced to Meg Lee at the Learning and the Brain Conference in the fall of 2016. They shared a passion for the science of learning and a common goal of incorporating research on how the student brain learns into educator professional development. The encounter sparked a partnership that has spanned more than five years. The partnership continues to generate innovative, replicable solutions for making the science of learning an integral part of the school district's culture, professional development, and student achievement.

"Our partnership and friendship has been mutually beneficial," says Whitman. "We have been privileged to think in new ways about the possibilities of MBE translation with help from a dedicated group of FCPS teachers and leaders whose insights have enhanced the design of the CTTL's tools and experiences to best serve educators in all school ecosystems."

Since 2011, Whitman and Kelleher have been dedicated to learning about MBE. Much of their work in translating new and evolving research into real-world strategies for their fellow educators has been conducted in collaboration with individual researchers and faculty from Harvard's Graduate School of Education, Stanford School of Education, and Johns Hopkins Science of Learning Institute and School of Education. Their faculty and research partners also lead research at schools internationally.

The school-based, teacher-led non-profit was founded in 2011 at St. Andrew's Episcopal School. St. Andrew's is a preschool through 12th grad school outside of Washington, D.C., that serves as an incubator for all of the CTTL's programming and resources. The CTTL's vision is a world where every teacher understands how every student's brain learns. The CTTL has trained, collaborated with, or shared its resources with more than 30,000 teachers to date at public, private, and charter schools internationally through its professional development tools. Those offerings include the book *Neuroteach*, which was published in 2016; the annual Science of Teaching and School Leadership Academy; the suite of online professional development courses, *Neuroteach Global*; and personalized workshops designed and delivered to align with a partnering school's goals and initiatives. In the fall of 2022, the CTTL will launch *Neuroteach Global Student*, an online course that delivers research-based strategies to help students in grades six through 12 develop more efficient and effective study habits and learning strategies.

## CTTL TIMELINE



The earliest exposure to the CTTL's work for FCPS teachers and school leaders was at the first annual Science of Teaching and School Leadership Academy in the summer of 2017. Now in its fifth year, the Academy brings together educators from around the world for a four-day deep dive into MBE. Leading researchers and practitioners, such as Dan Willingham, Nicole Furlonge, Adele Diamond, Mark McDaniel, and Mary Helen Immordino-Yang work with attendees to translate research into relevant and applicable teaching strategies. FCPS leaders were so invested in exploring how the district could benefit from MBE Science that the Superintendent and Deputy Superintendent accompanied school administrators at the professional learning event.

## The MBE-Aligned Journey

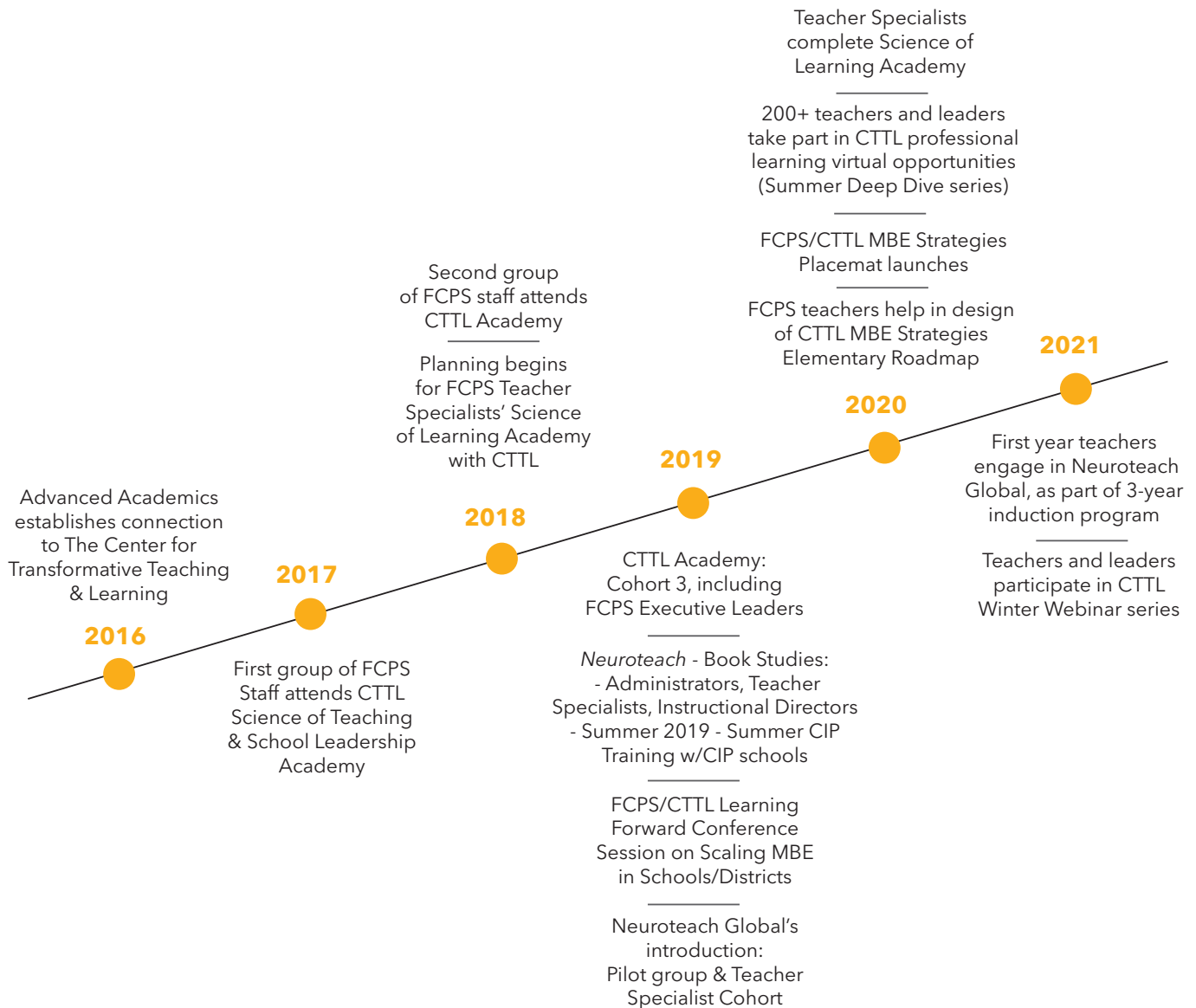
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Dr. Markoe emphasizes that the concepts of MBE easily aligned with FCPS' goals and strategic initiatives. The school system currently lists five aspirational goals on its website, the first two of which are related to facilitating high-quality instruction, raising achievement, eliminating achievement gaps, and recruiting, supporting, and retaining a high-quality, diverse workforce. Frederick County Public Schools embarked on the journey to become MBE practitioners in 2014. The steps taken in the first three years included learning about the brain and professional learning focused on creating a growth-mindset culture.

After making a connection with the CTTL in 2016 and sending a group of staff to the Science of Teaching and School Leadership Academy in 2017, the collaboration continued to evolve with FCPS sending groups of staff to the Academy each year since. In 2019, FCPS conducted a book study of *Neuroteach: Brain Science and the Future of Education* for administrators, teacher specialists, and instructional directors. They also participated in the pilot launch of *Neuroteach Global™*, the CTTL's collection of MBE research-informed micro-courses. The same year, the CTTL and FCPS co-presented at the Learning Forward conference. In 2020, FCPS completed work on a custom version of the CTTL's MBE Strategies Placemat and participated in the design of the CTTL's MBE Strategies Roadmap for elementary educators. Most recently, in September of 2020, FCPS implemented *Neuroteach Global™* as part of the three-year new-teacher induction program with a goal of all new teachers completing all 12 of the micro-courses offered. More than 300 teachers were enrolled in micro-courses in the 2020-2021 school year, and 230 teachers have been enrolled this school year.

In addition to the collaborative work with the CTTL, FCPS has become a model school system for MBE Science. The district was featured in *Mindsets in the Classroom* and *Create a Growth Mindset School*, both by Mary Cay Ricci, and was highlighted by the Alliance for Excellent Education, the Pew Charitable Trust, and EdSurge.

# CTTL & FCPS COLLABORATION TIMELINE



Lee insists that the success of an MBE implementation depends on the involvement of district leaders. The value, she said, in FCPS district leaders having the knowledge and ability to apply MBE strategies to their work is the impact it has on decision-making in various departments and moving the initiative forward.

“You have to have people who see the value and understand how it touches their individual condition. What does this mean, for the way we analyze the data and conduct our school improvement process -- that’s one lens. What does this mean for the way we design, deliver, and revise curriculum -- that’s a lens,” said Lee.

**For guidance on creating an MBE framework in your school or district, see the CTTL’s Science of Teaching and Learning Implementation Strategy.**



# The Impact

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The events triggered by the COVID-19 pandemic presented challenges for teachers and school leaders across the country, and FCPS was no exception. While measuring the quantitative impact of the investment in MBE in the past two years has been challenging, district leaders are committed to being practitioners and advocating for the value to the FCPS community. According to Lee, the systemic re-opening of FCPS schools was predicated on the whole-child development model, and, in fact, MBE has made its way into district policy, regulations, and strategic initiatives.

In the presentation to the Board of Education about the opening of the school year this past June, two of the MBE initiatives were to infuse evidence-informed strategies into curriculum and resources, and to prioritize students' understanding of how the brain learns. The district's wellness and homework regulations promote the importance of the whole child development and provide research-informed guidelines for creating and assigning homework and providing feedback.

Also, at the start of the school year, each teacher received the FCPS Guiding Principles brochure. The resource provides strategies for teachers to use in addressing the comprehensive student development, which includes mental health, social emotional development, academic development, and cognitive development. It also includes instruction on the appropriate ways to use retrieval practice and formative assessments, and ways to promote learning mindsets.

Michelle Keegin has been employed with FCPS for more than 23 years. She spent seven years as a teacher specialist before returning to the classroom as a kindergarten teacher for the 2020-2021 academic year. It was during her tenure as a teacher specialist that she was first introduced to MBE and the CTTL.

"MBE puts the students first and the science behind how the brain works first," Keegin said. "It just makes sense, and it works."

Keegin was the only kindergarten teacher in her school and said the MBE strategies that were her primary focus were social-emotional well-being, feedback, cognitive load, and memory. She said she used strategies learned from a CTTL micro-course to help with the design of her classroom, and she used the CTTL's MBE Strategies Placemat to hone her methods for providing parents with feedback during the district's period of distance teaching and learning.

"Just having the placemat in front of me...it helped me to lessen my stress a little bit. Having this in front of me all the time does help me to be that practitioner...and meet the kids where they are and provide the instruction they need to learn and grow," Keegin said. "I think MBE gives me the confidence in the science behind what I felt like was natural for me."

Jay Schill, Principal at Ballinger Creek Middle School, echoed Keegin's sentiments. "I've been involved with MBE and the CTTL for four years. This knowledge changed the way I look at education and educational leadership. Being familiar with MBE caused me to look at the 'why' we do things instead of just saying it's best practice or evidence-informed."

Schill went on to explain that understanding how the brain works, in addition to why certain teaching strategies are used, has been invaluable in building teacher efficacy and will continue to be an important element in developing the district's students and teachers.

"In terms of importance to FCPS, our systemic focuses on equity, the framework for teaching, and the accelerated learning process are all interrelated. One of the most common and important threads is Mind, Brain, and Education [Science]. Equity practices ensure that students feel a sense of belonging so their amygdala are calm, and they can learn. The framework for teaching helps to emphasize the importance best teaching practices, and often, when a teacher wants to achieve that distinguished rating...administrators can point to MBE practices to help get them there. The Accelerated Learning Process underscores the importance of formative assessments and helps to fuel purposeful and strategic lesson planning that allows for spacing and interleaving for maximum student learning. It's all connected. In my opinion, Mind, Brain, and Education is the secret ingredient that we've been missing. It's here to stay."

**To learn more about FCPS' MBE implementation, contact Wanda Ford ([wanda.ford@fcps.org](mailto:wanda.ford@fcps.org)) or Brandon Oland ([brandon.oland@fcps.org](mailto:brandon.oland@fcps.org)) in the FCPS Public Affairs Department.**

## The Champions

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Every worthwhile cause has at least one champion, and FCPS is fortunate to have several. However, each of the MBE advocates and champions spoke about the early and continued efforts of Meg Lee.

Lee has worked in Frederick County Public Schools for 27 years, first as a middle school language arts teacher, and later as a department chair, literacy specialist, and school administrator. Before the creation of the organizational development department she now leads, Lee was the supervisor of advanced academics for the district. She said that her passion for MBE started early, most likely influenced by her father, who was a psychology professor.

"I've always been interested in how people learn. I was particularly interested in exceptional education."

Lee connected with Mary Cay Ricci while exploring Carol Dweck's research and writings on growth mindset and exploring what it would mean for students and teachers to be a part of a growth mindset school system. Developing belonging, purpose, and growth mindsets in students are prominent strategies in MBE Science.

"We really thought this was a way that we could open the door for some kids who don't think they're smart to access more advanced coursework, which was one of the things that both of our districts were saying was imperative," said Lee.

In 2016, Lee was introduced to Glenn Whitman and Ian Kelleher from the CTTL and began to have conversations with district leaders about attending the Science of Teaching and School Leadership Academy.



At that time, Lee reported to Dr. Keith Harris, Executive Director of the Accelerating Achievement & Equity Department at FCPS. It was Dr. Harris who first received Lee's request to talk to other leaders about a strategic approach to practicing MBE Science. Together, they met with Dr. Markoe to discuss sending the curriculum instruction team he leads to the CTTL's academy.

Dr. Harris said he was confident in endorsing Lee's suggestion because the strategy was research-oriented and did not require a substantially greater lift than what the district was already working toward. Instead, he said, he thought of it as replacing what does not work with practices that were proven to work.

The progress and success of the initiative is also a reflection of the hard work and dedication of the district's professional learning department, school principals, curriculum specialists, teacher specialists like Laila Watkins, and teachers like Michelle Keegin. There are countless individuals who invested their time and energy in becoming MBE practitioners and have helped others grow in the practice of MBE Science along the way.

Lee's advice to districts interested in developing an MBE Science practice is to first prioritize their strategic goals. Then, determine which goals can be impacted by MBE Science and which steps can be taken in three-to-five years with the resources available. She said it's critical to create the conditions that would allow the practice to expand district-wide, such as identifying which staff positions will receive the training first and help to train others.

MBE Science is now embedded in the FCPS culture, and the journey continues. The district is currently defining a strategic initiative to focus on whole-child development for the next several years, and MBE is a central part of it. In addition to continuing to partner with The CTTL as part of the new teacher induction program, the district will also partner with colleges and universities in Maryland to develop MBE Science coursework for education students at the undergraduate and graduate levels. These higher education partnerships would provide future FCPS teachers with an MBE Science foundation before they enter the workforce, which ultimately benefits the district and their students.