



SOCIETY OF PHYSICS STUDENTS

An organization of the American Institute of Physics

Future Faces of Physics Award Proposal

Project Proposal Title	Physics You Can Feel; Hands-On Activities That Make Concepts Click
Name of School	Henderson State University
SPS Chapter Number	2798
Total Amount Requested	\$359.75

Abstract

We would like to host a professional development workshop for teachers working at rural and/or low-income schools surrounding our area. This workshop will provide hands-on, low-cost activities and experiments that can be replicated in their classrooms.

The participants will learn how to lead and make engaging experiments and receive read-to-use kits that include lesson plans that are designed for resource-limited classrooms.

Proposal Statement

Overview of Proposed Project/Activity/Event

The Society of Physics Students at Henderson State University and its committed members have decided to host a professional development workshop for teachers at low-income and/or rural schools, along with our partners in the Women in STEM club at our university. The purpose of this event is to provide high-engagement experiments and ready-to-use resources for low-income/rural teachers, with the ultimate goal of reducing educational disparities that can be faced by low-income/rural schools and inspiring greater student involvement and interest in physics.

Our target audience is science teachers from rural and/or low-income schools, with an estimated service to 20-30 educators. As each educator will receive plans to use in class and have an opportunity to practice the experiments, along with receiving materials to take home, we believe that the potential to reach hundreds of students across communities.

The workshop will include two low-cost and easily accessible experiments focused on different areas of physics. Our first experiment will be density and polarization: We will give the participants the needed materials (glass bottles, isopropyl alcohol, water, non-iodized table salt, highlighter, food coloring, and some bits of plastic.) in order to make Density Bottles that give a visual way to explore buoyancy, material properties, and fluid behavior. Our other activity will be to use plywood and rope to create gravity swings to illustrate centripetal force and motion. The participants will work through each activity as their students would, to gain firsthand practice to build confidence in the lesson plans and knowledge needed to bring hand-on science to their classrooms.

The motivation behind this project comes from many of the students at our university who didn't get many opportunities to study physics or have it taught to them in a hands-on way, which is the way studies show that most students prefer and learn better with. Limited funding, lack of access to lab equipment, and fewer professional development opportunities are limitations for many rural schools. However, this project will allow our chapter's ongoing outreach and relationship with schools to help counter these limitations with a new focus on educators. With our connections to schools through past outreach projects and community science events, our chapter is positioned to engage in a meaningful, practical workshop that will provide lasting benefits to not only teachers, but their students as well.

How Proposed Activity Promotes Physics Across Cultures

This project aims to expand access to STEM learning experiences for educators, and has the dual benefits of enhancing student learning, for participants from low income and rural schools. Low income/rural education is often underrepresented and underserved in sciences, facing cultural and economical barriers, such as limited funding, limited access, and geographic isolation, which causes restrictions for professional development for educators and students to hands-on learning. By having this event, we will provide educators with low-cost resources that they can bring back to their students and bring exposure to physics in an exciting way.

Plan for Carrying Out Proposed Project/Activity/Event

The officers of our SPS chapter will oversee the logistics of this event, along with the help of the officers of Women in STEM.

- The officers will reach out to the surrounding school districts to find a date that works best for attendance of educators.
- The officers will collaborate with the officers of Women in STEM to organize workers for the date set to help prepare materials, lead activities, and other duties decided before the date set.
- The officers will reach out to local businesses to ask for donations of supplies and/or gifts for teacher appreciation.
- The officers will reach out to the rural and/or low-income schools in our area to invite educators and get sign-ups to know how many to expect at the workshop. Advertising will start three months before the set date of the workshop. Final headcount must be taken two weeks before the workshop.
- The officers will practice the experiments and go over the lesson plans before the workshop to ensure proper knowledge and handling of the activities.
- Two weeks before the workshop, the officers will ensure that they have all proper amounts of materials, including refreshments, to set the event up for success.

Following the workshop, the officers will reach out to all participants to take surveys of events and provide any follow-up resources that may be needed, such as answering questions or providing recommendations for other similar experiments or variations of taught experiments.

Project/Activity/Event Timeline

- The event will occur in March (before spring break) or in early March.
- Three months before the event, the officers will reach out to schools to invite educators to the workshop.
- Three months before the event, the officers will begin to reach out to local businesses for donations. This will continue till one week before the event.
- Four months before the event, the date for the workshop shall be set. A back-up date should be set, in case of need.
- One month before the event, the officers shall start the purchase of all the materials needed for the number of participants signed up. A few extras should be purchased for practice and in case of extra participation.
- Two weeks before the event, the officers and all volunteers will practice the activities to ensure a successful event.
- Two weeks before the event, a final headcount shall be taken of signed up participants.
- Following the final headcount, the officers shall purchase any additional materials necessary.
- At the end of the event, the officers will ask all participants and volunteers to fill out an evaluation of the event for knowledge of future events.

Activity Evaluation Plan

At the end of the event, participants and volunteers will be asked to fill out an evaluation that shall be written by our officers two months prior to the event. This evaluation will allow our chapter to know what went well, what our participants enjoyed, and what could use improvement.

All records involving the planning and implementation of the event (. i.e. budgets, businesses and schools contacted, participants, and final cost) shall be kept for future reference. Additionally we will assign volunteers to take photos.

Our chapter will consider the event successful when we have at least fifteen educators attending. Have three SPS members volunteer for the day of, and hear back from the educators that they will implement a physics activity into their classroom.

Budget Justification

We are in a rural area, so we would like to be able to host this workshop without an entry fee. We are requesting funds only for supplies and to help fund lunch for everyone involved. We are requesting these items, so the schools that attend may take their creations back with them, free of charge, and spread the newfound knowledge of physics to their students.

After initial pricing, we estimate that the workshop's items will cost around \$360. We are aware that these prices may fluctuate if we have more, or less, participants in the workshop, but hopefully we have more than anticipated. Additional funds will come from the Henderson Physics Department, and other involved clubs, to help cover food expenses and to help prepare the workshop activities, such as drilling the plywood boards.