

Marsh White Award Final Report on "Fiziks is Phun" Ball State University 2005-2006

The Ball State University Chapter of the Society of Physics Students received a Marsh White Award from the National Office in January of 2006. The monies were used to purchase more science kits used for our outreach program, "Fiziks is Phun." This program, now in its third year, involves visiting local middle schools to interact with students using hands-on physics demonstrations. Any additional materials needed were supplied by the Department of Physics and Astronomy at Ball State University.

The demonstrations used discussed three main topics with the students: (1) optics and fiber optics (2) sound and waves and (3) mechanics. The demonstrations for the optics and fiber optics included using flashlights with diffraction gratings and polarization lenses. Also used was a laser with water in a container to show the principle of fiber optics on a larger scale. For the discussion of sound and waves, tuning forks and various sizes of metal poles were used to demonstrate differences in pitch and wave interference. For mechanics, a cart with a pressurized carbon dioxide canister was used to demonstrate equal and opposite forces. Also, a rotation stool, along with a bicycle tire was used to show and allow the students to FEEL the principles of rotational motion.

Two local middle schools and a local high school were visited by our students over the course of this semester. The schools were Central High School, in Muncie, IN, Yorktown Middle School, in Yorktown, IN and Selma Middle School in Selma, IN. With the high school students, not only were we able to do demonstrations with them, but we were also able to discuss and encourage science in their college education. Nine separate visits were made over the course of the spring semester. For each visit, Ball State Society of Physics Student Members saw two to four different classrooms full of students. We saw nearly 600 students this semester alone; doubling the number of students we visited in the first year of the program.

The students had a very positive reaction to our visits! We were barraged with many wonderful questions from students. The hours flew by when we were working with the students. They loved the hands-on demonstrations and their gasps of amazement were truly rewarding.

Not only were the students excited having us visit, but many members of Society of Physics Students were also motivated to attend these visits. We had the most interest this year then in the past two years from university students involved in SPS. We had to get mandatory limited criminal background checks and Zachary Law Checks this year before we could visit schools. Nearly 15 students signed up for these checks and several of these students were able to help with visits this semester.

One specific apparatus designed by one of our members showed not only the unique way that physical phenomena can be demonstrated, but also encouraged students to think together about what was going on. The apparatus included a modulated laser connected to an iPod, a photo-sensor receiver, a mirror and a specially designed waveform generator. The waveform generator was built by staff in the department, and included brass weights hanging from a cross beam by fishing line, at different lengths. When the weights were set swinging, initially at the same period, they would form sine waves in their oscillations over time. If the beam of the laser was put directly across the fishing line when the weights were at rest, then when the weights were in motion, you could hear the waveform in the speaker of the photo-sensor receiver. This apparatus caused students to want to know what was going on. This led to discussion on a variety of topics including light propagation, pendulum motion, photovoltaics, and sound waves. This covered a wide scope in classical physics as well as modern physics, and was a great success in the classroom.

In conclusion, the “Fiziks is Phun” program with the Ball State University Society of Physics Students continues to be a success! We already have teachers asking us to come back, and even more teachers that would like us to visit in the fall because we simply could not find the time to schedule visits to their classrooms this semester. All the participants involved in this experience grew from it this year and we will continue to encourage and inspire young people, from middle, high school and collegiate levels.

Budget for “Fiziks is Phun”

<u>Item</u>	<u>Cost</u>
Glass Prism Set	\$83
Light and Optics Kit	\$125
Fiber Optics Kit	\$50
Shipping and Handling	\$20
Travel Expenses	\$100
Printouts	\$20
Background checks	\$105
Subtotal	\$503
Other Contributions/Fundraisers	\$215
Marsh White Award	\$298

Note: The Department of Physics and Astronomy at Ball State University contributed funds, supplies and equipment to help with background checks and some of the demonstrations that were used

Pictures from Yorktown Middle School, April 3 and 6, 2006



SPS Ball State University chapter historians: Nick Humphrey and Benjamin Padgett and member, Angela Parrell



SPS member: Angela Parrell



SPS Ball State chapter historian: Benjamin Padgett



SPS Ball State chapter historian: Nick Humphrey



SPS chapter president: Courtney Rowe-Bultinck



SPS member: Ray Haney II



SPS member: Michael Kuntzman