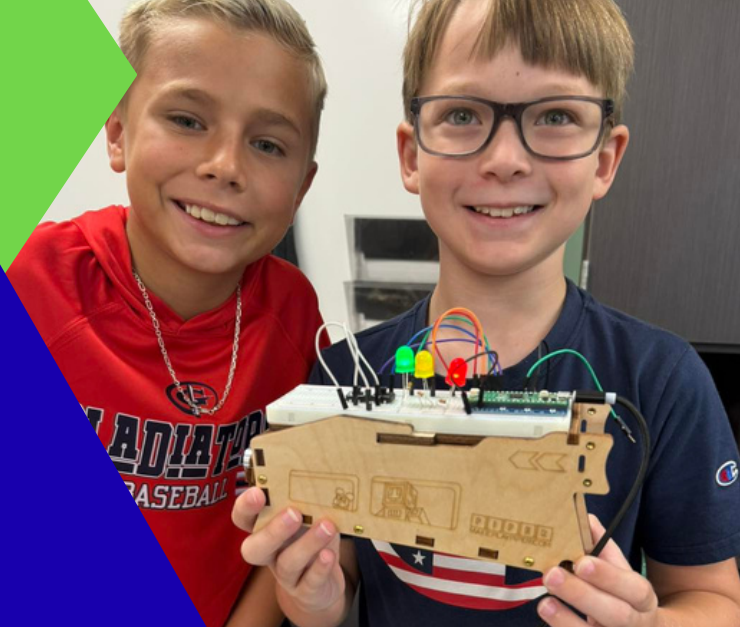




CASE STUDY

Building CTE Foundations
Through Hands-On Electronics



Educator: Meg Barnes

Role at Time of Implementation:
Pathways Teacher

School/District: Bayou View Middle School,
Gulfport, Mississippi

Grade Levels: 6-8

Products Used: Piper Make Base Station

Implementation Period: 3 weeks

Overview

At the intersection of STEM and Career & Technical Education (CTE), educators are searching for ways to help students build both the technical and problem-solving skills required for future careers in engineering, energy, and technology pathways.

This case study shows how one middle school used Piper Make to transform electronics instruction, connecting coding, circuitry, and career-ready learning through hands-on, collaborative missions. The experience fostered persistence, teamwork, and design thinking.

The Challenge

Teaching students real-world electronics mastery - not just connecting parts but understanding the wiring logic and programming principles behind professional electrical systems - was a persistent challenge.

Students needed a more interactive, exploratory environment that mirrored the hands-on, applied learning expected in modern CTE programs.

Traditional programming websites often failed to keep students engaged, leading to frustration and limited skill transfer. A new approach was needed to build confidence, curiosity, and technical fluency.

“I love how the students engage with the online platform. The missions are student-centered and keep their attention. The directions are very clear, so all students feel successful.”

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The Solution

The class was introduced to Piper Make, starting with building the Base Station kit. Students worked in pairs, progressing through the online missions that integrate hands-on circuitry with block-based coding. The Minecraft-like lessons kept the students interested and engaged the whole time.

Each mission built toward CTE competencies such as electrical systems design, programming logic, and system troubleshooting, skills that translate directly into energy, engineering, and robotics pathways.

The Experience

Over a seven-day module, students used the Piper Make Base Station to complete all missions. Due to limited kits, half the class alternated between Piper Make and another STEM activity.

The contrast was clear: students using Piper Make required minimal teacher intervention thanks to self-guided lessons that combined visual wiring diagrams, interactive simulations, and real-world challenges.

Students collaborated naturally, tested their own circuits, and celebrated every success, developing both technical competence and team-based problem-solving.

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The Impact

The shift to Piper Make produced significant changes in classroom dynamics and engagement:

- Students demonstrated greater persistence and confidence in troubleshooting.
- Coding became hands-on and meaningful, connected to visible, physical outcomes.
- Collaboration and peer teaching increased organically.

These experiences directly support CTE competencies in:

- Engineering & Technology Foundations
- Renewable Energy Systems
- Automation and Control Technologies
- Digital Electronics

“

Students tend to get bored with programming websites, but Piper Make changed that. They were excited every time a circuit came to life. They felt accomplished after every mission.

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Lessons Learned

What worked well:

- Pairing students in twos encouraged collaboration and supported varied skill levels.
- The scaffolded challenges built confidence while maintaining rigor.

Challenges encountered:

- Some students struggled initially with wiring, but adapted quickly with guidance and peer support

What's Next?

Based on the success of this module, the teacher plans to expand the Piper Make curriculum:

- Continue using the Piper Make Base Station for foundational electronics and coding.
- Integrate Piper Make Widgets to explore automation, sensing, and environmental technology.
- Pursue grants to add the Solar House and Piper Computer Kit to her lessons.

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