

Future Faces of Physics Award Proposal Supplement

Project Proposal Title	Future Faces of Physics and the Higher Education Support Program
Name of School	Colorado School of Mines
SPS Chapter Number	1287
Total Amount Requested	\$300.00

Abstract

SPS at Colorado School of Mines will visit two underprivileged or underrepresented schools to promote science education outreach and the value of college studies. We will present physics demonstrations, discuss the value of a college education, and describe careers in engineering and applied science.

School Activities

Event Description:

The goal of the Future Faces of Physics (FFoP) award, as described by SPS national, is to “promote the recruitment and retention of people from groups historically underrepresented in physics.” To achieve this goal the Colorado School of Mines (CSM) SPS chapter will visit a local middle school and a local high school where pursuit of higher education for students, especially in engineering and physics, is low. During our visit, we will educate the students by showing them some fascinating physics demonstrations while explaining how physics and SPS have shaped our college experience and help them to identify steps they can take to get prepared for college. After the large auditorium presentation we will break into smaller groups to talk with serious students about questions they have about science, engineering, and attending college. Lastly, we will set aside time to do a make-and-take workshop with some of the students.

Activities which are not strictly focused on physics will include discussions and presentations on the importance of staying in school and completing a secondary education, the benefits of attending college, how to apply to college, how to finance a college education, and our specific college experiences in the physics and engineering programs at CSM. We will also extend the opportunity to interested students to visit one of our research labs on campus where one of our physics faculty has volunteered to show students his physics research and its medical applications.

Event Activities and Setup:

For many of these underrepresented and at-risk students there has been little opportunity to see science or engineering in person, moreover many of them will not seriously consider the possibility of attending college in general. Our goal is to show the younger generation that math, science, engineering, and a higher education

can be something new and interesting, and can be a rewarding life choice for many students. In order to make this event as accessible as possible, we will have to visit during the school week so that we can meet with the students who have difficulties making time otherwise. An example agenda may look similar to the following:

8:00 am	Meet on CSM campus and travel to school
10:00 am	Arrive at High School or Middle School
10:00 – 10:30 am	Meet with teachers, discuss science curriculum and challenges
10:30 – 11:00 am	Setup event
11:00 am – 12:15 pm	Assembly style presentation and demonstrations for students
12:15 – 1:30 pm	One-on-one personal interactions with students (during lunch or in classes)
1:30 – 2:00 pm	Pack-up equipment and prepare make-and-take demo workshop
2:00 – 3:00 pm	Make-and-take workshop
3:00 – 3:30 pm	Review of days activities with teachers and discussion of lab tour at CSM
3:30 – 5:30 pm	Drive back to CSM Campus

Because schools may have differing schedules, this agenda may be modified to fit what the school can accommodate. Similarly, we will vary our content based on the audience we will have. During our visit to Berry Creek Middle School we plan on spending as much time as we can educating and motivating the kids in order to plant the seed of interest in science and physics. For the older students at Gateway High School, we will spend more time discussing what college is like and the resources available to them to make college more accessible. Part of this proposal, the Higher Education Support Program, is entirely dedicated to giving these students a line of communication to us should they need input regarding college such as, applying to colleges, what it is like, or how they can finance a college education.

Demonstration and Make-and-Take Activities List:

During the presentation section of the day we plan to demonstrate some of our biggest and best, large scale demonstrations, including:

- Van-der-Graaf Generator – Showing static electricity and its effects on various objects
- Laser Painting – Using Glow-in-the-Dark paint to show phosphorescence
- Anti-Gravity Wheels – Weighted wheels that can roll up a ramp, defying gravity
- Angular Momentum – Rotating tables and wheels to show angular momentum

Besides the demos we already have, we would also like to create a new, large-scale demo specifically for this event. The Bead Chain Experiment involves a long string of bead chain flowing from a large beaker; the beads seem to defy gravity as the chain falls. This kind of experiment is perfect for our event as it is as awe inspiring as it is simple to show.



Illustration 1: Bead Chain Physics Demonstrations,
<http://www.geek.com/wp-content/uploads/2013/06/beads-590x330.jpg>

For the make-and-take activity, we chose an experiment which would have a quick and straight forward construction with a result which is unexpected and possibly hard to fully understand at first thought. The homopolar magnet experiment is not only easy to make, but it is fascinating to watch and learn about. By taking a AA battery, copper wire, and neodymium magnets, the students will easily create their own spinning motor which they will be able to explain to their families when they get home.

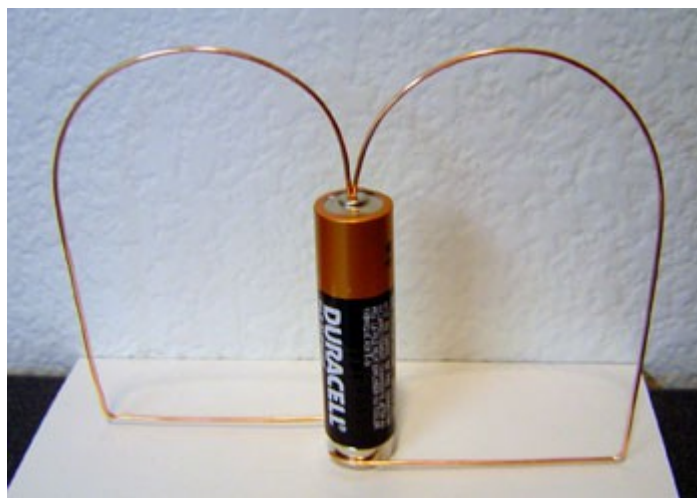


Illustration 2: Homopolar Motor Demonstrations,
<http://wohba.com/blogimages/motor0307.jpg>

Budget Explanation and Adjustment

Budget Adjustments:

In the original Future Faces of Physics proposal, it was mentioned that our chapter had two schools specifically in mind for this program as they had shown substantive interest by going as far as writing us a letter of support for our original proposal. We plan to continue with these schools as we move forward with this

event despite the large mileage between the schools and the CSM campus. Because of this, we would like to request 90 dollars for travel, consistent with the SPS mileage rates, and will use other funding opportunities to make up the difference in travel costs.

The remainder of our proposed budget is focused on creating a new demonstration for a large-scale audience and on providing materials for a make-and-take workshop. Many of our demos are safe for use in a hands-on learning environment with a small audience; we need to develop some new material to show to a large audience on a stage. Alongside this, we have also dedicated a portion of the budget to take-home items and a project that we can help students build and understand. Because we want the material we show them to be as applicable to their everyday lives as possible, we will show them physical process they encounter on a daily basis. Diffraction is a common natural phenomena that we can demonstrate and explain to the students using diffraction glasses. Inexpensive diffraction glasses are readily available and we will be able to leave the students with these glasses after the event.

Conclusion

We are extremely excited for this event. This is the first time our chapter has brought physics to underrepresented or underprivileged grade school students through school visitation, large demonstrations, and a system to help students achieve their goals using a tool like the Higher Education Support Program. We're also excited to give these students the opportunity to meet a physics professor and to see, for the first time for many, a true physics research lab. Though we are only requesting \$300 dollars we will be spending more than that with money from our department and from other people who would like to see this event be a success. Your support will help us as we initialize this event; it will help make it better and to continue this program in the following years.