

Wiring Real-World Connections: Integrating STEM Concepts into Agricultural Mechanics through Trailer Circuit Instruction

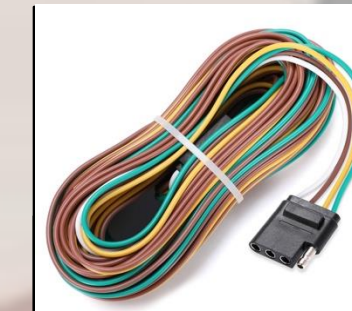
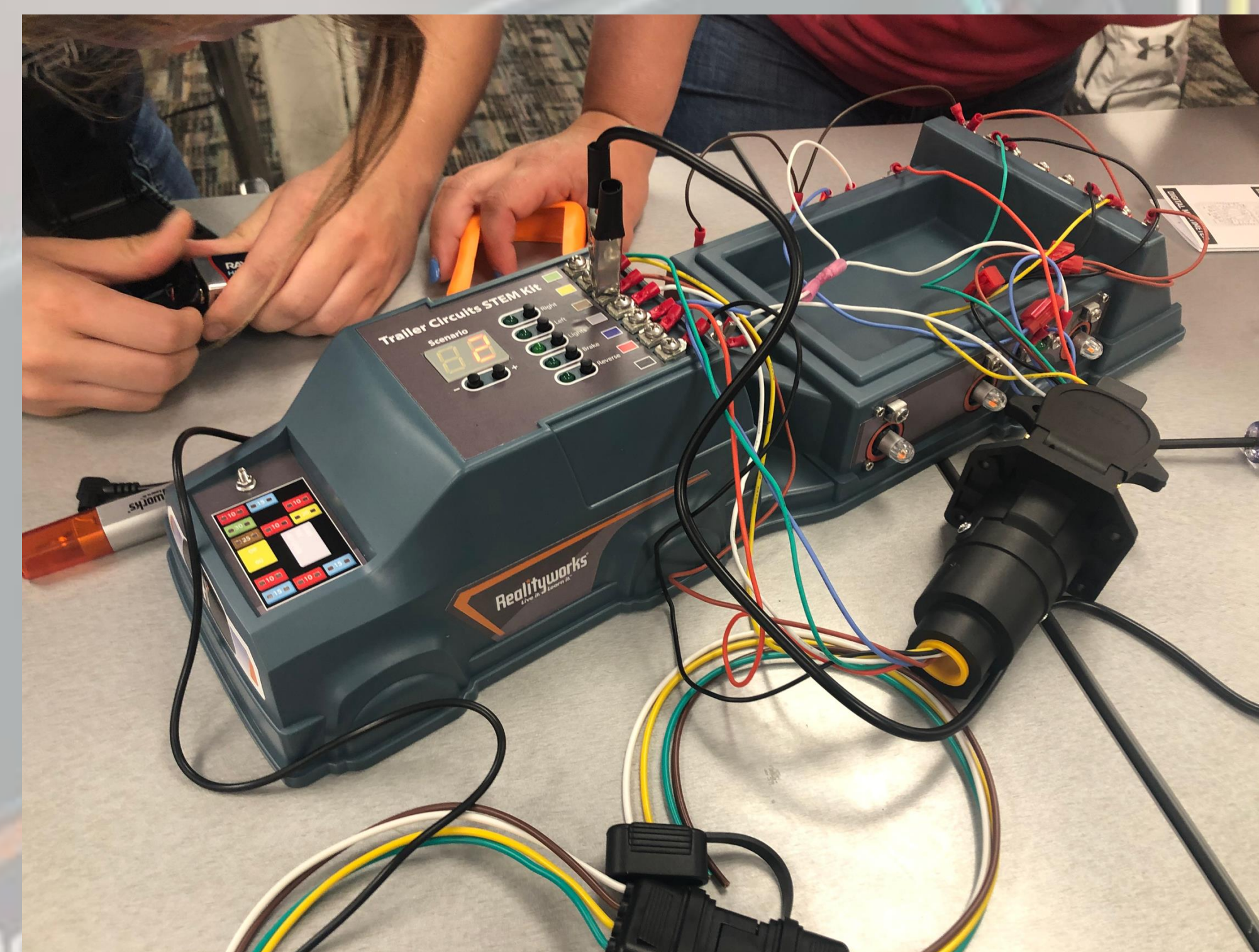
Jay Solomonson
Illinois State University

Trent Wells
Murray State University



Introduction

- Science, technology, engineering, and mathematics (STEM) concepts are often naturally embedded within agricultural education instruction, particularly in areas such as agricultural mechanics (Swafford, 2017).
- Agricultural mechanics diverse content allows teachers to meaningfully connect many STEM concepts to agricultural instruction (Wells et al., 2021).
- While agriculture teachers recognize the importance of integrating STEM (Smith et al., 2015), many report low confidence in teaching these concepts.
- Stubbs and Myers (2015) emphasized that teachers with more STEM-focused professional development (PD) feel better prepared to teach these concepts.



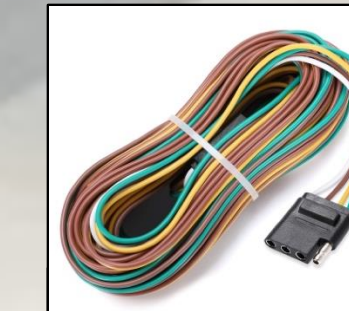
How it Works

- During a multi-day agricultural mechanics PD summer workshop focused on integrating STEM concepts, we engaged 20 agriculture teachers with the RealityWorks® Trailer Circuits STEM Kit.
- Participants were placed into small groups and guided through a demonstration of the kit. The participants applied embedded STEM principles, including DC electricity basics and circuit types, during the hands-on activity.
- Each group was challenged to wire and connect a 7-way round harness on their trailer within 60 minutes.
- The session concluded with a reflective discussion on how this activity could be integrated into their programs to enhance student learning in electrical systems.



Results & Implications

- Participant engagement remained high throughout the activity. Participants noted the kit's potential to enhance students' problem-solving and critical thinking skills without the need for a full-sized trailer.
- Evaluations confirmed the kit was among the favorite activities during the week. Several participants also indicated that they had purchased the kit for use in their own programs.
- We have integrated the activity into our AGR 231 course at ISU, using it as a laboratory exercise in our electricity unit. Undergraduate students also demonstrated strong engagement and expressed a high perceived value through feedback.
- Several students indicated interest in using the kit in their future classrooms, pending available funding.



Future Plans, Advice, & Costs

- We plan to continue incorporating the kit into our summer agricultural mechanics PD workshops and the AGR 231 course. Based on positive feedback from both our workshop participants and undergraduate students, we intend to increase the time allocated to this activity and explore the kit's curriculum and extension activities in greater depth.
- We encourage other instructors of agricultural mechanics courses to consider using this activity as an engaging method to help students apply STEM concepts in real-world agricultural contexts.
- The RealityWorks® RC Trailer Circuits STEM Kit costs \$2,199.00.
- A downloadable curriculum and student workbook are provided. The curriculum offers six to eight hours of instruction and includes all presentation slides, student activities, and assessments.

References

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