Grantee Name: Battelle Education (Tennessee STEM Innovation Network)
Grant Contract Edison Identification Number: 46452
Term of Grant Contract: July 1, 2018 - June 30, 2019
Total Grant Amount: $1,500,000

PROJECT SUMMARY
Battelle Education has continued its management and support of the Tennessee STEM Innovation Network (TSIN). The TSIN is a public-private partnership between the State of Tennessee and Battelle that was established by Executive Order of the governor in 2010 and serves as the central management structure for working with schools, regional teams, industry partners, and other supporting organizations actively involved in furthering STEM educational opportunities in Tennessee. The TSIN works collaboratively with the Tennessee Department of Education to ensure alignment to the State’s STEM strategy and dissemination of STEM funded activities and their outcomes.

In addition, Battelle Education, through the TSIN:
• Works collaboratively with Tennessee STEM businesses and institutions, such as the University of Tennessee, the University of Memphis, Dyersburg State Community College, the Tennessee Valley Authority, Oak Ridge National Laboratory, and Oak Ridge Associated Universities in direct support of education initiatives aligned to support the development of great teachers and leaders
• Shares promising practices and exchanges successful models with other state STEM networks through STEMx, a national network of state-level STEM networks
• Provides technical assistance to the network’s seven regional STEM innovation hubs and designated schools to connect them with peer organizations focused on similar goals, objectives, and innovative practices
• Coordinates with the Tennessee Department of Education to develop joint messaging strategies around STEM education in an effort to align programs and mutually beneficial outcomes

TENNESSEE STEM STRATEGIC GOALS

1 COMMON GOAL: STEM FOR ALL.

- Increase student interest, participation, and achievement in STEM
- Expand student access to effective STEM teachers and leaders
- Reduce the state’s STEM talent and skills gap
- Build community awareness and support for STEM

9,311 Students Impacted by Rural Teacher Training
222 Middle Schools using STEM Career Awareness Program
127 Districts Participating in Hub STEM Training Workshops
26 Designated STEM Schools
400 Educators at the STEM Summit
158 Graduates from Leadership Training Program
6 New Professional Development Courses
600 Educators at the STEM Summit

2018-2019 Annual Report | The Tennessee STEM Innovation Network | BATTELLE Education
STEM SCHOOL DESIGNATION

The Tennessee STEM Designation process recognizes schools that promote rigorous and experiential learning opportunities for all students. In Spring 2019, the Tennessee Department of Education, in conjunction with the Tennessee STEM Innovation Network and Tennessee STEM Leadership Council, awarded STEM Designation to 11 geographically and demographically diverse schools across the state.

Designation Interest Across Tennessee for the 2018-2019 Academic Year

<table>
<thead>
<tr>
<th>Initial Interest Form Submission</th>
<th>Completed Applications</th>
<th>Designated Schools</th>
</tr>
</thead>
<tbody>
<tr>
<td>26</td>
<td>19</td>
<td>11</td>
</tr>
</tbody>
</table>

DESIGNATION TIMELINE

SEPTEMBER-DECEMBER
- Schools completed self-assessment
- Initial phone interviews with school leads to determine readiness to apply
- Schools created portfolio applications highlighting artifacts for each of the STEM attributes

JANUARY-FEBRUARY
- Tennessee Designation Review Team reviewed portfolio applications
- Determined which schools were invited to move forward in the application process

FEBRUARY-MARCH
- TSIN conducted on-site observations for each school that moved forward to the second stage of the application process

APRIL-MAY
- TSIN made recommendations to the Tennessee Department of Education
- Tennessee STEM Designation Awards presented at the Tennessee STEM Innovation Summit

THE 2018-2019 STEM DESIGNATED SCHOOLS INCLUDE:
- Carmel Elementary School, Clarksville-Montgomery County Schools
- Charleston Elementary School, Bradley County Schools
- Croft Middle Design Center, Metro Nashville Public Schools
- Discovery School, Murfreesboro City Schools
- Elk Valley Elementary School, Campbell County Schools
- Farragut High School, Knox County Schools
- Hickerson Elementary School, Coffee County Schools
- Oliver Springs High School, Roane County Schools
- Park View Elementary School, Bradley County Schools
- Prescott South Middle School, Putnam County Schools
- Station Camp Elementary School, Sumner County Schools

OUTCOME:

In 2018, Battelle Education contracted with Everfi to make the innovative STEM career awareness program, Endeavor, available to all middle schools in Tennessee. Endeavor is an engaging online platform that connects students to STEM careers through an interest inventory assessment, career exploration modules, and targeted career pathway profiles. TSIN partnered with Everfi to plan a launch and publicity event at Croft Middle School in Nashville, in which 30 students engaged with the online modules and then discussed their STEM career plans with industry professionals and completed a hands-on coding activity. Throughout the 2018-2019 school year, 11,000 Tennessee middle school students from 122 active schools completed 31,000 STEM career awareness modules, representing 10,250 total hours of learning on the platform.

In 2018, Battelle Education contracted with Thinking Media, Inc. to make its innovative product, Learning Blade, available to 100 middle schools in the state. Learning Blade is a supplemental STEM career awareness curriculum that emphasizes the benefits of STEM careers, demonstrates the relevance of academic skills to future careers, and provides real-world examples of the use of math and ELA skills in practical situations. TSIN partnered with Learning Blade to plan two publicity events at Thurgood Marshall Middle School in Nashville and Dexter Middle School in Memphis, in which 32 students engaged with the online missions and then participated in a hands-on mission challenge activity.

DELIVERABLE 1

The Grantee, through TSIN, shall make available to all middle schools in the state a curriculum to educate students on the variety and benefits of STEM careers.
**Deliverable 2**

*The Grantee, through TSIN, shall implement STEM leadership training and professional development in all STEM Innovation Hub regions.*

**Outcome:**

The TSIN expanded opportunities to sharpen leadership and STEM skills through professional development in all regional STEM Innovation Hub areas. Each hub was sub-granted funds to provide professional development for the state’s teachers during the summer of 2019. In totality, 34 professional development workshops were conducted by the TSIN regional STEM Innovation Hubs, with 1,125 K-12 educators from 127 districts participating.

Hub workshops varied in duration, audience, and topic based on the needs of the region being served. Experiences were as varied as teacher technology training to networking and resource introduction to student-centered camps and explorations of STEM careers in TN and programs of study at Technology Centers and 2-year and 4-year institutions around the state. They were offered after school hours in the evenings and on weekends on dates spread throughout the school year calendar and beyond.

In addition, the TSIN continued the Innovative Leaders Institute (ILI) for a fifth consecutive year. Thirty-seven leaders from 19 different schools in 12 school districts participated in the ILI Cohort 5 (two districts had never had schools participate previously). The ILI is a year-long training and mentoring experience for educators that is led by sitting principals currently directing some of the most innovative schools in the state. The ILI provides participants opportunities to network with other building-level leaders from across the state to construct a cadre of innovative thinkers and leaders, visit innovative schools to examine different models of STEM integration, and share best practices and resources with the expectation of immediate impact. An emphasis is placed on experiences and training aligned with attributes listed in the state’s STEM School Designation rubric to encourage pursuit of designation. Participants in the ILI are required to submit competitive applications that must include a building-level team of a principal or assistant principal, and a lead teacher to strengthen the impact of the ILI on their respective schools. The ILI is approved for TASL credit by the TDOE. This year’s participants bring the total who have experienced this learning to 158 across the state.

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**Innovative Leaders Institute District Participation**

<table>
<thead>
<tr>
<th>District</th>
<th>Previous Years 2014 - 2018</th>
<th>2018 - 2019</th>
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<tbody>
<tr>
<td>Bartlett City Schools</td>
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<td>Bradley County Schools</td>
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<tr>
<td>Bristol City Schools</td>
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<tr>
<td>Campbell County Schools</td>
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<td>Clarksville-Montgomery County Schools</td>
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<td>Coffee County Schools</td>
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<td>Crockett County Schools</td>
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<tr>
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<td>Greeneville City Schools</td>
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<tr>
<td>Hamilton County Schools</td>
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<tr>
<td>Jackson Christian School</td>
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<td>Johnson City Schools</td>
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<td>Tullahoma City Schools</td>
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**Grand Total 2014 Through 2019: 158**
The Grantee, through TSIN, shall facilitate the establishment of two additional STEM innovation hubs – a physical hub to be located in Northwest Tennessee (established 2015) and a hub specifically dedicated to serving the rural areas of the state.

OUTCOME:
TSIN established a regional STEM innovation hub in Northwest Tennessee and commissioned a rural needs analysis to inform the establishment of a hub specifically dedicated to serving the rural areas of the state during the 2015-2016 fiscal year.

PROGRAM GOALS
Learn from each other, Reduce educator isolation, Leverage funding opportunities, Increase collective impact, Advance STEM learning access and equity for rural students across Tennessee.

In 2017-2018, the TSIN scaled lessons learned and launched the Tennessee Rural STEM Collaborative (TRSC), a virtual hub designed to develop teacher leadership capacity, strengthen innovative instructional strategies, and provide a collaborative network for educators in rural areas. In the 2017-2018 pilot year, 43 diverse educators from 24 counties were selected to participate in the program. In 2018-2019, 43 diverse educators from 19 counties engaged with the program.

We engage with rural educators and their communities in a variety of ways: personalized learning, sharing resources, professional development, partnership development and engagement, and STEM advocacy. Each participant planned a targeted STEM initiative to pilot in their local context and were provided a stipend to support implementation.

Expanded implementation of the TRSC provided the opportunity for educators across Tennessee to learn STEM best practices, develop a comprehensive network of educators and community partnerships, and implement a targeted STEM initiative in their home community. Example initiatives included the planning of district wide STEM nights, partner supported instructional units, and work-based learning activities for students. In all, these initiatives impacted Tennessee students by exposing them to 21st Century Skills, STEM tools and technologies, and local STEM career pathways.

STUDENT DELIVERABLES

COMMUNITY PARTNERS
100% reported that working with teachers to create opportunities for students to learn more about local STEM fields was... fulfilling, meaningful, a good use of my time...

STUDENTS
100% feel confident in their ability to implement STEM activities and assess student learning

76% now know more about Local STEM job opportunities
85% think STEM will help them better prepare for the future

TEACHERS
100% felt the program provided the tools to make an impact in their community, after participating in this program

TSIN partnered with the University of Memphis’ Center for Research in Educational Policy to evaluate the Tennessee Rural STEM Collaborative, here’s what we’ve learned:

8,895 STUDENTS IMPACTED IN 2018
9,311 STUDENTS IMPACTED IN 2019
TSIN has experienced increasing requests for learning opportunities to benefit teachers and leaders at building and district levels on various STEM education topics.

In response, TSIN staff have developed and delivered sessions at district in-service meetings and school faculty trainings over the course of the 2018-19 academic year on a case-by-case basis. Using feedback from participants, we continue to refine the presentations and have increased our staff with a new position dedicated to Professional Learning, starting in July, 2019. This position is tasked with building out a menu of learning opportunities to benefit teachers, leaders, and non-formal educators on STEM-related themes. It will work alongside TDOE partners to align message and effort with the Department’s teacher and leader growth initiatives to offer the highest quality learning for adults focused on STEM throughout the state. Ongoing beginning July, 2019.

Digital Readiness: Computer Science Standards Trainings

TSIN strongly believes that students learn best by ‘doing’ rather than being provided direct instruction and that the same is true for educators. TSIN, working alongside Tennessee teachers, developed and implemented the K-8 Computer Science Standards trainings for each grand division in June 2019. One-hundred and sixty-three teachers engaged in unplugged, computer science activities for their respective grade band, discussed the seamless integration of those activities into the learning process, and unpacked the new computer science standard(s). Educators were given the opportunity to identify additional aligned exemplar tasks to be implemented in the 2019-2020 academic year. TSIN plans to scale this professional learning model in 2019-2020, using the STEM Innovation Hub structure, to grow the number of teachers well-trained to teach computer science.

Manufacturing and Engineering Externship Program (MEEP)

Through a grant from the Office of Naval Research, TSIN launched the Manufacturing and Engineering Externship Program in 2018. This program is designed to prepare educators to prepare future-ready students by connecting educators with local manufacturing and engineering organizations for experiential learning opportunities. Through the on-site externship, educators learn about STEM career opportunities in the field and the skills and habits necessary to be successful. Each of the educators in the program are trained on project and problem-based learning and develop a curricular unit for their students based on their externship experience. In the summer 2019 pilot of the program, twenty-two educators participated at externships at nine different sites across the state, including DENSO Autoparts, US Army Corps of Engineers, Oak Ridge National Lab, among others.
TVA STEM Curriculum Development Initiative
The Tennessee Valley Authority (TVA) partnered with the TSIN to create STEM-focused Project/Problem-Based Learning exemplars for classrooms across the state. TVA contributed $30,000 to fund the development and with the network’s help, 28 high quality PBL units were created that highlight green energy concepts and careers in the Tennessee Valley. Any Tennessee educator can access these open resources at https://www.tvastem.com/teachers/.

STEM Excellence Awards
The STEM Excellence Awards are designed to recognize a phenomenal teacher, a leader of a school, a district, or a regional/state organization, and an exceptional advocate for STEM education. Tennessee’s recent successes in STEM are due to the combined efforts of exemplary teachers in the classroom, innovative school and district/regional leaders, and advocates that place STEM on the top of their priority list. The STEM Excellence Awards seek to recognize one awardee in each of the following areas: Excellence in STEM Teaching, Excellence in STEM Leadership, Excellence in STEM Advocacy, and the STEM Innovator Award. Awardees were honored at the 2019 Tennessee STEM Innovation Summit and videos highlighted each awardee’s contribution to STEM.

Goals of the Program
• Promote effective teaching strategies by recognizing and rewarding quality STEM teachers
• Highlight effective advocacy partnerships at the local and state levels
• Share strategies for creating an innovative STEM culture within a school building/district/region

Tennessee STEM Innovation Summit
The fifth annual Tennessee STEM Innovation Summit was held May 14 and 15, 2019 at the Nashville Airport Marriott Conference Center. More than 400 educators and leaders attended the sold-out event. This year’s event featured 40 learning sessions highlighting STEM promising practices in the conference tracks of: Underrepresented Groups in STEM, Community Partnerships, School Culture, Innovative Instructional Strategies, and STEM Career Awareness. Day one of the 2019 Summit was kicked off by a thrilling interactive keynote from Steve Spangler, the celebrity science author, teacher, and STEM toy designer. Day two highlights included keynotes from State Senator Bo Watson and TN Commissioner of Education Dr Penny Schwinn, who presented the TN STEM School Designation awards for 2019.

Visiting Planetarium Program
As an in-kind contribution through its corporate philanthropy focus on STEM education, Battelle Memorial Institute contributed $25,000 to the TSIN to enable the deployment of a visiting planetarium program to rural schools across the state. Billy Hix, Associate Professor of Education at Motlow State Community College, coordinated and led the program’s planetarium visits to 12 rural schools during the 2018-2019 academic year, reaching over 3,500 students. Schools selected for visits were geographically isolated, located in high-poverty areas, or lacked the resources for school field trips. During each visit, Professor Hix led a full program related to the study of the solar system, engaging students through standards aligned discussions.
The STEMx network is a multi-state STEM network developed for states, by states. This grassroots movement provides an accessible platform to share, analyze, and disseminate quality STEM education practices and tools across states. TSIN is a founding member state of STEMx and frequently shares Tennessee's STEM models and practices with a national audience. Participation in STEMx is provided as an in-kind contribution from Battelle and used as a way to infuse promising STEM practices utilized by other states into the work of the TSIN.

100kin10
As the designated representative of the Tennessee Department of Education’s STEM efforts related to 100kin10, TSIN’s Director participated in the Partner Summit held in March 2019 at the San Diego Zoo. 100kin10’s mission is “to train and retain 100,000 quality STEM teachers over the next 10 years.” TDOE’s commitment to 100kin10 focuses on the retention of quality STEM teachers, utilizing the network’s outreach to provide professional development and leadership strategies to the state’s educators.

In 2017, the TSIN launched the STEM Executive Council to meet twice per year with the objective of engaging leaders to drive a greater collective impact toward advancing science, technology, engineering, and mathematics opportunities in Tennessee. The council connects business and education to provide input regarding essential skills that students need to be successful and to work to strengthen partnerships that extend student learning beyond the classroom walls.

Fourteen executives from leading STEM industries and organizations agreed to charter the council to more fully advance STEM across Tennessee.

JAKE BASDEN
Vice President of Publicity & Corporate Communications
Big Machine Label Group

JOEY HATCH
Executive Vice President
Skanska USA Building Inc.

LAWRENCE BLANK-COOK
National Technology Director
Deloitte

HEATH HOLTZ
Vice President of Vehicles Manufacturing Supply Chain Management & Purchasing
Nissan Motor Corporation

GRANT BOYD
Senior Vice President of Business Development
The Trust Company of Tennessee

BRADLEY JACKSON
President & CEO
Tennessee Chamber of Commerce & Industry

STATE REP. BRENDA GILMORE
(D) - Nashville

STATE SENATOR BO WATSON
(R) - Hixon

In 2018-2019, Tennessee Valley Authority (TVA) and Bicentennial Volunteers Incorporated (BVI), a TVA retiree organization, awarded $680,000 in STEM mini-grants to schools across the seven state Tennessee Valley region, with $400,000 supporting 161 public schools in Tennessee. Educators applied for grants from $500 up to $5,000 to support STEM projects that would spark student curiosity and increase engagement in STEM. Each of the selected projects aligned with one of TVA’s focus areas of environmental and energy exploration, community problem-solving, and economic and career development.