



SOCIETY OF PHYSICS STUDENTS

An organization of the American Institute of Physics

Marsh White Award Report Template

Instructions: Please complete each section after reading the purple text describing what should be in that section. Then delete the purple text.

Project Proposal Title	Physics Demonstrations for Underserved Elementary Students
Name of School	Brigham Young University
SPS Chapter Number	706
Project Lead (name then email address)	Matthew Ricks
Total Amount Received from SPS	\$500
Total Amount Expended from SPS	\$495

Summary of Award Activities

The SPS chapter at Brigham Young University fostered excitement for physics among approximately 40 elementary school students by partnering with the local Boys and Girls Club to bring physics demonstrations and do-it-yourself kits to an after-school educational program for underserved students. Preparation for the outreach show took place during weekly get-togethers called “midweek munchies” to socialize and learn how the demos work. The elementary school students and SPS members alike enjoyed the experience. Using supplies purchased for this event, SPS members also participated in STEM fairs for children sponsored by Brigham Young University and a local elementary school.

Statement of Activity

Overview of Award Activity

Brief Description: Our SPS chapter held several events throughout the semester (approximately weekly) to socialize, enjoy some snacks, and learn how to present several of the teaching demonstrations used in the department. We worked with the department's instructional support specialist to learn how to teach most effectively with the demos. We then partnered with the local Boys and Girls Club of Provo to visit them during one of their after-school educational programs, which are a tremendous resource for underserved children, to present the demos and provide them with do-it-yourself physics kits. To maximize the impact of training we had undergone throughout the semester and to use excess supplies for the DIY kits, we also led physics outreach events at two STEM fairs geared toward elementary school children, one organized by Brigham Young University and the other by Wasatch Elementary, a local public elementary school.

Outcomes: This project benefited the elementary school students who participated in the outreach events as well as the university students who led the events. Over 200 students participated in hands-on physics demos and activities across the three outreach events, including approximately 40 at the Boys and Girls Club, which has a large contingent of students from underserved populations. These activities promoted enthusiasm for and interest in physics and science in general. The SPS members who led the activities also benefitted by learning how to teach and engage young children, gaining a better understanding of the physics principles behind the demos, developing stronger bonds of friendship and collaboration among their student cohort, and building a passion for community outreach.

Audience: The target audience was elementary-school-aged children in the community. Over 200 students participated in our physics outreach events.

Context of the Project: This project is well aligned with other goals and activities of our SPS chapter and our department. A major point of emphasis for our SPS chapter is to build a sense of belonging among our students. This project contributed to that by facilitating weekly get-togethers for socializing and learning. Our SPS chapter is also committed to community outreach, which was the main objective of this program. Community service and outreach are also important goals for the department.

Highlights and stories: Two anecdotes are worth sharing. After one of our outreach events, a parent emailed a faculty administrator to thank the students who led the outreach activity. This parent shared how her son had always been interested in science but had not felt motivated to work hard in school. However, after attending the event and enjoying the interactions with the BYU students so much, he had a complete change of focus and committed to working hard so he can get into a good university and study physics. The second anecdote involves an elementary school student who participated in our outreach event at the Boys and Girls Club in April, and then also attended our STEM fair booth at Wasatch Elementary. When he came to our booth and recognized the physics demos and the students running the demos, his eyes lit up with excitement. He eagerly came up to us and participated in the activities, sharing everything that he remembered from the first event (and he remembered a lot!). This shows how effective these types of experiences can be for fostering excitement for science.

Impact Assessment: How the Project/Activity/Event Promoted Interest in Physics

Proposed goals of the project: Foster excitement for physics and science among local underserved elementary school students and develop teaching skills among SPS members leading the outreach events.

Commentary on proposed goals: These goals were both met. Over 200 elementary school students participated in our hands-on demo shows, and from the energy level of the students at the event and from formal feedback provided afterward, the students overwhelmingly enjoyed the activities and learned a lot. In addition, SPS members who participated greatly enjoyed the experience, became better friends, and learned how to teach children more effectively.

Assessment plan: We assessed the effectiveness of the outreach event by soliciting feedback from the administrators of the Boys and Girls Club after-school programs. The feedback came in the form of direct discussions after the event and an anonymous post-event survey. The success of involvement by SPS members was assessed by tracking attendance at our weekly events and at the outreach activities.

Assessment results: Feedback from the program administrators was positive. By consensus of the administrators, the activity was ranked 5/5 for student enjoyment, 4/5 for student learning, and 4/5 for student engagement. The administrators said they are eager to have us come again. In addition, the unsolicited feedback received from parents was very positive, as noted earlier. Involvement by BYU students was also high. We averaged more than 30 students at each of our socializing/training events, and across the three outreach activities, we had 17 distinct students participate.

Key Metrics and Reflection

Who was the target audience of your project?	Local elementary school students.
How many attendees/participants were directly impacted by your project? Please describe them (for example "50 third grade students" or "25 families").	200 local K-6 students.
How many students from your SPS chapter were involved in the activity, and in what capacity?	17 directly involved in leading the outreach activities; 30+ in the weekly socializing/training activities.
Was the amount of money you received from SPS sufficient to carry out the activities outlined in your proposal? Could you have used additional funding? If yes, how much would you have liked and how would the additional funding have augmented your activity?	The amount of money was sufficient. With more funding, we could have purchased supplies for more DIY physics kits, but we had enough for the activities we held.
Do you anticipate repeating this project/activity/event in the future, or having a follow-up project/activity/event? If yes, please describe.	Yes, we anticipate visiting the Boys and Girls Club again, possibly on a regular basis.
What new relationships did you build through this project?	We built relationships with the local Boys and Girls Club, with administrators at Wasatch Elementary School, and within the physics student cohort at BYU.
If you were to do your project again, what would you do differently?	We would do a dry run of the demo

show. Knowing how to operate and explain the demos by practicing on your own beforehand does not always translate directly to a polished delivery when you are in front of a large group.

Press Coverage (if applicable)

Not applicable.

Expenditures

Our expenses included supplies for about 200 DIY physics kits, which consisted each of a battery, magnet, light bulb taken from a Christmas light strand, compass, straw, and cotton ball. Additional expenses were the snacks and lunch food for our regular meetings to train with the demos and socialize.

Expenditure Table

Item	Please explain how this expense relates to your project as outlined in your proposal.	Cost
Miniature compasses		\$31
AA Batteries		\$168
Christmas tree lights		\$45
Straws and cotton balls		\$10
Magnets		\$40
Pita chips, hummus, cinammon rolls		\$40
Cookies, Rice Krispy Treats, Hi-Chews		\$29
Chili, chips, and soda		\$132
Total of Expenses		\$495

Activity Photos

Please include captions and credits for each photo. By including photos below, you are giving SPS and the American Institute of Physics permission to use these photos in their online and printed publications.

Note that you will be encouraged to upload high resolution copies of your best photos directly to SPS via the FluidReview site when you submit your report.



BYU student Matt Scherer works with elementary school students on their DIY physics kits that demonstrate principles of electricity and magnetism. Photo credit: Ben Frandsen.



BYU student Kristi Nuttall discusses waves with elementary school students. Photo credit: Ben Frandsen.



BYU student Levi Hancock amazes students with a levitating ball as he demonstrates the Bernoulli principle. Photo credit: Ben Frandsen.



Students and parents look on at a wave demonstration as part of the physics booth at a STEM fair organized by BYU. Photo credit: Ben Frandsen



Elementary school students learn about the principles of angular momentum that allow them to ride their bikes. Photo credit: Ben Frandsen



BYU students engage with elementary school students to teach them about various principles of physics through hands-on demos at the BYU STEM fair. Photo credit: Ben Frandsen



BYU students engage with elementary school students to teach them about various principles of physics through hands-on demos at the BYU STEM fair. Photo credit: Ben Frandsen



If you have any questions, please contact the SPS National Office Staff
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