



SOCIETY OF PHYSICS STUDENTS

An organization of the American Institute of Physics

Marsh W. White Award Proposal

Project Proposal Title	Demo Show Series Inspired by the Next Generation Science Standards (NGSS)
Name of School	University of Central Arkansas
SPS Chapter Number	1059
Total Amount Requested	\$500.00

Abstract

The University of Central Arkansas SPS performs yearly demonstration shows for approximately 1000 K-12 students. These shows hope to inspire student interest in physics through fun science demos. Our goal is to design and make available to educators five self-contained demo shows inspired by the Next Generation Science Standards (NGSS).

Proposal Statement

Overview of Proposed Project/Activity/Event

For the last few years the College of Natural Sciences and Mathematics at the University of Central Arkansas has reached out to elementary, middle, and high schools as well as other educational institutions within driving distance of the UCA campus to participate in entertaining and educational science demonstration shows. These shows are comprised of SPS members presenting a series of demonstrations to an audience of students. These presentations are designed to allow students to explore science concepts through an interactive presentation that reflects the scientific method. In a single demo, students are presented with a question such as: What will happen if a balloon is placed on a bed of nails? Several hypotheses will be collected from students about the outcome before the actual demonstration. After several students are able to voice their opinions, the balloon is placed on the bed of nails. Students are then prompted to share thoughts on why the balloon didn't pop. After a few suggestions are collected the SPS members then guide the students through the correct reasoning. Depending on the age group and the pace of the presentation anywhere between 4 and 6 demos may take place in a show saving 10-15 minutes at the end of the show to allow the students an open floor to ask any science question they wish.

On a year to year basis, SPS members work with UCA faculty to schedule demo shows. In late spring, upwards of 1000 students of all ages will attend these demo shows. Last year, demo shows were performed for upwards of 1,300 students. In the upcoming year we're predicting to have a similar number of students attend Demo shows. The

upcoming demo shows offer an amazing opportunity to show many students how fun and interesting physics can be. Our SPS chapter hopes to improve our demo shows by formalizing a series of pre-made, content-themed, demo shows. It is our goal to use these demo kits to be able to provide entertaining and educational demo shows that focus on specific content that relates to the Next Generation of Science Standards (NGSS) so that teachers can easily choose the most beneficial for the students

This project consists of five large tubs each containing a unique set of equipment and materials that can be used to demonstrate specific physics content that relates to the NGSS. The proposed shows are: “Heart of the Matter” a show that focuses on phases and properties of matter, “Under Pressure” a show that focuses on applications of pressure, “Sound & Vision” a show that focuses on light and sound waves, “Electric Avenue” a show that focuses on electricity, magnetism and circuits, and “Push It” a show that focuses on forces and motion. These shows seek to present the content in a method that engages students and makes science seem less like “class work” and more like entertainment. It is our hope that this will spark an interest in physics.

How Proposed Activity Promotes Interest in Physics

This series of demo shows is designed to present physics content to students in an entertaining, engaging, and educational presentation meant to capture students with the joy of learning. It is our hope that presenting physics as entertainment will inspire students to take an interest in physics.



SPS Demo Show May 3rd, 2016

Plan for Carrying Out Proposed Project/Activity/Event

- Biology professor Kyle Hurley reaches out to schools and educational groups to invite them to come and participate in a variety of activities including demo shows with SPS.
- Physics department secretary Nancy McDaniel coordinates with schools, UCA faculty, and SPS members to schedule field trips to campus.
- The demo shows are operated by the SPS Demo Committee, which focuses on educational outreach. Committee members and other SPS volunteers are responsible for preparing and presenting shows with the assistance with an SPS faculty sponsor.
- In addition to the actual shows, the outreach officer also plans to hold seminars to train other SPS members to provide informative and engaging demo shows.

Project/Activity/Event Timeline

Traditionally all demo shows are usually scheduled during the end of the spring semester. We anticipate that approximately 20 demo shows will be scheduled to take place during this time. For maximum efficiency, all five demo kits should be prepared by April 1st. Before the scheduled demo shows take place, members volunteering to perform demo shows will be trained through demo seminars. All evaluations gathered before the final report is due will be analyzed for the effectiveness and further use of demo shows in the following years.

Activity Evaluation Plan

A detailed account of attendance will be recorded from each show. A short survey will be given to the teachers to ensure that demo shows cover relevant content, contain accurate information, whether or not the presentation was appropriate for the age group, and collecting any comments/suggestions. SPS members will also participate in a short reflective exercise to help the individual improve their presentation abilities.

Budget Justification

In order to acquire all of the materials and equipment to put together the demo kits a budget for approximately \$1000.00 is required. Upon the acceptance of the Marsh W. White award the Department of Physics and Astronomy has agreed to donate \$500.00 to cover the difference in cost between the award and the budget created. The budget submitted covers \$500.00 of the total cost associated with the creation of these demo kits. All funds are allocated to the materials and equipment for preparing the kits so that the demos covers a wide range of NGSS topics. Each item in the budget is listed with its specific kit name, or, if the items apply to multiple kits it is designated "Various Shows." It is important to us that these kits be completely self contained. Self-contained kits will allow SPS to use equipment without worrying about creating conflict with instructor's use of the department's demonstrations for their own classes.