



SOCIETY OF PHYSICS STUDENTS

An organization of the American Institute of Physics

Future Faces of Physics Award Proposal

Project Proposal Title	"Fall" in Love with Physics!
Name of School	University of the Sciences
SPS Chapter Number	5619
Total Amount Requested	\$425.84

Abstract

Our SPS chapter at the University of the Sciences wants to be as influential as possible to underrepresented groups in STEM. For this project we will go to St. Francis de Sales (economically disadvantaged, with a high population of minority students) and present influential gravity and potential energy demonstrations in multiple sessions.

Proposal Statement

Overview of Proposed Project/Activity/Event

Brief description - Our chapter of SPS will travel to the middle school and break students in the class into groups. One to two members of SPS will supervise each group and guide them through multiple activities involving the physics of “falling,” including (1) egg drop experiments, (2) modified free-fall experiments with spin (Magnus effect), (3) optical illusions of levitation (levitating water droplets), (4) inertia experiments with falling polymer beads, (5) dynamics of a coin vortex and (6) energy transformation in free fall.

Goals of the project - Middle school is an influential time in a student’s life. In fact, many young girls lose their interest in science by middle school. We hope to inspire these students to consider careers in physics by showing them fun and interesting demonstrations and allowing them to build their own DIY (do-it-yourself) experiments, like an egg drop cradle and Magnus effect-powered hovering paper cups. We hope to generate more interest in physics as well - helping students “fall in love” with physics, so they will consider taking more physics and science classes in high school. We will ask the students to fill out questionnaires after the event in order to gauge their feelings and receive feedback.

Intended audience - Our intended audience is a high population of minority middle school students from the economically disadvantaged West Philadelphia school district.

Background and motivation - Every year, our chapter of SPS works very hard to do multiple outreach events, because we care about spreading our love for physics and inspiring the younger minds. We place special emphasis on providing outreach events to students who are typically not represented well in the fields of physics and STEM. We pick topics that we ourselves are interested in, but that also are fun to demonstrate and explain to others. This year we chose gravity and energy. We chose St. Francis de Sales because it is close to our university, with a middle school that has a high minority and economically disadvantaged population. Our university is looking to partner with the school in the future to develop STEM activities - which we can complement with our outreach.

We are planning to be set up in one of the science labs at St Francis de Sales. There will be a group at each table, along with one or two SPS members to explain and help the students work the demonstrations and to build their own experiments. The students will be divided into groups by their teacher. Each group will spend almost the entire period together and will work through several experiments. After the time in groups, all SPS members will showcase several other demonstrations to the whole class.

How Proposed Activity Promotes Physics Across Cultures

Our event will take place at St Francis de Sales Middle School. St Francis de Sales is known to have lots of different traditionally underrepresented groups and minorities in physics, and by introducing them to interesting experiments and letting them learn hands-on the awesomeness of physics could inspire them to pursue futures in physics. Our goal is to open physics to minorities and underrepresented groups, and encourage them to explore their full potential as scientists. A few of our chapters’ members that are in the demographic of the underrepresented groups in physics will attend this outreach to show the students that everyone can do physics

no matter the background. This can be an opportunity for us to build some type of relationship with the students and help steer them to the direction in physics or STEM.

Plan for Carrying Out Proposed Project/Activity/Event

- Personnel - SPS Member and Vice President Alyssa Petroski will be the student lead, SPS members Despina Nakos, Ryan Hess, Edward McLaughlin and Gabrielle Moss will serve as group leaders, and our SPS advisor Dr. Ramos will be on hand to assist the SPS members. Additionally, another 4-6 SPS members will be on hand to help.
- Marketing - We will supply the school with flyers and an event description one month prior to the event. Teachers at the school will explain to their students that our group will be visiting, and will also encourage participation.
- SPS member participation - We expect 5-11 SPS Members to assist with the event.
- Expertise - SPS members will use their knowledge of physics and gravitational energy to explain demonstrations. Dr. Ramos will provide additional insight if needed.

Project/Activity/Event Timeline

Early February 2020 - All demo orders will be placed. A time and day for the event will be established with *St. Francis de Sales School*

Late February/Early March 2020 - SPS Members will begin familiarizing themselves with the demonstrations. Each student group will write-up an explanation of the experiments in anticipation of the event.

Late March/Early April 2020 - The day prior to the event, all participating SPS members will meet for a final review of the demos, and the entire group will run through a simulation of the event.

Late March/Early April 2019 - SPS Members will travel to St. Francis de Sales to present on gravitational potential energy to middle school students. Immediately following the event, surveys will be distributed to students to determine the impact of our event.

Late April 2019 - Additional follow-up surveys will be distributed to the students who attended our event to determine the lasting impact.

Activity Evaluation Plan

SPS members will take note of the backgrounds and the number of students in attendance and how they participate. Immediately following the event, students will be given a survey, which will tell us what demos they liked, what they did not like, what we can improve for future events, and if they would consider pursuing physics in the future. If a diverse group of students does indicate that they are more interested in physics after our event, we will consider it a success. If the results of a follow-up survey, to be distributed a couple of weeks after the event, still indicate that the students are interested in physics, we will consider our event a major success.

Budget Justification

Our chapter of SPS does not have the kits and demonstrations necessary for teaching students about gravity. We would like to purchase these kits so every group of students has the opportunity to build their own experiment and has the opportunity to experience physics hands-on. Some of the demonstrations we are bringing the students will be able to do at home. By purchasing these familiar materials, we can show students that science and physics are accessible at home. Additionally, the demonstrations are fun and will help maintain the students' interests. With these physics demonstrations we can impact more middle school students and encourage them to consider a physics or physics-related career. The budget will also cover transportation to/from the site using the most efficient way. We will be using one of the SPS member's car to transport the demonstrations and the other team members will meet up at the middle school.