



SOCIETY OF PHYSICS STUDENTS

An organization of the American Institute of Physics

Future Faces of Physics Award Proposal

Project Proposal Title	Promoting Physics in Mississippi
Name of School	University of Southern Mississippi
SPS Chapter Number	6266
Total Amount Requested	\$500

Abstract

The SPS chapter at The University of Southern Mississippi performs outreach at many schools in the surrounding areas. We go to high schools and middle schools in Mississippi and perform visual demonstrations pertaining to thermodynamics, optics, and mechanics. SPS would like to implement a program in which we frequently visit one specific high school that has a high concentration of underrepresented students or students with a minority status. We wish to do this over the span of a semester with multiple visits.

Proposal Statement

Overview of Proposed Project/Activity/Event

The Overview should be a more detailed description of the proposed project/activity/event than the abstract.

This section should include:

- Brief description – We aim to continuously visit Hattiesburg High School to develop a mentor type program with the students. We will go to the school 6 times over the course of the semester. Four of our visits will be to give interactive lectures on physics that include demonstrations for the topic at hand. This semester we want to focus on demonstrations pertaining to mechanics. The other two visits will be to administer quizzes on what we had lectured on the week before. This way we can effectively measure how well the material is being absorbed.
- Goals of the project – We wish to expose this high school class to a full range of physics topics to which they may not have been exposed beforehand. By providing this underprivileged high school with opportunities to engage in fun, hands-on physics experiments, we expand the number of potential physics majors and contribute to our project's main goal: promotion of gender and racial diversity in this scientific field.
- Intended audience – Our intended audience is a specific high school physics class. This high school's student body is made up of mostly minority students.
- Background and motivation – The Society of Physics Students typically visits Hattiesburg High School at least once a year. This last year when we visited, a student expressed to us that he had been undecided on his major but we had convinced him to commit to a S.T.E.M. degree. If only one visit can achieve this much, we believe multiple visits with the same students can convince even more students to study science.

How Proposed Activity Promotes Physics Across Cultures

We intend to go to an economically challenged and mostly minority high school. According to usnews.com (<https://www.usnews.com/education/best-high-schools/mississippi/districts/hattiesburg-public-school-dist/hattiesburg-high-11280>), Hattiesburg High School shows 100% of students being economically disadvantaged and 97% minority enrollment for students. We feel that we have an opportunity to really impact and help our community. It is our aim to bring physics to a school that has an underdeveloped science program. We intend to foster relationships and become role models to these students over the course of 6 visits to the school.

Plan for Carrying Out Proposed Project/Activity/Event

- Personnel - Who will be in charge of planning the event and how will progress be monitored?
 - Our chapter will be working with the Hattiesburg High Physics teacher. Our chapter will be in charge of carrying out the demonstrations and lectures, as well as leading the activities. We will have to keep a continuous stream of communication with the teacher, as his decisions are what we must follow.
- SPS member participation - At least 5 SPS members will be present at each event. These members will be expected to give advice, demonstrations, and aid to the students' learning while attending the events.
- Expertise - Our SPS adviser has experience teaching mechanics at the graduate level, as well as the introductory Physics classes at our University. Three of our active members have also taken Mechanics at the graduate level, and four of our senior SPS members have taken undergraduate Mechanics.

Project/Activity/Event Timeline

- January 7-13:
 - Purchase required equipment for egg drop experiment
- January 16:
 - Teach students about the relevant principles regarding an egg drop experiment
 - Students work in groups of 2-3 to build egg drop experiments
 - Survey for student interest
- January 23:
 - Students take a quiz on the relevant topics discussed in lecture given the previous Tuesday
 - Egg drop experiment takes place on Hattiesburg High football stadium
- February 20:
 - Give students an angular momentum demo regarding concepts
 - Conservation of angular momentum using bicycle wheel
 - Stroboscope
 - Teacher supplies students with a short graded quiz on the topic
- March 11-17:
 - Purchase equipment for mousetrap project
- March 20:
 - Teach students about relevant principles regarding mousetrap cars
 - Students work in groups of 2-3 to build the mousetrap cars
- March 27:
 - Students take a quiz on the principles discussed in the previous week
 - Students will race the cars and be awarded prizes for winners
 - Three races will take place:
 - Speed - the cart that reaches the highest velocity wins
 - Stability - the cart that travels the farthest in a straight line wins

- Distance - the cart that travels the farthest uphill wins
- April 17:
 - Give students a lecture on waves and acoustics
 - Quizzes will be taken in and graded by the teacher
 - Exit survey on student interest

Activity Evaluation Plan

There are several ways for measuring the success of our activities, one of which will include surveying and receiving feedback the students on their interest both at the beginning and ending of trips with them. We will work hand-in-hand with the physics instructor of Hattiesburg High School, Mr. Walker, to gauge the interest of the students' and for feedback towards our lessons. To evaluate how well the students are retaining the information, they will be quizzed on the material we cover one week after our lecture and or demo.

Budget Justification

Egg Drop Experiment Materials: This is a list for possible materials that students can use in an egg drop experiment. We will purchase these materials and make them readily available for the students.

1. Eggs
2. Paper
3. Popsicle Sticks
4. Hot Glue
5. Bamboo Skewers
6. Hot Glue Gun
7. String
8. Tape
9. Rubber Bands
10. Straws
11. Plastic Bags
12. Pipe Cleaners
13. Various Materials like the ones listed above

Mouse Trap Car Materials: This is a list for possible materials that students can use in a mouse trap car. We will purchase these materials and make them readily available for the students.

1. Mouse Traps
2. CDs
3. Rubber Bands
4. Hot Glue
5. String
6. Tape
7. Bamboo Skewers
8. Popsicle Sticks
9. Various materials like the ones listed above

Sonic Levitation Machine: This device will be for the Wave and Acoustics Lecture

Stroboscope: This will be used for the Angular Momentum Lecture.