

Tennessee STEM Designation

Cleveland City Schools - Cleveland Middle School

Infrastructure Team:

Renny Whittenbarger

Scott Carroll*

Stephanie Pirkle

Jeff Elliott

Joel Barnes

Leneda Laing

Attribute 1.1 STEM Action and Sustainability Plan: Detailed STEM strategic plan grounded in research and in which actions toward the Tennessee STEM Attributes are outlined.

Attribute 1.2 Leadership Team: STEM programming requires leadership teams who collaborate and engage in dialogue frequently about the STEM action plan's design and effectiveness. School leaders provide the opportunity for staff members to exhibit responsibility and commitment to the success of the school. The staff contributes to and has a say in decisions regarding the school. The staff collaborates for continued improvement.

Attribute 1.3 Leadership Professional Development: School leaders participate in professional development that addresses STEM education issues in order to develop concepts of innovative leadership practices, enhance capacities to promote best practices across the curriculum, develop strategies to promote staff effectiveness and improve teaching and learning environments and to prepare leaders with the procedures and policies to promote success.

Attribute 1.4 School Environment: Facilities have been adapted or designed for STEM learning. Spaces are available for collaboration and project work. Obvious efforts have been made to make resources available to students for use in learning, design, and project effort.

Attribute 1.5 School Schedules: School leaders create school schedules that allow consistent teacher collaboration; co-teaching and integration of subjects; and ample time for projects, teacher planning, and non-traditional courses.

Curriculum and Instruction:

Kristen Early*
Emily Buckner
K.J. Harris
Sarah Thomas
David Hanley

Curriculum and Instruction: The STEM curriculum framework contains Tennessee State Standards and has articulated interconnectedness between science, technology, engineering, mathematics, and other content areas. Project and problem based learning activities form a substantial part of the curriculum. Each of the following attributes strengthens a curriculum framework that is conducive to sustaining a well-rounded STEM program.

Attribute 2.1 Project-based and Problem-based Learning: Quality STEM learning experiences are student-led, engaged in real-world content and multiple solutions for promoting student collaboration and carefully designed to help students integrate knowledge and skills from Science, Technology, Engineering, and Mathematics. Problem solving learning at this school requires a thorough process of inquiry, knowledge building, and resolutions. Curriculum includes projects, often interdisciplinary and ranging from short- to long-term, which are focused on solving an authentic problem.

Attribute 2.2 Engineering Design Process & the Design Thinking Process: Quality STEM learning experiences require students to demonstrate knowledge and skills fundamental to the engineering design process and design thinking (e.g., brainstorming, researching, creating, testing, modifying).

Attribute 2.3 Quality of Technology Integration: Technology is seamlessly embedded within the lesson and activities of all content areas and is not demonstrated as a separate entity, providing a student-centered environment that encourages personalized and blended learning.

Attribute 2.4 Exploring STEM Careers: Quality STEM learning experiences help students better understand and personally consider STEM careers.

Attribute 2.5 College and Career Readiness Skills: Students use employability skills of communication, creativity, collaboration, leadership, critical thinking, and technological proficiency to create and consume in authentic ways.

Attribute 2.6 Integrity of the Academic Content (including Cognitively Demanding Work): Quality STEM learning experiences are content- accurate, anchored to the relevant content standards, and focused on the big ideas and foundational skills critical to future learning in the targeted discipline(s). A Designated STEM School establishes curriculum expectations, monitoring, and accountability mechanisms that are reflectively

revised to ensure a constancy of mission purpose (aligned resource allocation, integrated STEM curriculum development, teacher professional growth, and student results). Students use thinking and process skills. This includes considering alternative arguments or explanations, making predictions, interpreting their experiences, analyzing data, explaining their reasoning, and supporting their conclusions with evidence. Providing cognitively demanding work will promote student achievement in the areas of math and science.

Attribute 2.7 Enrichment Learning Activities: Students are given the opportunity to participate in STEM enrichment activities that take place before, after, or during school hours. (e.g. competitions, STEM exhibits, robotics, Science Olympiads, DECA, TSA, HOSA, FCCLA, Future Educators Association, FFA, Business Professionals of America, FCCLA, clubs, makerspaces, etc.)

Professional Development:

Emily Raper*

Erica Parker

Cheree Thompson

Christina Melton

Professional Development: A Tennessee Designated STEM School ensures a systemic professional development model that provides continuous learning based on student results, teacher development, and the short- and long-term goals of the school. The PD model, including school-level and personalized plans, creates an environment that allows educators to continue to learn and pursue opportunities that build the capacity to provide better STEM learning opportunities for students. Each of the following attributes creates an environment of continued learning for all that is conducive to sustaining a well-rounded STEM program.

Attribute 3.1 Quality STEM Professional Learning: Quality STEM professional learning aligns with STEM initiatives and is provided throughout the year to support the school's STEM action plan.

Attribute 3.2 Designing PBLs: Teachers participate in professional development that addresses integrated content, community/industry partnerships, and connections with postsecondary education, pedagogy, art and design opportunities, and digital learning in order to develop PBLs that are custom designed to provide relevant learning for the school's student population by providing opportunities to research challenges within the community.

Achievement:

Erin Lefever*

Ali Creel

Ed Fickley

Tonya Cawood

Achievement: Assessments are incorporated to measure student outcomes and teacher instruction to ensure a strong, innovative, and cohesive STEM program. Each of the following attributes uses innovative assessment to sustain a well-rounded STEM program.

Attribute 4.1 Performance Assessments: A variety of assessments are incorporated to measure student outcomes and teacher instruction to ensure a strong, innovative, and cohesive STEM program. The assessment plan includes rubric-based performance assessments that require students to demonstrate knowledge of STEM concepts and skill in completing authentic tasks that model performances in work-based learning.

- *Describe the metrics you use to evaluate the effectiveness of your STEM program. (250 words max)*
- *Provide a narrative, and link one-three artifacts exhibiting how your school evaluates the effectiveness of your STEM program here.*

Attribute 4.2 Accountability (Data): Diagnostic, ongoing, and vertically and horizontally aligned formative and summative assessments are used for all students to drive instructional decisions to promote student achievement.

- *Outside of state standardized assessments, what else does your school use to assess students? How do these assessments drive instruction? (300 words max)*
- *Provide a narrative, and link one-three artifacts exhibiting how your school assess student performance and modify instructional practices here.*

Community and Postsecondary Partnerships:

Derek Morris*

Jon Bovee

Grace Dyrek

Rodney Broadnax

Valerie Helmstetter

Community and Postsecondary Partnerships: Community and postsecondary STEM partnerships are established and provide connections between curriculum taught in the classroom and practical applications outside of school. These partnerships have created an environment in which students develop high-level STEM skills and knowledge inside and outside of the classroom and increase their readiness for college and careers. These attributes are essential in creating connections between what is taught and real-world settings in order to sustain a well-rounded STEM program.

Attribute 5.1 Partners Support Instruction: Direct experiences with STEM professionals, professional STEM work environments, and/or practical applications of STEM content, including experiences that incorporate innovative design and art immersion led by professionals within the arts community, during and/or outside school are available to students.

Attribute 5.2 Work-based Learning: STEM work-based learning experiences increase interests and abilities in fields requiring STEM skills for high school students. See the K–12 progression below:

Career-exploration WBL Methods Pre-professional WBL Methods

Career-preparation WBL Methods Exploration Immersion Industry Awareness

Career Awareness

Service Learning

Career Exploration

Service Learning

Clinical Experience

Service Learning

Career Training

Primarily grades K–5 but continuing into higher grades

Primarily grades 6–8 but continuing into upper grades

Primarily grades 9–12 but continuing into postsecondary

- Foster career and workplace awareness
- Promote career exploration
- Strengthen motivation and informed decision-making skills
- Deepen career and work readiness knowledge
- Develop personal qualities and workplace readiness skills
- Impart beginning professional skills
- Develop technical knowledge and skills necessary for entry into a specific occupation
- Strengthen industry and career awareness, career exploration, preparation, and training

Attribute 5.3 College Opportunities: The high school provides courses (online

courses included) for preparation in college courses and career training; these courses develop time management, prioritization, and organization skills.