



SOCIETY OF PHYSICS STUDENTS

An organization of the American Institute of Physics

Marsh W. White Award Proposal

Project Proposal Title	Continuing Elementary School Engagement in Physics
Name of School	Colorado School of Mines
SPS Chapter Number	1287
Total Amount Requested	\$600

Abstract

The Colorado School of Mines SPS Chapter would like to host more physics outreach events directed towards elementary-age students to inspire the next generation of physicists. Our previous outreach events to these groups have been successful, but our demonstrations are in need of replacement.

Proposal Statement

Overview of Proposed Project/Activity/Event

The Colorado School of Mines SPS Chapter wants to be involved in outreach activities at elementary schools and other events directed towards children. We have a history of doing these activities in the past and want to continue to participate in them. In Fall 2023, we participated in Mitchell Elementary's Math and Science Night, and also organized the Fall Physics Fest, an outreach event directed towards elementary students. At these events, we bring our physics demonstrations but some of them have broken and degraded over time. For example, our Jacob's Ladder demonstration no longer works and starts smoking. Previously, we had a demonstration where students waved a strong magnet in front of a CRT TV to see the distortion caused by the electrons being affected by the magnetic field, but the CRT TV no longer works. These are only a few of the demos that have been handed down from previous SPS leadership teams for many years and have degraded in quality. We want to be able to purchase new demonstrations that we can bring to elementary schools to inspire the next generation of physicists.

How Proposed Activity Promotes Interest in Physics

This project is bringing exciting performative and hands on science to elementary-age students to promote interest in physics. Young students viewing or participating in engaging physics demonstrations can have a lasting impact in their education and hopefully guide them towards a path in science.

Plan for Carrying Out Proposed Project/Activity/Event

- Personnel – Jayden Johnson (Mines 2023-24 VP of Outreach) will oversee planning the event and monitoring the progress, but all SPS officers will be involved. Jayden will reach out to elementary schools and be the point of contact between schools and our SPS chapter. Progress will be communicated to the other officers at the weekly officer meetings.
- Marketing – Flyers for the event will be created and emailed to the schools we are attending. We will encourage the schools to hang up the flyer, and put them in the weekly newsletter to parents.
- SPS member participation – There will probably be ~10 SPS members volunteering with an additional ~5 from the Teach@Mines program who have historically helped out. ~15 volunteers will be plenty for the event we have in mind.
- Expertise – Jayden Johnson coordinated our contribution to the Mitchell Elementary Science Night as well as coordinated the Fall Physics Fest outreach event that was advertised to elementary age students. His experience will be pivotal in our success. Many of our members have worked with physics demonstrations and their experience will be valuable when the event occurs.

Project/Activity/Event Timeline

The event will take place in the Spring semester but the date is not determined yet. Below is a table detailing the actions that will happen prior to the event.

Time before event	Milestone
>5 weeks	Purchase and build new physics demonstrations
4 weeks	Organize time and date for outreach event
3 weeks	Start advertising volunteering opportunities at weekly SPS meetings
2 weeks	Select which demonstrations to bring
1 week	Finalize volunteers list and teach the volunteers the physics demonstrations we plan to use
1 hour	Arrive at school, be ready set to up our demonstrations

Activity Evaluation Plan

We will evaluate the success of the outreach event by keeping an attendance approximation, surveying reactions from the elementary students to each physics demonstration and asking attending parents their thoughts on the event. After the event has concluded, we will ask our volunteers what they thought went well and what could be improved upon. The same questions will be posed to an administrator of the elementary school. The attendance approximation will give us insight on how successful our marketing was. If the attendance was lower than expected, we should put more effort into it next time. The surveying reactions from elementary students will give us an idea on which physics demonstrations are popular. Talking to parents could give us insight on what they want their children to see demonstrated as well as general improvements for the event. Talking to volunteers and an administrator of the school will give us further insight on what went well, and what to improve upon in the future.

Budget Justification

All of the items in the budget proposal are physics demonstrations that we would either buy or make ourselves. These demonstrations would replace broken ones, and also some nice additions to engage young students in physics. The CRT TV we have is broken now. We used to have students wave a magnet in front and watch the screen change, from the electrons being affected by the magnetic field. We already have the magnet, so with this purchase we can start using this demonstration again. The Ruben's tube will be a very exciting demonstration that elementary age students probably won't fully understand, but it will promote great interest in science and what you can do with physics. The electrostatic plume set is a great hands on demonstration where a variety of electrostatic experiments are possible. The atmospheric mats are an interactive demonstration where students can try to lift these mats off the ground, but no matter how hard they try it won't budge. The weight of the air molecules pushing down on the mat creates a suction like effect where it is almost impossible to remove by the handle. The gravity well will also be a great addition to simulate gravity. By letting kids place small balls in the warped space-time created by the large ball, gravity can be visualized in an interactive way. All other costs associated with attending an elementary school event, like travel costs, will be covered by our local SPS Chapter monies.