



# SOCIETY OF PHYSICS STUDENTS

An organization of the American Institute of Physics

## Marsh W. White Award Proposal

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<b>Project Proposal Title</b>	Physics Demonstrations for Underserved Elementary Students
<b>Name of School</b>	Brigham Young University
<b>SPS Chapter Number</b>	0706
<b>Total Amount Requested</b>	\$500.00

### Abstract

The Brigham Young University SPS chapter will present a physics demonstration show for local elementary school children to teach physics principles and promote enthusiasm for physics. In preparation, we will hold weekly activities to master the demos, learn effective teaching practices, and foster friendship and collaboration among SPS members.

# Proposal Statement

## Overview of Proposed Project/Activity/Event

- Starting on January 11<sup>th</sup>, we will hold weekly events where SPS students will gather to learn about one of the physics demos available in the BYU Physics and Astronomy Department. We will learn how the demo works and effective ways that we might teach the relevant principles to elementary students. In mid-March, we will hold an outreach activity where we will present several demos to a group of underserved elementary students that are visiting campus. We will also provide do-it-yourself demo kits to the children to take home.
- The goal of this project is to improve the experience of elementary students at outreach activities by preparing the undergraduate students that usually lead the presentation. Additionally, we want to increase the confidence and knowledge of the pool of SPS students that regularly participate in these types of activities.
- The primary audience will be the elementary students that will benefit from the demonstration presentation. We will work with the Provo Youth Mentoring program at BYU, which has strong ties to local schools and regularly brings underserved children onto BYU campus to interact with BYU student mentors. In addition, SPS members will also benefit from the weekly events by becoming better teachers, having a better understanding of the physics behind the demos, and developing friendship and collaboration among their peers.
- BYU SPS has worked regularly with local elementary schools to do physics demonstrations for their students. The BYU Physics and Astronomy Department has an comprehensive collection of physics demos, and even has a full-time staff member in charge of building and showing demos. In the past, students have helped present these demos, but sometimes they lack the knowledge of how best to use the demos to teach and spark interest among the kids. We want to bring together the tools that we have available and the eagerness of the students to maximize the experience for the elementary-aged students attending the presentations and the undergraduates presenting.

## How Proposed Activity Promotes Interest in Physics

This activity will promote interest in physics among the elementary-aged students that attend the presentation in March. Watching an exciting presentation that demonstrates a physics concept could have a lasting impact on the kids' education and hopefully steer them toward a greater interest in physics. Thanks to the community contacts within the BYU Provo Youth Mentoring program, the elementary school audience will have a large

component coming from historically underrepresented groups. Furthermore, this project will increase our undergraduate students' interest and experience in physics teaching. We feel this project fulfills the stated purpose of the Marsh W. White Award to promote interest in physics among students and the general public.

### Plan for Carrying Out Proposed Project/Activity/Event

- **Personnel:** The BYU Physics and Astronomy department employs several students to bring demos to the physics lectures. These same student employees would bring the demos to the weekly events and give a brief introduction to the demo and how to use it as a teaching tool. As the activity in March approaches, we will ask for volunteers among the pool of students that have been attending the weekly events to present at the outreach activity. The hope would be to have between 6 – 12 different demonstrations with multiple students sharing the responsibility to teach each demo.
- **Marketing:** The weekly meetings will be advertised through our standard channels of an email to all of the undergraduate physics and astronomy students. We will also promote the activities on social media (Instagram and Twitter), through flyers posted in the Science Building, and announcements in classrooms. Snacks will be provided at the weekly meetings in order to encourage students to attend. The outreach activity will be done in conjunction with the BYU Youth Mentoring Program that already brings elementary school students on BYU campus regularly.
- **SPS member participation:** From past events, we anticipate that more than 30 undergraduate students will attend the weekly meetings and hope to have 10-20 students attend the outreach event. All volunteers will come from physics and astronomy undergraduates who are members of SPS.
- **Expertise:** The student employees that run the demonstrations in classes will bring their expertise to the weekly training events. We will also invite one or two of our full-time faculty in the area of Physics Education Research to speak to us at our weekly meetings about effective teaching practices.

### Project/Activity/Event Timeline

The actual outreach event will take place in March; the exact date is yet to be determined. The weekly training events will take place on Wednesdays at 12 pm starting on January 11<sup>th</sup>.

## Activity Evaluation Plan

Success will largely be gauged by the participation from the undergraduate students and the experience of the elementary school students. To measure this, we will keep track of the attendance of the weekly meetings as well as the number of students that volunteer to participate in the outreach activity. The success of the outreach portion of the activity will be gauged by the report from the administrators of the program that bring the elementary school children to campus. We will meet with them after the activity to discuss what they liked about the activity as well as ways that we can improve.

## Budget Justification

We are putting 60% of the received funds toward creating demo kits to give to the elementary students during the demonstration presentation. We expect these kits to include items such as a cotton ball and straw to demonstrate how charges interact, a battery and a small lightbulb to teach about circuits, a compass and small magnet to show how magnetic fields work, etc. We have found this to be a fun way for the children to solidify what they learn during the presentation and further promote interest as they continue to play with their physics kit.

The other portion of the funds will go toward the weekly events, including snacks to encourage attendance and any costs that we might accrue in preparing the demonstration presentation. We believe that if we make this weekly event a positive experience for the undergraduate students, they will be more likely to continue attending and volunteer for future outreach activities.