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

Marsh White Award Report

Project Proposal Title	Crash Course in Fundamental Force
Name of School	University of Florida
SPS Chapter Number	8599
Project Lead (name then email address)	Foster Sabatino fsabatino@ufl.edu
Total Amount Received from SPS	$245
Total Amount Expended from SPS	$245

Summary of Award Activities

"Crash Course in Fundamental Force" was a series of demonstrations put together by the University of Florida chapter of Society of Physics students in order to increase the public's general knowledge and interest towards science. This goal was attained by frequently engaging with the public at a local science museum and other public places within the city of Gainesville.

Statement of Activity

Overview of Award Activity

The project first started with the devoted members and officers of the UF chapter of SPS. Many of us would travel across town in order to find either new or reused miscellaneous items that we could use to create physics demonstrations. After creating said demonstrations we promoted the days we would be showing off the demonstrations. We performed said demonstrations across the city of Gainesville at local parks but especially at the local science museum.

When we presented the physics demos, we would attract masses of people. The members of our chapter would explain the demonstration and the underlying physical phenomena occurring in a way that was simple to understand and encapsulated the main idea of the demo.

The students and local families of Gainesville were our audience and every day we presented, we would interact with around 60 - 100 different individuals. This project worked especially well with the other activities of our SPS chapter. We are constantly in need of demos for various volunteering events and science outreach. Such an example is the International Day of Women and Girls in Science. Our SPS chapter and department heavily promoted a science day fair at a local park for this special day. After our chapter reached out to various science clubs on campus, we had around 7 different clubs attend and put on science demonstrations in their respective fields e.g. , chemistry, geology, biology. Using the physics demonstrations we had made, we were able to increase the public's interest in physics and the sciences in general. There aren't exact anecdotes, but many adults showed extreme fascination with the topics we were explaining. Many people would tell us how our demonstrations changed the way they look at certain phenomena and where it occurs in everyday life. After talking with many of the families who came to our demonstrations we knew we had achieved our goal of promoting interest in physics.

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

The demonstrations were deemed overall a success. The main goals of the demonstrations that were satisfactorily met were the following:

- a basic understanding of electromagnetic induction through the eddy pipe
- light dynamics through plastic diffraction glasses and the glass prism
- a demonstration of tension through beads self-propelled out of a mason jar
- a visualization of different modes of wave propagation by a Slinky
- a visualization of magnetic field lines by iron filings suspended above a magnet
- an introduction to the geometry of planetary orbits through a gravity well demo
- an introduction to chaos through a multi-armed pendulum
- brief overview of pressure through the vacuum jar

The general results of the activity was positive feedback from the participants. Kids enjoyed exploring and learning from the demos, parents also enjoyed primers on the relevant physics.

To assess our performance we originally intended to use a small survey to gauge how many people were attending our presentations and also to see how impactful our presentation was for each individual. We quickly found out that having discussions either one on one or in a small group was a much better way to assess our performance. Additionally, we had physics professors, physics majors, and non - physics majors attend our presentations. When speaking with each of these groups we found that our demonstrations were an overall success. We were able to convey exciting and accurate information in a way that the general public could understand.

Key Metrics and Reflection

Who was the target audience of your project?	Families of children near a local science museum
How many attendees/participants were directly impacted by your project? Please describe them (for example "50 third grade students" or "25 families").	60 families
How many students from your SPS chapter were involved in the activity, and in what capacity?	Approximately 10 students managed and explained demos at the day fair and constructed the demos
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?	Only one demo suffered shortcomings due to funding, the multi-armed pendulum.The materials used were not of the highest quality. With an additional $100, we could build and weld a better mount and build it in a way that would allow use for years to come in similar activities.
Do you anticipate repeating this project/activity/event in the future, or having a follow-up project/activity/event? If yes, please describe.	This has been an annual event for several years, and we hope to repeat this activity for several more years to come. We may slightly vary the demonstrations, but it will largely remain the same.
What new relationships did you build through this project?	One of our professors spearheaded our activity's alignment with the UN's Women in Science Week, Peter Hirschfeld. Professor Hirschfeld has grown closer to the club in this collaboration. Additionally, we had glancing interactions with LSU professor Gabriela Gonzales when she gave a lecture at the Alachua County Public Library
If you were to do your project again, what would you do differently?	We would build more sophisticated demos. With more preparation and funding, we can create more and better demonstrations.

Press Coverage (if applicable)

N/A

Expenditures

We were able to create more demos than originally anticipated by going to a local business that resold miscellaneous items that we needed at a much lower price than expected. Items we could not find here were either bought in stores or online for the prices we expected them to be. We purchased a Nerf Gun, bike wheel, vacuum bell jar, a copper pipe, neodymium magnets, a glass prism, tuning forks, springs, an electroscope, an electrostatic kit, a large cloth, pvc pipe, a wooden stand, and metal piping. Our total expenses were approximately $490 , $245 worth of supplies purchased with SPS funding.

Expenditure Table

Item	Please explain how this expense relates to your project as outlined in your proposal.	Cost
Slinky	The Slinky was used to demonstrate waves, both longitudinal and transverse.	$11.00
Vacuum Bell Jar	The vacuum bell jar was used to show various phenomena dealing with pressure.	$120.00
Neodymium Magnets	The neodymium magnets were used with magnetic filings to manipulate the magnetic material inside as well as with the copper pipe to show Lenz's Law with induced magnetic fields.	$10.99
Glass Prism	The glass prism was used to demonstrate the diffraction of light into its separate wavelengths and explaining the light's wave properties.	$10.97
Copper Pipe	Used with the neodymium magnets to show Lenz's Law.	$10
Large Cloth	Used to create gravity well demo.	$4
PVC Pipe	Used to create gravity well demo.	$24.20
Wooden Stand	Used as base for pendulum.	$18.84
Metal Piping	Used for arms of pendulum.	$35
	Total of Expenses	$245

Activity Photos

University of Florida Society of Physics Students after the International Women and Girls in Science day fair