SOCIETY OF PHYSICS STUDENTS
An organization of the American Institute of Physics

Future Faces of Physics Award Report

Project Proposal Title	Lab for Kids
Name of School	Adelphi University
SPS Chapter Number	SPS Chapter #2 Sigma Pi Sigma Chapter #124
Project Lead (name and email address)	Julianna Yee, juliannayee@mail.adelphi.edu
Total Amount Received from SPS	$231.40
Total Amount Expended from SPS	$231.38

Summary of Award Activity

To engage local high school students in STEM, the Adelphi University SPS Chapter held the event "Lab for Kids", during which chapter members volunteered to lead physics labs. Students rotated through different stations throughout the Adelphi Physics Department to perform different hands-on activities, which allowed students to understand basic physics principles. Students were given lab tours from our members currently involved in research. This outreach program not only allowed demonstrations of physics principles, but also allowed students - many of whom were part of underrepresented groups - to ask questions to our members regarding what opportunities there are in physics.

Statement of Activity

Overview of Award Activity

Groups of 6 to 7 high school students rotated between four different stations, which were run by our student volunteers. Our first station consisted of optics, the speed of light, and spectroscopy. Students were able to measure the speed of light, and experiment with refraction glasses and polarizers. They also saw spectroscopy in action using various elements (neon, hydrogen, etc.). The second station combined LED circuits and DC motors. Diagrams were provided to the students with series, parallel, and advanced circuits, which were accompanied with solderless breadboards and all the necessary components needed for them to make their own circuits. Afterwards, the high school students made their own DC motors with batteries, magnets, and wire, which they were able to take home to continue experimenting with. The third station combined various task such as angular momentum, gravity, and sound. For gravity we used a circle of pipe made by one of our volunteers with a thin elastic sheet attached across it, and encouraged the students to toss marbles/balls and add weights to it to simulate gravity's effects on celestial objects in space. We demonstrated angular momentum by allowing students to stand on a spinning platform and hold a bike wheel to see how it affects their momentum. In addition, the students also stood on the platform themselves, and moved their arms in and out to see how it affected their speed. For sound, we used boomwhackers to demonstrate how sound propagation works and sheet music was provided so the students could create music with the boomwhackers. We also used slinkys to show how longitudinal and transverse waves work. This year we also incorporated the new sound SOCK kits by setting up the Chladni Plate with speakers. Lastly, for the fourth station we demonstrated electrostatics and gave a tour of our labs. In electrostatics, students were allowed to take part in a demonstration using the Van de Graaff generator and various materials. For the tours, leading research students showed where they do their research and explained the projects they were currently working on.

This project was able to teach a wide array of subjects to a large amount of high school students in various underrepresented groups in physics. On an academic level, we were able to improve their knowledge and understanding of the several physics principles than will benefit their current and future academic careers. On a more personal level, we believe that by allowing young students to freely ask questions, and experiment as much as they want, we are able to strengthen their passion for physics--which may have not happened without this opportunity. We hope that through our endeavors, we can increase the number of students participating in higher-level STEM academics and professions, and also increase the number of underrepresented groups in physics.

Our goal was to reach out to all high school students in attendance, many of which were from underrepresented groups in the physics community. Our program touched various fields of physics while allowing the students to participate freely and in a hands on manner. We believe that all students that participated - and even our volunteers - were positively impacted by this opportunity to learn and enjoy science from a new perspective.

Our SPS chapter is always striving for inclusivity in our field, as well as increasing the number of successful students who go on to seek fulfilling careers in physics. We believe that our outreach programs will help people better understand the world around them, and seek further knowledge. With the current school curriculum often neglecting physics education, it is a main goal of ours to reach out to younger audiences and introduce them to physics so they can have a chance to enjoy it and potentially seek a future in it. It is also important that our SPS members understand how to communicate their knowledge to others in an understandable way – regardless of whether or not they intend to pursue a career in the education field. Whether it be amongst those already in the physics field, our peers, or with individuals with a basic understanding of physics, we try to provide our members with the opportunity

to use what they've learned to spread their knowledge to others, as well as learn new concepts themselves.

Impact Assessment: How the Project/Activity/Event Promoted Physics across Cultures

Our goal for this event was to provide a comfortable space to allow students of all ethnicities, genders and socioeconomic backgrounds to learn about and enjoy physics. We accomplished this goal by inviting a very diverse group of 26 high school students into our ethnically diverse department to learn about physics through different activities. Throughout the course of the event, we checked with all students to make sure they were understanding the activity and - more importantly - felt comfortable. Through verbal confirmation and observation, we were able to assess these aspects; students had very positive feedback. All students appeared to understand the activities and felt comfortable across the board. We provided a diverse environment and allowed for students of all cultures to feel comfortable about asking questions and participating in activities. For this reason, we believe this event truly awakened a curiosity in physics in all types of students. We hope that the curiosity that this event helped bring out will urge these incredibly diverse students to pursue careers in physics in the future.

Impact Assessment: How the Project/Activity/Event Influenced your Chapter

The SPS chapter members had to work together as a team to host this event. The members who lead the activities were a mixture of upperclassmen and underclassmen, so students of all ages had to work together. Additionally, our leaders were outnumbered by students, so they had to work to be efficient as a team. This teamwork strengthened our members' relationships and communication with one another. Additionally, many members developed or enhanced their teaching skills, because they had to describe physics to the students in an understandable fashion, so they would be able to execute and understand the activities. Because of this, some members realized how much they enjoy sharing and explaining information to others. Some were influenced to tutor or even consider pursuing careers in education.

Key Metrics and Reflection

The Future Faces of Physics Award is designed to promote projects that cross cultures. What cultures did your project attempt to bring together? (Please be as specific as possible.)	We aimed to reach underrepresented groups in physics including but not limited to women and racial minorities. The NYS Department of Education data from 2016-2017 has data on the school that we primarily work with (Westbury High School), which shows that majority of their population is under-represented in physics, as: 85% of their students are economically disadvantaged, 68% are Hispanic/Latino, and 29% are black/African American.
How many attendees/participants were directly impacted by your project? Please describe them (for example "50 third grade students" or "10 high school volunteers").	We had about 26 high school students attend, and 13 volunteers from our physics department. Joining the high school students were the vice principal of their high school, and their science teacher.
How many students from your SPS chapter were involved in the activity, and in what capacity?	13 of our students volunteered to assist in the running of our stations. Each student focused on one area, with the exception of a few students who went between stations to check on time management.

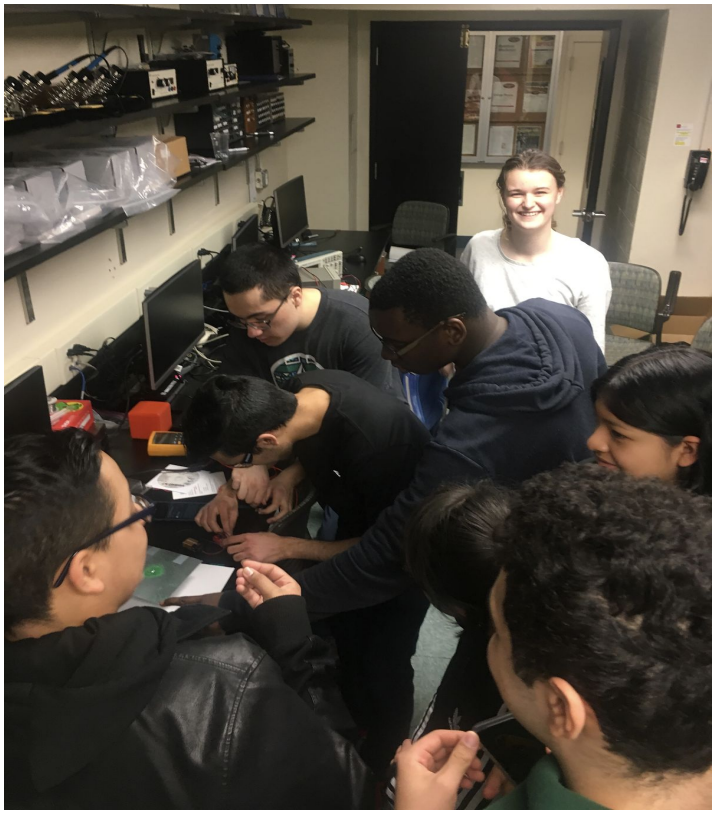
	ensure demonstrations were running smoothly, or take photos.
Was the amount of money you received from SPS sufficient to carry out the activities outlined in your proposal? Could you have used additional funding? If yes, how much would you have liked? How would the additional funding have augmented your activity?	The money we received from SPS was sufficient to carry out this event.
Do you anticipate repeating this project/activity/event in the future, or having a follow-up project/activity/event? If yes, please describe.	We have established Lab for Kids as an annual event for our chapter. We intend to repeat the event next year around the same time-- albeit with a few changes to the demonstrations at each station. We will work with the teachers at the high school for a specific date.
What new relationships did you build through this project?	Our volunteers found the teaching experience helpful to develop their own teaching styles, as well as bond through teamwork. For students in our university's STEP program training to be future educators, they were able to speak directly with the teacher and vice principal that attended the event to network and further learn about the intricacies of teaching. As for the participating high school students, they were able to take away important physics lessons, as well as a new appreciation for the field. If there was time after demonstrations, students were also able to ask our volunteers for life and academic advice.
If you were to do your project again, what would you do differently?	The primary goal would be to increase the number of demonstrations at each station (excluding the DC motor/circuit station as it fills in the time allotted as it is). We already have a few demonstration ideas to teach the students the physics of sound and wave propagation. We want to increase the number of our volunteers to better assist the students and answer their questions on a more personalized level. While we did have a volunteer specifically for taking photos, we are considering methods to improve the quality, and number of our photos of the event, as well as whether we want to invest in taking videos as well.

Expenditures

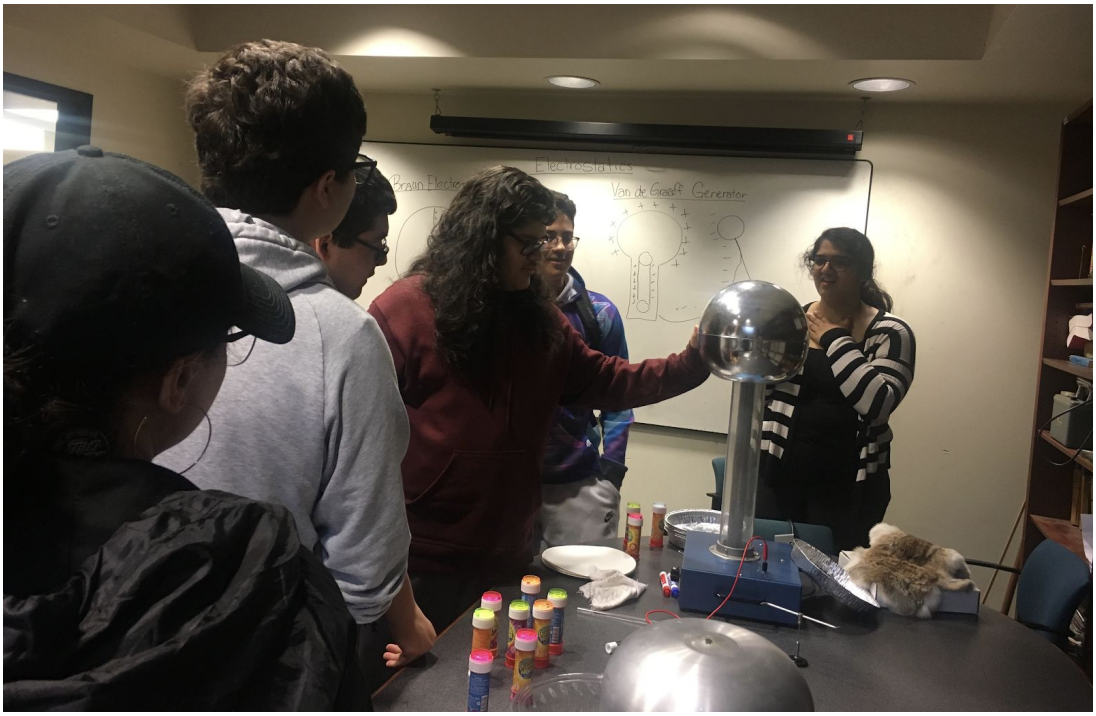
Expenditure Table

Item	Please explain how this expense relates to your project as outlined in your proposal.	Cost
Bubble World Fun Bubble Bottles (12 Pack) Bubbles for Kids - Non-Toxic Bubbles with Built-In Wand for Mess-Free Play	The soap bubbles was used in demonstrations with the Van de Graaff generator.	$18.99
Linear Polarization A4 Sheet Polarizer Educational Physics Polarized Filter Optical	The polarizer was used for the optics and light lab experiment.	$39.80
3M Wetordry Sandpaper, 9-Inch, Super Fine 400 Grit, 5-Sheet - 9085NA	The sandpaper was used during the DC motor experiment to scrap the wire.	$7.82
JORESTECH Eyewear Protective Safety Glasses, Polycarbonate Impact Resistant Lens Pack of 12 (Multi-Color)	The safety goggles are used to promote lab safety with the students and provided eye protection for students and volunteers during the experiments.	$35.97
Dritz 7216 Curved Safety Pins Size 2 Nickel-Plated Steel	The safety Pins was used during the DC motor experiment to create the motor.	$17.18
The Original Slinky Brand Metal Slinky in Blister Pack	The slinky was used during the acoustics experiment to demonstrate the different types of waves.	$31.18
YSAGI Funny Cat Catch Interactive Light Toy, 2 in 1 Chaser Toy with Laser Dot and Flashlight ti Scratching Training Tool for Cat or Dog (2 Pack)	The laser pointers were used for the optical experiments.	$55.93
GRAFIX KSF6-S Brights, 8.5-Inch, Super Sanded, 6-Pack	The clear plastic sheets were used during the optical experiments for hologram making.	$24.51
	Total of Expenses	$231.38

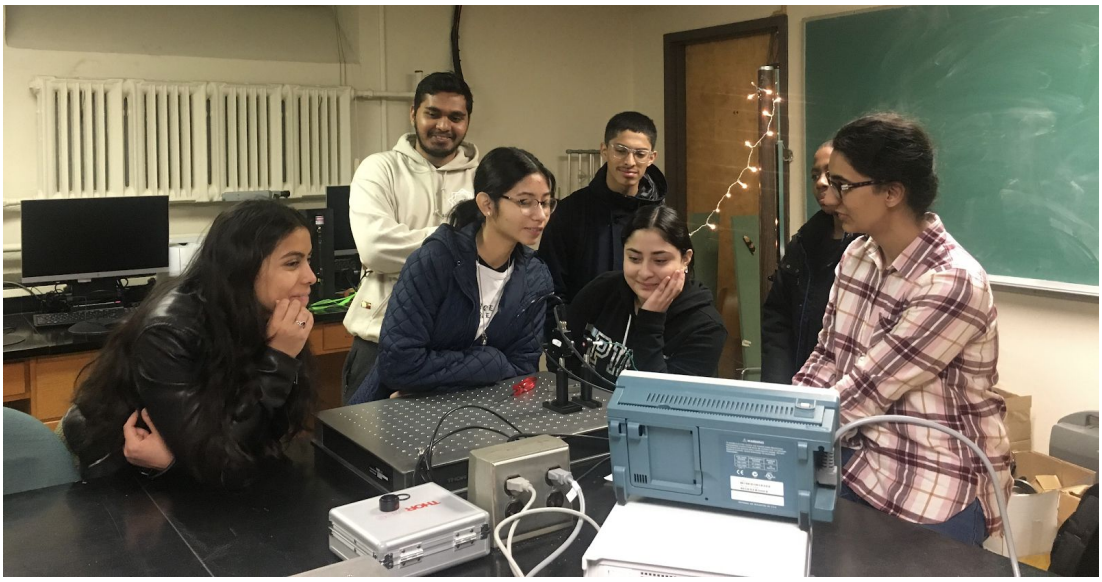
Activity Photos



Students interacting with the SOCK kit for the purpose of understanding sound waves.
- Credit: Sally Lau

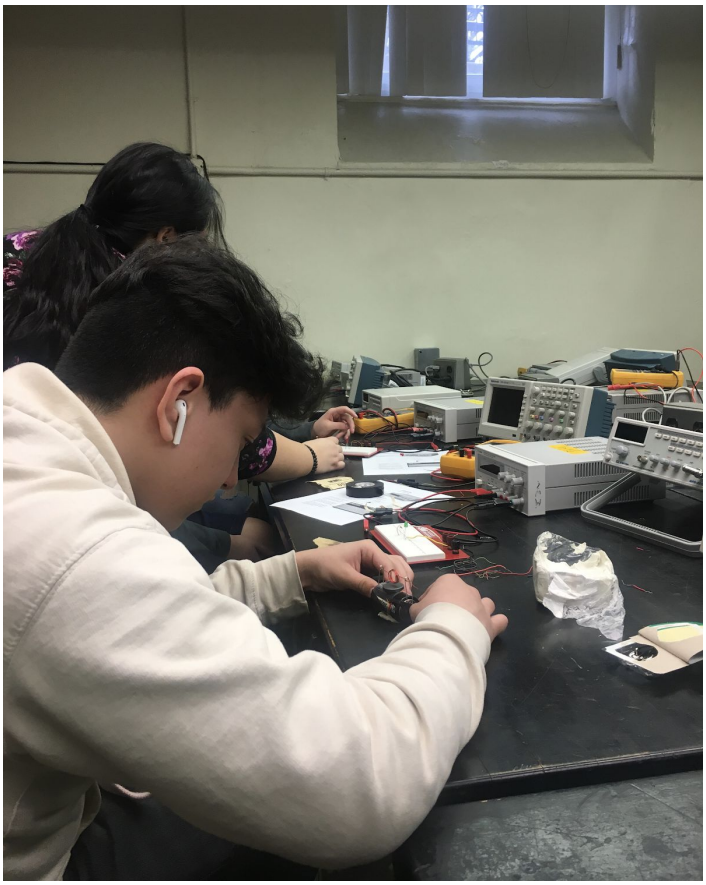


Understanding electrostatics through the interactions of Van de Graaff Generator
- Credit: Sally Lau

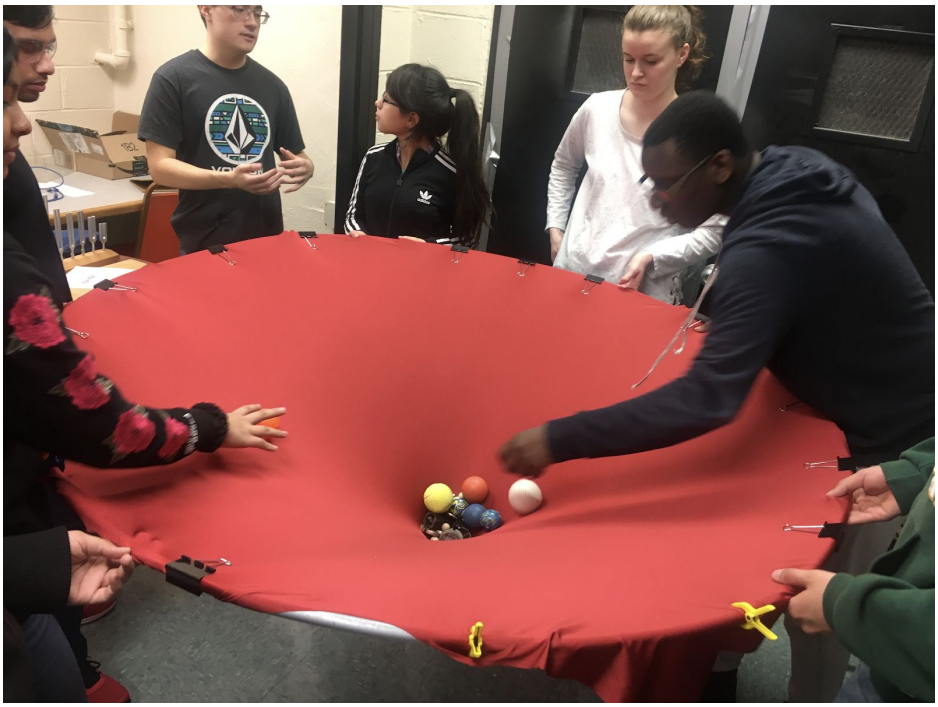


Measuring the speed of light through the use of lasers, oscilloscope, and a power supply
- Credit: Sally Lau

Students learned about polarization through 3D paper polarization glasses
- Credit: Sally Lau



Building DC motors
- Credit: Sally Lau



Using the 2017 SOCK kit to simulate gravity in space time fabric
- Credit: Sally Lau

“Like charges repel and same charges attract”
- Credit: Sally Lau

Students use slinkies to understand the difference between longitudinal and transverse waves
-Katie Gifford

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