



SOCIETY OF PHYSICS STUDENTS

An organization of the American Institute of Physics

Future Faces of Physics Award Proposal

Project Proposal Title	Patching the Pipeline
Name of School	Drexel University
SPS Chapter Number	1619
Total Amount Requested	\$155.01

Abstract

Drexel University SPS hopes to take a small step toward tackling the underrepresentation of women in physics by organizing outreach events at local all-girls high schools. Our goal is to break down the stereotypes surrounding physics and show girls that physics is fun, accessible, and a viable career option.

Proposal Statement

Overview of Proposed Project/Activity/Event

The Drexel University Chapter of the Society of Physics Students will expand our Future Faces of Physics project from last year. As a way to address the underrepresentation of women in physics, we will organize outreach events at a minimum of three local all-girls schools and present a physics workshop at the 2014 CATALYST Conference. Last year Drexel SPS taught five sections of physics classes for a day at Little Flower Catholic High School for Girls.

We will organize events specifically at all-girls high schools in order to reach the greatest number of local girls. Our outreach events could take on various forms depending on the exact school. Possible events include teaching physics classes for a day, a larger assembly-style presentation, or visiting an existing after school program. Regardless of the specific format of our event, we will utilize SPS's existing physics demos to create a hands-on presentation. Popular demos include the angular momentum wheel, conservation of energy roller coaster, Lenz's Law tube, Gauss rifle, and a can crushing experiment. We will consult with the teacher at each specific school in order to choose demos that complement and build on concepts the girls have recently or will soon learn in school. We will end each session with a group discussion about the role women play in science, what it's like to study science in college, and answer any sorts of questions the girls may have. We collected feedback from the girls at Little Flower High School after our presentation last year, which we will use to improve our presentation this year. We asked the girls if they had any questions, and we made a list of common questions many of the girls had which we will be certain to address in our open discussion at the end of the presentation.

The CATALYST conference is organized by Swarthmore College every year and is a STEM conference for middle school girls which includes workshops in chemistry, math, biology, computer science, engineering, and physics. We will present a physics workshop about magnetism and have the girls make and decorate their own cork compasses to take home. We will also conclude our workshop with an open discussion. Since these will be middle school girls instead of high school girls, we will focus more on the perception of women in science and the transition into high school rather than on focusing on college and career choices. We will adapt our list of common questions (developed from feedback from Little Flower) so that they are applicable to middle school girls.

How Proposed Activity Promotes Physics Across Cultures

The issue of diversity is of great interest to the Drexel University Department of Physics, especially the underrepresentation of women in physics. Oftentimes, the track taken by women in physics is considered a 'pipeline' from grade school to becoming tenured faculty, and the underrepresentation of women is a result of breaks in this pipeline. Breaks occur at major transition points (i.e. high school to college, college to graduate school, etc), and at each break, more women 'leak' out of the pipeline. Over time, this results in the underrepresentation of women in physics that we see today.

Drexel SPS will attack the local leak from middle and high school to college by specifically reaching out to middle and high school girls. Our goal is to show girls that physics is both fun and accessible, get them to consider that a career in science *is* an option, answer questions about the transition from high school to college, and to break down stereotypes surrounding physics that are perpetuated by popular shows like The Big Bang Theory. We intend to do this by organizing outreach events at local all-girls high schools and presenting a workshop at the 2014 CATALYST conference.

Plan for Carrying Out Proposed Project/Activity/Event

- **Personnel:**
 - An interested senior SPS member will be appointed as project leader
 - We may choose to have several project leaders, one in charge of the high school outreach and one in charge of the CATALYST Conference workshop.
 - The project leader will be responsible for organizing logistics and preparation for the event (point of contact, scheduling meetings, arranging transportation, etc.)
 - Progress will be monitored by correspondence with Drexel SPS Chapter officers and updates to the general body at our weekly meetings
- **Marketing:**
 - Email is our primary marketing tool to get in touch with local high schools and the CATALYST conference. We will improve the email we send to local high schools this year in order to garner more responses.
 - We will also attempt to network through our contact at Little Flower High School. She greatly appreciated our visit last year and may be able to help us contact other local teachers more directly.
- **SPS Member Participation:**
 - We expect ~ 6-10 SPS members total to participate at each high school outreach event. This number varies depending on the length of the event. For example, when we taught classes all day, we worked in shifts to accommodate SPS members' schedules. Working in shifts also allowed more members to participate.
 - We expect ~ 4-8 SPS members to help run the workshop at the CATALYST conference. The number of volunteers also depends on the number of workshop sessions we offer.
- **Expertise:**
 - For any event we host, we require some volunteers to be SPS officers or senior SPS members who have participated in SPS outreach events in the past. Our goal is for the remaining needed volunteers to be newer members so that they can gain experience.
 - We also perform 'dry runs' of our events with our volunteers before the actual event to address any questions or concerns about the material we are presenting and to make sure everyone is comfortable and knowledgeable about the material.
 - We had students from last year's event at Little Flower High School write short reflections on what they learned from our presentation. We will use their responses and feedback from their teacher to improve our outreach events this year.

Project/Activity/Event Timeline

- **November:** determine project leader(s), create list of schools to contact
- **Mid-December:** begin contacting local all-girls high schools
 - Determine interested schools
 - Determine presentation style (teach class, assembly, etc.)
 - Discuss curriculum, what the teacher would like to see
 - Set a date for outreach
- **January:** plan specific demos, outreach, gather volunteers
- **Late January:** find out if received Future Faces Award
- **February:** plan CATALYST conference workshop, order supplies
- **February and March:** outreach to high schools
- **March:** CATALYST conference
- **April/May:** additional outreach (dependent on interest from schools and availability of volunteers)
- **May:** write final report

Activity Evaluation Plan

One way we will gauge the success of this project is by the number of high schools we organize events at, which of course is proportional to the number of girls we reach. Last year, we emailed more than five schools, and only one responded. Our goal is to organize events at a minimum of three schools this year.

At the high school outreach events, we plan on having the students complete a short survey both before and after our outreach event. All students will answer questions based on a number scale (5 = strongly agree, 1 = strongly disagree) regarding how they feel about science, whether women can do science, if they think they would want to pursue a career in science, etc. For the more senior students, this form may also include short science questions based on the demos and concepts we present. We hope that using before and after surveys will help us gauge the impact we have on the students. We plan on having a similar survey at the CATALYST Conference, but it will only be a post-survey.

Budget Justification

To fund the outreach events to local all-girls high schools and a workshop at the CATALYST conference, Drexel SPS is requesting \$298.01. We do, however, have approximately \$143 remaining from our 2012-13 Future Faces of Physics Award, which we will use towards this year's budget. This brings our total request down to \$155.01.

A large portion will cover the travel expenses of our volunteers to these events. We want all of members to be able to volunteer regardless of financial concerns. The remainder of the budget is to purchase supplies to make small bar magnet compasses at the CATALYST conference. We feel very strongly that the workshop should include a make-and-take project to remind the girls of what they learned and to take home to show their parents. We think this is a great way to engage students, particularly younger ones, and to really reinforce the concepts we present.

Any incidental costs that we have not accounted for will be funded by either the surplus from our 2012-13 Future Faces of Physics Award (after conference materials have been purchased) or from Drexel SPS fundraising events.