

Marsh W. White Award Proposal

Project Proposal Title	Making Waves: The Physics of Sound and Light
Name of School	Indiana Wesleyan University
SPS Chapter Number	3116
Total Amount Requested	\$300.00

Abstract

The Society of Physics Students at Indiana Wesleyan University would like to put on an event titled “Making Waves: The Physics of Sound and Light”. This event would be used to raise awareness of the University’s new Physics major in addition to increasing general interest in Physics and SPS.

Proposal Statement

Overview of Proposed Project/Activity/Event

The proposed project, “Making Waves: The Physics of Sound and Light”, would be executed as an event held at Indiana Wesleyan University, in either the common area of the Student Center or Science Building. It would include a series of demonstrations displaying the diverse array of phenomena caused by waves; the proposed demonstrations include:

- Radar Gun Demonstration: Measuring the speed of objects and the Doppler Effect
- Chladni Plate Demonstration: Understanding physical vibrations
- Slow Motion Videography: Observing sound as a product of mechanical vibration
- Liquid Nitrogen Demonstration: Understanding differences in vibrations at low temperatures
- Survey: Requesting feedback from the students

The purpose of this event is two-fold. First, the event would be used to promote a general interest in physics and the Society of Physics Students. Second, it would serve to advertise the new Physics major to the campus at large. Depending on location, this event can easily be expected to reach at least one hundred students if not upwards to five or six hundred. Additionally, we will be inviting students from the local schools as well as members of the community and family members. Given our strong ties to the local school and community, this should yield at least another one hundred people. This project would mark the increased presence of physics students on campus and a new beginning for SPS to promote physics on the campus. It is the goal of the SPS to advertise this to students and the community in order to expand awareness of the major and a general understanding of what is included in the study of physics.

How Proposed Activity Promotes Interest in Physics

“Making Waves” would be a large step forward in advertising both the new physics major and broad spectrum of topics covered in physics to the campus at large. Not only would it allow for increased awareness and presence of the physics students, it would create an environment for the physics students and faculty to interact with interested students in a causal format which would be more conducive to promoting physics without being intimidating. Additionally, it would provide the general student body with a better understanding of how sound and other common objects, such as radar guns and musical instruments, work. It would also function as an outreach to students in the arts, both visual and musical, as it would be directly applicable to their interests and studies. This event will also bring in students from Marion public schools as well as the community at large. By doing so, we will be helping to increase interest in physics with the general populace of Marion.

Plan for Carrying Out Proposed Project/Activity/Event

The SPS chapter president will select a qualified member from those who volunteer to take charge of the specific planning of the event in conjunction with our faculty advisor and others interested in helping. This person will be monitored by regular reports to the chapter leadership and to the faculty advisor. The event will be marketed through the University’s daily email announcements, flyers posted throughout campus, and through word of mouth through conversations between SPS members and professors on campus. In addition to this, the event will be advertised to the local middle and high schools through posters and communication with the science faculty. We will need at least 6 members and volunteers, preferably ten, in order to properly execute this event. While we will primarily draw from SPS members, we will also be approaching Indiana Wesleyan’s “Science Club” for potential volunteers as well as advertising it to students in the physics classes at the university through the several physics professors. Several of our SPS members have experience in planning events of similar nature, in addition to those who have participated in similar events in the past. One of our members is an Eagle Scout who has a strong background in leadership and organization.

Project/Activity/Event Timeline

Note: The dates below reflect optimal placement of the event with respect to the university's academic schedule, however they are flexible to accommodate any changes proposed by the university or division and/or any restrictions placed on preparation with regard to funding availability.

Anticipated Event Date: April 1st, 2015

In preparation:

1. Wednesday March 25th – Practice setup, run through, and tear down
2. Wednesday March 11th – Finalization of station explanations and demonstrations
3. Wednesday February 25th – Rough preparation of station explanations and demonstrations
4. Wednesday February 18th – Determine specifics of ideas and theories presented at each station and determine flyer design to post around campus
5. Wednesday February 11th – All members will present research on the various demos and the best methods to present the information
6. Wednesday January 28th – Order all materials and demonstration equipment
7. Wednesday January 14th – Establish official date and time for event

Activity Evaluation Plan

In order to evaluate the effectiveness of this event, we will be asking students to fill out a brief survey at one of the stations during the event. By students completing this, we will have a tally of how many students participated, basic demographic information, and what they thought of it. Questions may include:

- Year in school
- Current plan of study
- Awareness of Physics major
- Contact information if further interested in physics major
- Favorite part of the event

These results would then be collected and compiled by the chapter for usage in the future. By analyzing the information, we will have a better understanding of which types of demonstrations were most interesting to students as well as how great of an increase in awareness and interest in physics there was associated with the event.

Budget Justification

Note: Equipment including the vibration generator, liquid nitrogen, and slow motion camera will be provided from the supplies already possessed by the physics department.

The radar gun and associated balls and catch screen would be one of the primary demonstrations and could be used as a competition to see who could throw the fastest to further increase interest among athletically inclined students. While there are a few radar guns available for a lower price, the radar gun we selected is the cheapest option we could find with positive reviews when it came to recording the speed of the smaller objects that we will be working with. The variety of balls will help diversify those who can participate as well as increase interest to more students.

The Chladni plate set would complement the existing vibration demonstration we have but the variety of sizes and shapes would provide further demonstration abilities.

The ice cream and balloons will function as part of the liquid nitrogen demonstration. This will be an eye-catching demonstration and help to draw in passersby. By examining the difference in kinetic energy between solid and liquid states of ice cream and the effects of temperature on gas volume, we will be presenting the understanding of kinetic energy as the result of vibrational energy, as well as providing a tasty treat for participants.