

LITTLE SHOP OF PHYSICS 4-H EXTENSION LARIMER COUNTY

Interns:
Kyros Kasner
Connor Leftwich

Mentors:
Heather Michalak
Toby Swaford

PROJECT INTRODUCTION

Our internship this summer was the design and construction of hands-on learning experiences for learners of all ages from surplus materials and projects already bought by 4-H for their Mobile Energy Lab Trailer, as well as spending time doing outreach in underprivileged Fort Collins communities.



INTERNSHIP GOALS

The primary goals of the internship were to learn about and become familiar with the production of engaging and well-constructed hands-on experiments in a hands-on manner itself, as well as develop an understanding of different communities, groups, and individual's needs for learning, and how to aptly meet those needs.

HOW DOES THIS APPLY TO YOUR EDUCATION

The experience working both directly and indirectly with youth benefits our education by broadening our view of the world, as well as our understanding of different methods of problem solving and thought processes. Both interns plan on pursuing a teaching profession, and so the opportunity to directly interact with and teach students was invaluable.



WHAT YOU DID

We worked primarily on two bike-pedal generators and turning them into a hands-on learning experience. Kyros worked on the construction and experience portion of the project, while Connor primarily worked on the electrical components. The design went through several iterations and prototypes over the summer, as issues, new ideas, and improvements were brought to light. The final design incorporates several different ways for learners to interact with the projects, and multiple unique learning outcomes to discover.

A few other projects were also developed, built, and tested. Wiggling Wilhelm, which uses a power drill to generate electricity and cause a brush creature (Wilhelm) to wiggle around a plate using a motor with an off-center weight on the end. Spinning Static Sprinkles involves a clear acrylic tube, sealed between concentric disks on either end, filled with Styrofoam beads, with a fabric cuff wrapped around it. As the cuff was moved back and forth, it builds up static electricity, causing the 'sprinkles' to stick to the tube.



Interns

Connor Leftwich is an undergraduate at CSU in math education and is excited to teach middle school mathematics after graduating. His passion for sharing science and math with all ages inspired him to apply for the 4-H internship. Connor hopes his work this summer sparks interest in those who may not realize they are scientist or mathematicians. If you were to know only one thing about mathematics, he noted, "It's less about learning the formulas, and more about problem solving."

Kyros Kasner is an undergraduate at CSU studying Geology-Geophysics with a minor in Graphical Information systems. The opportunity to build hands-on science experiments and do scientific outreach and engagement with underrepresented communities drew them to the 4-H internship. If you were to only know one thing about geology, they noted, "Every system on Earth is deeply interconnected (water, atmosphere, climate, people, plants, etc.). When one system changes, the effects are felt worldwide." Outside of school and scientific pursuits, Kyros is a hobbyist woodworker, enjoys Dungeons and Dragons, and is a fan of MLB's San Diego Padres.

WHAT YOU LEARNED

We learned a lot about ourselves, and how we fit into the world. We also learned about our community and the many different aspects that make up a community. Through the development of our project we also learned about the design process, prototyping, and several design and construction principles. There were many designs tested and ultimately scrapped, and each one provided insight into what worked and what didn't. One particular moment this summer stands out, and it was when Kyros and Heather were testing one of the generators, and in trying to determine its maximum wattage output, accidentally blew out the generator; instead of outputting 120 Volts, it was permanently capped at a 5V output. This actually ended up being beneficial, as it allowed us to distinguish between our generators, as well as changing how the experiment worked.



NEXT STEPS

The projects we designed, prototyped, and built are now integrated into the 4-H Mobile Energy Lab and will be taken all over Colorado and beyond to engage students with learning about the source of the electricity they use every day. We still plan on creating a poster for the trailer, outlining the human relationship to energy and energy production.

Both Kyros and Connor are continuing their work with the Little Shop of Physics this fall, and are very excited about new projects they have lined up, as well as continuing time engaging with students through the various outreach events the Little Shop of Physics attends.

