



SOCIETY OF PHYSICS STUDENTS

An organization of the American Institute of Physics

Marsh W. White Award Proposal

Project Proposal Title	Phenomenal Fields of Physics
Name of School	Rhodes College
SPS Chapter Number	5940
Total Amount Requested	300.00

Abstract

The Rhodes College Society of Physics Students will host a science day for kids in grades 6-12. The goal of this event is to spark the curiosity of the students and interest them in the sciences.

Proposal Statement

Overview of Proposed Project/Activity/Event

We intend for this event to engage the students in the sciences by exposing them to thought-provoking scientific demonstrations. We have, for the past three years, used this funding to participate in the Rites to Play children's carnival, an event hosted by our college that that . Thanks to the funding, we have been able to give Rites to Play an extremely successful scientific component, with around one thousand kids attending. Because Rites to Play is now completely stable, we will create a new event with the sole intent of science education. This year we will use the funding to create a new and separate event which we presume will be similarly successful, but with a different audience. This event will be targeted at kids in grades 6-12, an audience that is usually overlooked by our usual outreach activities. We also have an extended goal: to teach the kids in such a way that they will retain what they have learned. For us, this is ambitious, but we believe with some well-placed effort it will be rewarding both to us and to the children.

We will be focusing on 6 fields of physics. They are Pressure, Magnetism, Electrical Conversions, Visual Acoustics, Engineering, and Energy Conversions. The demos that we are planning on using to demonstrate those fields are the Theremin, Vanda Graff generator, electric bike, fire tornado, ooblick speaker, Rueben's tube, flux trapping, tiny computer, thunder tube, can implosion, bridge building, and several centripetal motion demos. We will have 6 stations set up where we will have people giving presentations on one of the fields by using the demos as points of explanation.

We will start off with a 10-15 minute introduction session, where we will give a brief overview of the event, as well as ask and answer questions to gauge where the students' understand of the material is. After this intro, we will have the students split up into one of the six stations, and have them rotate through until they have had exposure to all 6 fields. After this we will, bring everyone back together and have a large session to tie in everything they have learned in the day. We will take this as an opportunity drive home a lot of the concepts as well as explain these fields in larger systems.

How Proposed Activity Promotes Interest in Physics

The purpose of this project is to expose middle and high school students to several different aspects of physics. By showing them great phenomena from six fields of physics and exposing the students to the theory behind them, we are fostering a sense of curiosity and wonder. Our plan is to teach and amaze in a way where the students will leave the Phenomenal Fields of Physics Day with the urge to continue learning science and developing their curiosity.

Plan for Carrying Out Proposed Project/Activity/Event

- This event will be led by Edo Draetta, currently a junior physics major at Rhodes College who has been highly active in our outreach program since his freshman year. He will have the constant support of our

Outreach Officer Zain Kinnaire and the entire Rhodes SPS officer corps for all leadership and organizational tasks.

- Specific schools, teachers, and classes will be contacted through the relationships we have already developed for our weekly and bi-weekly outreach regarding this event.
 - Additional schools, which other Rhodes College service organizations such as the Bonner program and COTA group, will be invited to attend. Teachers will be receive a thorough description of the event, as well as personal invitations to allow for any additional questions they may have.
 - Individual teachers will be asked if they are willing to offer a small amount of extra credit (2 or 3 points) as an incentive for students to participate in this event.
 - We will also advertise at the Pink Palace, a local Memphis science museum, the Memphis Kroc Center, and at the Children’s Museum of Memphis to increase our audience.
- SPS member participation will occur on a volunteer basis, which usually produces 12-17 volunteers for similar Rhodes SPS events.
 - 2-5 additional volunteers are often pulled from the Biology and Mathematics Departments at Rhodes College (these are biologists and mathematicians who frequently participate in SPS events and have often taken physics courses but may not have become official SPS members)
 - The SPS chapter at the University of Memphis will also be invited to volunteer as demonstrators
 - Total: As many as 25 volunteers
- Essentially all of our SPS members have experience with large outreach events. Specifically:
 - 4 of the officers and 2 SPS members have been involved with organizing events for 400-1000 viewers since 2010
 - Zain Kinnaire is the current Outreach Officer, and has experience presenting physics to students of all ages 1-3 times a week. President Morgan Smathers and Communications Officer Alec Lindman have both held this position previously and share Zain’s experience
 - SPS member Mark Sellers has been performing relatively similar demonstrations for younger audiences as the Pink Palace approximately once a week for the past 5 months.
- Logistics
 - The desired location (the McCallum Ballroom) will be reserved through the College’s electronic reservation system at the beginning of next semester for the desired time, as well as 2 hours for set up and an hour for take down
 - Each presentation station will need a “mini stage” which will be borrowed from the Theater Department (we do this yearly for our Pumpkin Drop event and have the established relationship to be able to borrow said materials).
 - 8 tables, for stations and any necessary administrative details, will be reserved through Physical Plant and the emplaced reservation system at Rhodes.
 - At least 2 mobile white boards will be borrowed from the Physics Department in order to assist in explanations.
 - Students and schools will be encouraged to carpool to Rhodes College
 - Campus Safety will be informed of the influx of visitors two weeks prior and signs will be placed the day of the event to ensure attendees are not confused
- Demonstration Presentations

- Demonstrations will be conducted as stations, with 10 minutes to present to each group as they rotate through
- There will be several demonstrations and possibly a demonstrator in the lobby for parents driving students as an alternative to going into the main 2 hours of demonstrations or simply sitting on their phones the entire time (food will also be for sale in the cafeteria below)
- Presenters will volunteer/ be assigned at the end of 2013 and beginning of the 2014 semester
- As our semi-weekly SPS meetings begin, presenters will be the assigned “demo” for that meeting and rehearse their presentation in front of the chapter so we can test the effectiveness of their presentation and their understanding of the demonstration

Project/Activity/Event Timeline

- **Event Date: March 22, 2013, 12:30-2:30 pm**
- **Basic Event Timeline:** (10 minute rotations, 2 minutes to move between stations)
 - 12:30-12:45 – Welcome, introduce with exciting demonstrations and a few questions for students. Explanation of rotation/ division into groups
 - 12:50-1:00 – Rotation 1
 - 1:02-1:12 – Rotation 2
 - 1:14 -1:24 – Rotation 3
 - 1:26-1:36 – Rotation 4
 - 1:38- 1:48 – Rotation 5
 - 1:50 – 2:00 – Rotation 6
 - 2:02 – 2:12 – Rotation 7
 - 2:15 – 2:30 – Final demonstration presentation and close out
- **January:** Assign demonstration teams
 - Reserve space, tables, stages
 - Begin rehearsing presentations during SPS meetings
 - Begin inviting schools and determining availability of class groups (shift date if necessary for maximum attendance)
- **February:** Order any materials that may take significant amount of time to arrive
 - Continue practicing demonstrations during meetings
 - Continue contacting teachers and schools
 - Contact Pink Palace, CMOM, Kroc Center about advertisement
 - Assemble demos with new materials
- **March:** Contact Campus Safety about event so that they will not be surprised by increase of campus visitors and can direct students
 - Verify reservations
 - Buy materials such as acetone, propane, etc. prior to Spring Break (March 8-16 for Rhodes College)
 - Send preliminary reminders to

- March 17-22: Final rehearsals
 - Final reminders to teachers, schools, advertisement methods
 - Event!

Activity Evaluation Plan

We will have three modes of evaluating our success in this endeavor. The first will be through student turnout. We are expecting to have approximately 200 students to participate. We will look at the range of ages that attend, as well as the areas of Memphis in which they live. The second mode is teacher evaluations. We will ask the teachers that accompany the students for feedback in terms of what they thought about the project, what they see their students getting out of it, as well as general feedback. The third mode will be from the volunteers. We will have a volunteer meeting at the end to see how we could have improved and to ask the volunteers how much they thought the kids were understanding and enjoying the concepts.

Budget Justification

All the items listed will be used for demos during the event. Acetone is a necessary component for the fire tornado, propane is needed for the Ruben's tube, and liquid nitrogen is for flux trapping. The raspberry pi minicomputer is to demonstrate the inner working of computational physics, and it requires a SD card to function. The vacuum bell is need to give to a comprehensive explanation of pressure. We also need Popsicle sticks and glue for the bridge building activities in the engineering station.

Most of the other equipment we need for the demos is owned by our SPS chapter. The Rhodes College Physics department will help with moving equipment and providing the location. We will have our PA and Sound system, as well as the projector and/or monitor for the minicomputer will be covered by Rhodes College Media Center.

