



SOCIETY OF PHYSICS STUDENTS

An organization of the American Institute of Physics

Future Faces of Physics Award Proposal

Project Proposal Title	From Quarks to Questions: Presentations for Underrepresented Youth
Name of School	Brigham Young University
SPS Chapter Number	0706
Total Amount Requested	\$500

Abstract

Our project involves physics students from Brigham Young University creating demo kits and presenting at various schools in the Utah Valley area that have large percentages of students from historically underrepresented groups in physics. We hope to inspire the rising generation in these underrepresented groups with an interest in physics concepts.

Proposal Statement

Overview of Proposed Project/Activity/Event

The goal of this project is to inspire students from schools with high percentages of students from historically underrepresented groups in physics, so that they have an increased interest and understanding of basic physics concepts. The first step of this project will include reaching out to and contacting schools in the Utah Valley area that have populations of students with groups that are historically underrepresented in Physics. A Physics Education faculty member at Brigham Young University has provided us with a list of schools to contact that fit these criteria. We plan to organize events at 2 to 3 schools in the area where we will present a demo show and provide take-home demo kits for each of the students we present for. Our demo presentation will include demos and activities on topics such as electricity and magnetism, the Bernoulli Principle, angular momentum, and conservation of energy. Some schools we plan to contact include Lakeridge Jr High School (36% not white, 32% from low-income families) and Dixon Middle School (46% non-white, most of which are Hispanic, and 48% from low-income families).

In anticipation of the presentations, we will put together simple demo kits to provide for each of the students to allow the students to do hands-on demos with us during the presentation and for each student to take home with them afterward. Some potential items that will be included in these kits could include batteries, mini-LED lights, and magnets. We will also create simple instructional videos that will be shared after our presentations for students to be able to bring home the demo kits and continue to use them in their homes. Each video will be less than a minute and will simply explain how to use the demo equipment and explain some of the science behind why the demos work. These videos will be produced by members of the Society of Physics Students club using video equipment provided by the Brigham Young University Physics Departments.

Approximately one week before the presentations at the schools, we will hold a training event for all of the volunteers that will be performing these presentations in the schools where each volunteer will help put together the demo kits and be trained on how to present a specific demo in the presentation by a Physics Education faculty member who specializes in the creation and presentation of physics demos. After this meeting we will then be ready to go into the schools over the next few weeks to present demos and interact with students.

Our chapter of the Society of Physics Students at Brigham Young University has been heavily involved in outreach activities at STEM fairs and nearby schools over the past several months. We have many students that are trained on presenting physics demos, and we have numerous contacts at nearby schools and community daycares where we have performed physics presentations in the past. Additionally, at BYU we have specialized physics education majors and faculty that have expertise in the creation and presentation of physics demos who will be very helpful for our project. Ideally, we would like to present for approximately 100 students per school we attend, which will create an overall audience of 200-300 students in the Utah Valley area for this project who we will be able to inspire and teach regarding physics concepts.

How Proposed Activity Promotes Physics Across Cultures

At our own university we have noticed a lack in gender diversity and racial diversity among physics students. We hope that by sharing these physics demos and other demonstrations in our local

community, we can reach out to students that could likely attend our university and populate the physics program in the future. By introducing these students to exciting demos in the classroom, we are introducing them to concepts that may spark their interest in physics earlier in their academic journey. Additionally, this project will help us to create connections with these schools that can be utilized in the future. Our club has been very active in community outreach over the last several years, and we will stay in contact with these schools in the years to come to continue to address this need of sharing physics with people historically underrepresented cultures.

Plan for Carrying Out Proposed Project/Activity/Event

Personnel – All planning will be done by the Presidency of the Brigham Young University SPS chapter, faculty advisors, and the other SPS council members that meet together weekly to plan events during the year. The presenters and volunteers in our project will all come from our own Society of Physics Student membership.

Marketing – We will send out a public announcement over an email list of undergraduate students in the physics department to find volunteers that are interesting in being trained on presenting the demos. Then to set up our specific demo presentations we will reach out to science teachers at local schools that have high percentages of non-white students (this information can be found at greatschools.org/utah).

SPS Member Participation – We anticipate needing the help of 20 volunteers for this project. We have traditionally had 100+ club members participate at our monthly activities, so we are confident that we will be able to acquire the number of volunteers needed. These volunteers will help put together the demo kits, create the demo explanation videos, and present the demos. Prior to this event, they will be trained in presenting the demos by a Physics Education faculty member at Brigham Young University.

Expertise – Our club has had much experience presenting demos and interacting with youth in the past on numerous occasions such as at community STEM fairs, giving tours of the campus Science building to field trip groups, and at the local Boys and Girls club. There are also many Physics Education majors in our club that have taken classes on how to present difficult physics concepts to students. These experiences will help our volunteers have the expertise needed to make our project successful.

Project/Activity/Event Timeline

December 22 – have all of the schools already contacted and establish specific dates for presentation days.

February 23 – Finish creating explanation videos of the demos using BYU physics department video equipment.

February 28 – Hold official SPS club activity to create demo kits and train volunteers on how to present demos.

March – Presentation days. Each presentation day will be coordinated with the individual schools and teachers.

Activity Evaluation Plan

To document the success of our event we will take many pictures and videos of the physics presentations in the schools and the volunteer training activity to share and refer back to in future years. Additionally, we will have the completed demo instructional videos as resources for future years.

Following the presentations, we will also send emails to the participating teachers at the schools to ask for suggestions and thoughts about our demo presentation in their school. We hope to be able to stay in contact with these teachers to open up doors for future outreach and interaction between our university and their schools in the future. We will view the project as successful if we are able to present at and maintain in contact with representatives from 2 to 3 schools in the Utah Valley area.

We will also be able to gauge success by the number of college student volunteers. In addition to trying to help the students we are presenting for, we would like for this activity to be an opportunity for physics students to learn more about teaching physics to youth and engage with the community. We are hoping to have 20 volunteers or more that will help with creating the demos kits and presenting the demos at the schools.

Budget Justification

\$300 – Demo supplies

We anticipate creating approximately 200 demo kits, which will require lots of materials. Some of the items we plan to put in these kits could include batteries, mini-LED lights, and magnets, as well as various other materials. We anticipate the creation of these kits being our largest expense.

\$50 – food for demo kit creation and demo training activity on February 28th

By providing food at the activity, we anticipate a much higher attendance and a larger number of volunteers who are willing to assist in our project.

\$150 – Transportation of volunteers and demos in vehicle for 2-3 schools (gas and vehicle rental)

Presenting at the schools will require the transportation of numerous volunteers and all of our demo equipment. The budgeted money for transportation will cover the cost of renting a transportation van through the university for the days we are presenting as well as the gas used to travel to the schools.

Other Materials

All of the larger demos that we will be using in our presentation will be provided by Brigham Young University. Additionally, the video equipment used to create the demo instruction and explanation videos will be provided by Brigham Young University.