



SOCIETY OF PHYSICS STUDENTS

An organization of the American Institute of Physics

Marsh White Award Report

Project Proposal Title	Catch That Wave! The Physics of Waves
Name of School	University of the Sciences
SPS Chapter Number	5619
Project Lead (name then email address)	Katee O'Malley komalley@mail.usciences.edu
Additional Project Leads (two lists: names then emails)	Kacy Catalano kcatalano@mail.usciences.edu
SPS Chapter Advisor	Roberto Ramos
Total Amount Received from SPS	\$500.00
Total Amount Expended from SPS	\$500.00

Summary of Award Activities

The Society of Physics Students at University of the Sciences in Philadelphia represented their club and school at The Philadelphia Science Festival Carnival on April 29th, 2017. Led by project leader, Katee O'Malley, the group prepared a variety of visual and hands-on demonstrations to exhibit the physics of waves at a carnival booth. A variety of participants of all ages from community of Philadelphia were invited to participate in the event. This outreach event helped eliminate the stigma surrounding the difficulty of physics and helped community members recognize that physics is all around us in our daily lives.

Statement of Activity

Overview of Award Activity

- Brief description – There were a total of 11 demonstrations brought to the booth that was set up by the Philadelphia Science Festival. The demonstrations were a combination of visual and hands on. Participants were able to visit the booth, watch the demonstrations, and participate in them. They were prompted with questions that helped them think about the physics of waves and how it impacts our daily lives. The demonstrations revolved around the physics of waves and included, the Physics of Music, a Voice Amplifier, Boom Whackers, a Doppler Ball, Sound Hoses, a Vacuum Bell Jar, Talkie Tapes, Chladni plates, Wave Illustrations, a Standing Wave Demonstrator, and a Wave Pendulum.
- Outcomes –The project was able to bring physics to a large amount of people of all ages. It helped fight the stigma associated with physics, that it is extremely difficult and only affecting those who are in the field. These demonstrations illustrated that physics is all around us and can be understood by all ages.
- Audience –The target audience was the community of Philadelphia. This included members of all ages, ranging from infants to the elderly. Each demonstration was explained to individual levels of understanding. There were thousands of people at the festival with close to several hundred visiting our booth specifically.
- Context of the Project – Our chapter of SPS is particularly fond of outreach within the community; our love for physics is something that we enjoy sharing. The members of our SPS were able to share their passion in the process of informing the community about physics. The department, including staff, were invited to participate in the event. Some staff helped organize the booth setup and some staff even helped explain some of the demonstrations. In addition, it gave our small department a lot of recognition from the University. We were the only organization from University of the Sciences to have a booth at the carnival and the school was very grateful and proud of our accomplishments. Overall, it was a great event that brought the department closer together.
- Highlights and stories – Alyssa Petroski, University of the Sciences Class of 2020, “I really enjoyed volunteering at the Science Carnival. My primary role was to use a hands-on demonstration to introduce the topic of waves and the types of waves to children. The kids loved playing with the demo, which was a slinky, but I was most surprised by the parents' interactions. Some parents would ask their children to repeat the information I had just taught them. I was extremely impressed by this, because parent involvement and repetition are very important in education. In addition to this, I loved watching the kids' faces light up as they learned something new about physics”.

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

The event was successful on promoting the interest among students and the general public. The Philadelphia Science Carnival had thousands of participants of all ages from infants to the elderly.

Our goals for the event were to (1) educate the general public on the fundamentals of waves so that they can better understand the world around them and (2) help eliminate the stigma and to engage the community in

2016-2017 Marsh White Award Final Report, page 2

understanding physics, and more specifically, the physics of waves. After setting up the demonstrations within our booth, participants began to trickle down the sidewalk and began to eye the colorful, musical, and interesting demonstrations we had laid out on our tables. Kids, students, adults, etc. began to walk over to our booth with awe in their eyes. The student volunteers from Usciences began a conversation with the participant by asking what they knew about waves. From the volunteers helped the participant understand what a wave was and why they are important to us. They did this by walking the participant through each demo. The volunteers then followed up with the participant to see if they were catching on to the concept, and without a doubt, they did. The visual and hands on demonstration allowed the participants to understand, visual, and connect the concept of waves to their everyday lives. Through this we impacted a vast amount of the general public on their knowledge of waves and made it clear to them why it was important. By using the method of hands on interaction, we made it possible for the general public to not fear the concepts of physics and help eliminate the stigma that physics always has to be difficult.

The proposed assessment plan was to have participants fill out a survey after they finished with all of the demonstrations. The survey asked three questions: (1) What was your favorite demonstration? (2) What physics concept did you learn today? (3) What would you like to see next year? Unfortunately, the surveys were an inadequate way to gauge success of the goals. Due to the heavy flow of people through the booth and the heat, it was not easy to have participants fill out the surveys. Instead, volunteers were told to engage the participants in repeating the physics concepts and asking them to recall what they have learned. We found that the participants were very responsive to this exercise showing that they were understanding the physics behind the waves.

Key Metrics and Reflection

Who was the target audience of your project?	Community of Philadelphia, All Ages
How many attendees/participants were directly impacted by your project? Please describe them (for example “50 third grade students” or “25 families”).	Thousands of Participants
How many students from your SPS chapter were involved in the activity, and in what capacity?	9 SPS members were involved in the activity. Each member made their contribution to preparation for the event, set-up for the event, participating in the demonstrations, and clean-up for the event
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 only additional funding required was to have a table at the carnival that was paid for by the university.
Do you anticipate repeating this project/activity/event in the future, or having a follow-up project/activity/event? If yes, please describe.	Yes, this was the second year that our chapter of SPS was at the carnival and we plan to continue the tradition
What new relationships did you build through this project?	We were able to network with a lot of people at the carnival. Some people within the industry, some local school and organizations that would love for us to come to their site to have demonstrations for their students
If you were to do your project again, what would you do differently?	While I think there were plenty of demonstrations, there is always room for more

Press Coverage (if applicable)

<https://www.usciences.edu/events/philadelphia-science-festival/>

Expenditures

All of the expenses provided by SPS were used to buy items for certain demonstrations. The extra funds were absorbed by our chapter's school budget. The Physics Department at USciences covered the cost of the booth at the carnival. The breakdown of the funds is listed below. The number of the cost includes the item, tax, and shipping and handling. Unfortunately, the only demo that did not get received in time was the speakers for the proposed demonstrations of 'dancing non-Newtonian fluid', however, these speakers will be used for outreach in the future.

Expenditure Table

Item	Cost
Speakers	90.95
Voice Amplifier	9.97
Wave Demonstrator Set	18.97
Vacuum Bell Jar Set	64.95
Wave Pendulum	69.90
Doppler Ball	15.00
Talkie Tape	16.00
Standing Wave Machine	52.64
Musician Tool Kit	43.19
Maracas	23.98
Mechanical Wave Driver	138.15
Total of Expenses	543.70

Activity Photos



Figure 1: SPS members and University of the Sciences Professors teaching the participants of the Philadelphia Science Festival Carnival all about waves! From left to right Dr. Tarlok S. Aurora, Dr. Sergio Freire, Karla Miletic, and Kacy Catalano



Figure 2: Some of the setup of our demonstrations



Figure 3: SPS Member Austin Vantrease teaches a participant about the Doppler Effect



Figure 4: SPS Members prepare for the event. From left to right: Alyssa Petroski holding a musical triangle, Katee O'Malley holding maracas and a boom whacker; and Depsina Nakos holding a slinkie



Figure 5: SPS member and president, for the 2017-2018 school term, Alyssa Petroski demonstrating the physics of music



If you have any questions, please contact the SPS National Office Staff
Tel: (301) 209-3007; Fax: (301) 209-0839; E-mail: sps-programs@aip.org