

STEM 7 Checklist: Realityworks Alignment to Key Concepts

STEM 7 Pillar	Trailer Circuits STEM Kit	RC Tractor Pull Challenge	Electrical Wiring Kit	Measurement Math Training Kit	guideWELD VR® welding simulator
Pillar 1: Focus on Real-World Problems One of the most effective ways to engage students in STEM is by presenting them with real-world challenges that are relevant to their lives and future careers.	When connecting a trailer to a car, truck, or tractor, its likely to find something that needs to be fixed. This kit brings this real-world challenge into the classroom, along with that “ah-ha!” moment when the fix has been made.	The 5 RC tractors are student modifiable, allowing students to make the same adjustments needed to prepare a tractor for a real task or tractor pull event.	The understanding and skills that an electrician needs on a construction site are brought right into the classroom, along with the tools and materials universally utilized in the real world.	The ability to make precise measurements is a fundamental STEM skill, no matter the challenge being tackled.	Welding is a fundamental skillset for many careers and real-world challenges. From building the bridge of the future to creating tomorrow’s space port, understanding welding opens students to a future of possibility.
Pillar 2: Engagement in Engineering Design STEM learning should foster creativity and innovation through hands-on engineering design challenges. Students must be able to design, build, test, and refine their solutions, just like professional engineers.	Learning how to think about circuit design, series and parallel circuits, and Ohm’s Law, students will design, wire, and test their circuits as they are challenged to successfully install both a 4- and 7-way trailer wiring harness.	Students test how changing wheel size, spur and pinion gearing, and hitch height influence the tractor’s abilities, ultimately designing the most effective tractor.	Students use the Assessment Tool to safely test their installation, allowing them to independently evaluate and troubleshoot their work. The Enhancement Exercises encourage students to apply their knowledge in even more complex installations.		Immediate feedback on 5 measurable welding parameters allows students to engage in reflective improvement independent of the teacher’s intervention.
Pillar 3: Context Integration Many students struggle to see the relevance of their STEM education, often asking, “Why do I need to learn this?” Context integration is about helping students connect their learning across multiple disciplines to real-world applications.	Students struggle with transferring electrical understanding to the real, physical world. The simulator’s trailer form provides a direct application of concepts and skills learned, getting them ready to fix that real trailer’s faulty lights, or apply their learning to robotics, automotive repair, and more.	Learn about weight and friction, gear ratios, and more... then see their immediate impact with every tractor pull. The concepts learned and experienced here transfer throughout the world of trades and engineering.	Using the same standard wire, electrical boxes, and fixtures universally found, students can easily transfer their learning from this kit to the real-world.	Hands-on manipulatives allow students to engage in real hands-on practice.	The simulator recreates the details of the booth welding experience, with MIG and Stick guns, physical joints to interact with, and welding gloves. This hands-on approach is the perfect steppingstone to success in the booth.

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Pillar 4: Content Integration STEM education should break down the traditional silos between subjects. By integrating content from math, science, and technology, students gain a more holistic understanding of how these subjects interconnect.	Ohm's Law calculations, technical wiring skills, and multimeter testing all enrich the learning experience by connecting to those in math, science, and technology classes.	These 5 lessons tie together science topics such as experimental design, Newton's Laws, and friction, while engaging students in relevant mathematical calculations regarding mechanical advantage, gear ratios, and force angles.	The same electrical understanding and skills developed in science class, or put into action in robotics or engineering, is applied in this kit.	From mathematics and numeracy to physics and chemistry, the tools and skills developed in this training kit find a home in nearly every STEM classroom.	The 5 measurable welding parameters and provided curriculum connect mathematical concepts (angle), physics (distance, speed, electricity), and chemistry (safety, gasses, fumes) into this real-world skill building experience.
Pillar 5: Engagement in Authentic STEM Practices Authentic STEM practices involve students in activities that mirror real-world professional experiences, such as data analysis, experimentation, and reasoning.	Students are guided through the Troubleshooting Process, applying their learning at a high level as they assess faults and test repairs using the 10 Troubleshooting Scenarios.	Students are guided through experimental test trials to evaluate the influence of different variables on performance. Then, analyzing this quantitative data, students are challenged to build the ideal tractor and articulate the reasoning behind their modifications.	Reading the color-code on the Assessment Tool puts the student in the electrical inspector's role, giving the opportunity to troubleshoot a faulty installation.	STEM professionals must confidently collect and work with precise measurements, numeric data points, and be fluid in making conversions.	After each weld students are presented with an assessment snapshot and instant replay, allowing them to analyze their weld and identify specific parameters to focus improvement on.
Pillar 6: 21st Century Skills In addition to technical skills, STEM learning must foster 21st-century skills such as communication, teamwork, and collaboration—skills that are critical in today's workplace.	This learning experience is ideal for small teams, allowing students to capitalize on their individual strengths as they collaborate on their team's curricular progress.	This learning experience is ideal for small teams, allowing students to capitalize on their individual strengths as they collaborate on their team challenge.	This learning experience is ideal for small teams, allowing students to capitalize on their individual strengths as they collaborate on their team challenge.	This kit contains 5 sets of manipulatives, allowing students to work in teams while being held independently accountable with the student workbook and online activities.	The external monitor effectively allows small teams to engage with the simulator as a group, rotating roles and capitalizing on peer-teaching between students of varying experience levels.

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Pillar 7: Awareness of STEM Careers Engaging students in STEM learning also means preparing them for the wide range of careers that require STEM skills. Effective STEM education raises awareness of the opportunities available in STEM fields and equips students with the skills they need to pursue those careers.	Understanding electricity is fundamental to the future's technical and engineering careers, from automotive, manufacturing, and aerospace technicians to engineers across all disciplines.	Students experience the thrill of applying their conceptual understandings and hands-on skills in this engaging challenge, which illustrates the wide range of abilities and interests that can find success in trades and engineering careers.	Mirroring the skills and practices of an electrician, this kit develops a practical foundation that opens doors to multitudes of career opportunities.		Welding's status as a foundational skillset for so many career opportunities make it so important that students find success when introduced to it. With a solid foundation built on the simulator, students progress quickly in the live welding booth and are primed to engage in future career development opportunities.