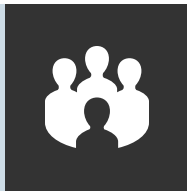# Rural STEM Education Toolkit
Presented by Tennessee's Rural STEM Alliance

Meet the Team

The Tennessee Rural STEM Alliance Task Force has compiled a comprehensive set of starting materials for schools and districts to begin to explore STEM education. If you have any questions about the resources within this toolkit please reach out to us at tsin@battelle.org.

Cedric Bunch
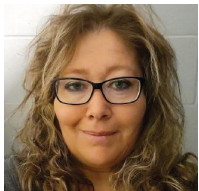Director of Extended Learning
Haywood County Schools

Sarah Combs
STEM Educator
Portland East Middle
Sumner County

Alison Ledford
Elementary Educator
Prescott South Elementary
Putnam County

Deana Sain
Librarian/Media Specialist
Bolivar Middle
Hardeman County

Yvonne Schlangen
Science & Special Education Interventionist
Creekwood High
Dickson County

Kathryn Vaughn
Art Educator
Brighton Elementary
Tipton County

Brandi Stroecker
Director, TSIN
Cheatham County

Statewide Focus Group Data

Focus groups were conducted across the regions of west, middle and east Tennessee and included a variety of stakeholder groups. Here's what they said:

STEM benefits all learners
100%

Counties Represented
48

STEM education leads to
Upward Mobility

Believe schools prioritize STEM
53%
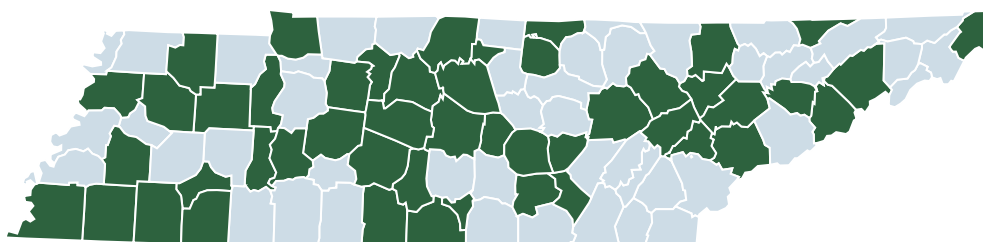
Use STEM skills on the job
87%

Rural communities need STEM
92%

Counties Represented in Focus Groups in Dark Green

Vision for STEM in Tennessee

"All Tennesseans can contribute to our state's progress and vibrancy. To be prepared for the Science, Technology, Engineering, and Mathematics (STEM) careers of the future, all learners must have an equitable opportunity to acquire foundational STEM knowledge.

STEM Education in Tennessee brings together our advanced understanding of how people learn with modern technology to create more personalized, authentic learning experiences, inspire learning and foster creativity at all ages.

STEM Education will unleash and harness the curiosity of young people and adult learners across Tennessee, cultivating a culture of innovation and inquiry, and ensuring our state remains a leader in emerging industries."

Resources included in this toolkit:

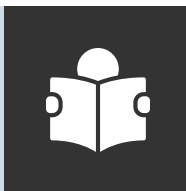| K-12 Instructional Resources	Educator Professional Development	Community Partnership Development	Career Pathway Options

K-12 Instructional Resources

Well-designed project/problem-based learning (PBL) has been shown to result in deeper learning and more engaged, self-directed learners.

PBL rubrics measure students' ability to apply the skills and knowledge learned. Students use their higher-order thinking skills to create a product or complete a process.

In good PBL projects, students learn how to apply knowledge to the real world, and use it to solve problems, answer complex questions, and create high-quality products.

Resource	Link	Grade Levels	Topic Examples
Best for All Central	https://bestforall.tnedu.gov/	K-12	Lessons, videos, and resources for all subject areas including STREAM
TVA STEM	www.tvastem.com	K-8	Zoology, Water Cycle, Climate, Wind Turbines, Biodiversity, Physical Science
NASA	www.nasa.gov	4-8	Space, Earth Systems
Oak Ridge Institute for Science Education	www.orise.orau.gov	K-12	Pollinators, Energy, Engineering, Physical Science
Teach Engineering	www.teachengineering.org	K-12	Physical Science, Mixtures/Solutions, Electricity, Simple Machines
TN Dept of Transportation	https://www.tn.gov/tdot/human-resources-home/trac-program.html	6-12	Transportation, Civil Engineering
Engineering is Elementary	https://www.eie.org/stem-curricula	K-8	Multiple Engineering Disciplines
Art Technically	https://arttechnically.org/	K-12	Arts Integration to STEM
Engineering for Us All	https://e4usa.org/	9-12	Multiple Engineering Disciplines
STE(A)M Resource Series	https://www.tsin.org/resourceseriesindex	3-12	IT, Manufacturing, Healthcare, Entrepreneurship, Esports, Art
PBLWorks	https://www.pblworks.org/	K-12	Online PBL Workshops, Courses and Services
Getting Smart	https://www.gettingsmart.com/blog/	K-12	News and Resources

Professional Development

TSIN provides several professional development opportunities to share best practices in STEM. Ranging from year-long cohort programs to hands-on training sessions, TSIN is committed to connecting educators, sharing best practices, and promoting professional learning and growth.

Regional STEM Innovation Hubs

Offer local teacher professional development and after-school programming for students, to address the needs of partnering schools and districts.

Tennessee Rural STEM Collaborative

Offers a year-long learning experience for K-12 rural teachers in any subject focused on creating a local, STEM initiative. Stipends provided.

Innovative Leaders Institute

Offers a year-long mentoring experience for school building leadership focused on creating a STEM culture. Teams of two apply and receive 30 hours of TASL credit.

Career Exploration and Advising Curriculum

Defined Learning and ElevateTN are free career exploration curriculum and resources for Tennessee students in grades 5-12.

## Computer Science Professional Learning

In order to grow the number of teachers qualified to teach K-12 CS courses, there are several professional learning options statewide.

STEM Workforce Fellowship

Cohorted externship program for K-12 teachers that connects them with a local industry partner to expand their STEM integration options.

Community Partnerships
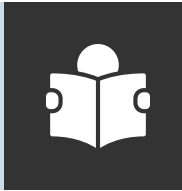
Partnership benefits go beyond the wall of the school building and have an impact on the surrounding community. Partnerships help students become aware of opportunities in their local community.

Potential Partners: Local Chamber of Commerce, Industries, Banks, City Government, County Government, Local Higher Education Facilities, Other programs within your School District/ Community, area STEM Innovation Hubs, Local UT Extension Office

Partnership Agreement Template

Partnership Ideation Activity & Asset Mapping Template

Evaluating Partnerships:

Partnerships should be evaluated periodically to ensure that both parties are upholding the agreement. Programs should make sure they are giving feedback to partners on how the program goals are being met or have changed. Keeping data on successes and struggles is a good way to evaluate program and partnership agreements. Partnerships are strengthened through shared communication.

Partnership Survey Example

Purposeful Partnerships TSIN Workshop Session

Career Pathways

There are a variety of opportunities for integrating STEM career pathways into K-12 instruction. Below are a few Tennessee-specific models that can be leveraged in rural communities.

High-School Industry Partnerships

BlueSky Institute - a groundbreaking partnership between BlueCross BlueShield of Tennessee and East Tennessee State University.

Local Government Partnerships

Through the support of the Tennessee Chamber of Commerce, local chambers across the state have been engaged with this exciting TN-CAPS initiative—bridging the gap between education and industry.

Dual Enrollment

Students are enrolled at the postsecondary institution and earn postsecondary credit upon completion of the course. High school credit is awarded based on local policy.

University and Community College Partnerships

The College System of Tennessee has announced that its technical colleges will provide an onsite workforce training center to facilitate a career-to-workforce pipeline for Ford Motor Company's future assembly plant in Blue Oval City.

Grant Funding Opportunities

TVA Grants — Tennessee Valley Authority Sponsored Classroom Grants for K-12 STEM Integration $1,000 - $5,000 through TDOE and TSIN.

TDOE Grant — School-Based Enterprise Start-Up Grants are intended to drive innovation in meaningful work-based learning experiences.

US DOE — Describes the kinds of grants ED offers and provides links to information about eligibility, forecasts, and applications.

Next Wave — Funding opportunities for bringing more STEM and emerging technologies to all students.

NSF — National Science Foundation grants opportunities designed to support K-12 STEM education.

Local — Local Tennessee-based foundation and district grants from STEMfinity.com.

NEA — NEA Foundation STEM grants provide the resources for districts to build and expand their STEM programs.

STEM — STEM Grants for K-12 and nonprofit organizations with open and rolling deadlines.

SFS — The STEM Action Grant program provides small grants of up to $5,000 to innovative nonprofit organizations led by social entrepreneurs.

AFA — Afterschool Alliance Aim High Grants open across the United States.

GW — GrantWatch has a category specifically for science grants, as well as one for Arts and Culture and one for technology.
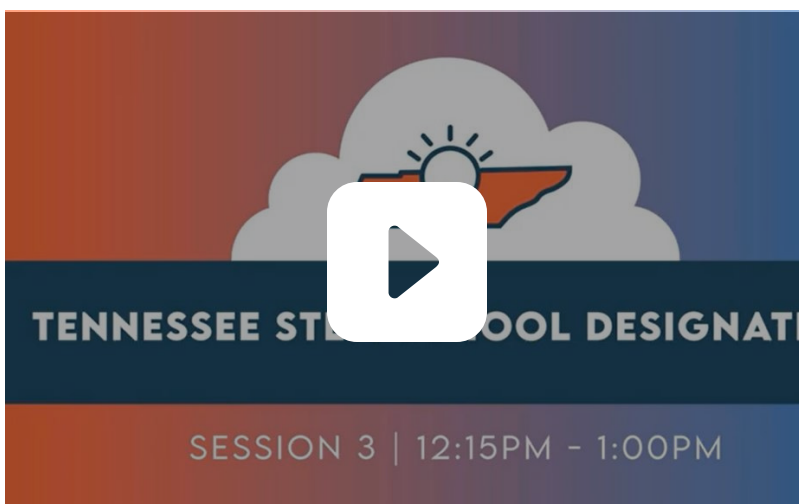
Learn More

PBL and How We Learn
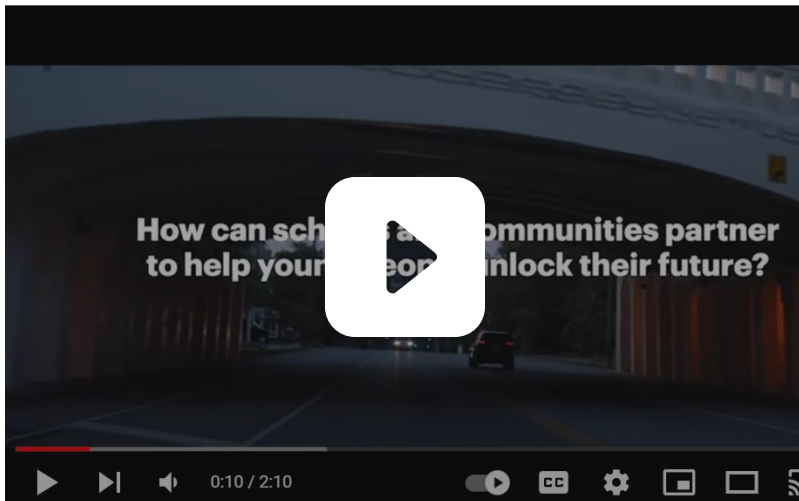
Building Community Partnerships

STEM School Designation

Contact Details

We are happy to hear from you. You can easily reach us using the following contact details.

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Nashville, TN 37212

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Twitter: twitter.com/thetsin