

Partners in Physics Fun with Waves

**Mitchell Elementary School
Golden, CO**



**Colorado School of Mines
Marsh White Award Final Report**

The past year has been a great success for the Colorado School of Mines (CSM) Society of Physics Students. We were able to continue community events from the past two years and were also able to include a new outreach event, Partner's in Physics at Mitchell Elementary School in Golden, CO. In April 2010, 7 volunteers from the CSM SPS Chapter trained local high school students to help us teach younger children about waves.

On Sunday April 25th three Golden High School juniors and one Conifer High School freshmen came to the Colorado School of Mines Physics I and II learning studio. Here they learned the basic concepts of waves, mainly mechanical transverse and longitudinal waves. We also reviewed wave properties such as the wave number and angular frequency as well as their relationships to wavelength and period respectively. In addition we taught the high school students about interference and standing waves. We used tools such as a slinky and the large spring from the Makin' Waves SOCK (from 2008) to demonstrate these concepts along with some computer activities from our introductory physics courses.

Each of the high school students then built a standing wave machine out of a small vibrating motor and a long thin string. By holding the string at different locations, different standing wave modes can be observed. On Thursday April 29th our volunteers went to Mitchell Elementary School along with the high school students, and taught 28 1st - 6th grade children about waves. We began with a science show involving standing waves on a spring, sound waves, water waves, and a lot of excitement. After the science show the children were divided into groups for make-and-take activities. This included the construction of the wave machines mentioned earlier, space phones made from string and plastic cups, and “kazoos” made from straws that slide for different tones.

The Marsh White Funds were used to buy the following items:

<u>Item</u>	<u>Price</u>
Chips	\$10.77
Chips	\$4.00
Duct Tape (for wave machines)	\$7.78
Cups	\$11.97
Cups	\$3.29
Mason Line (String)	\$12.72
Motors	\$262.40
Batteries	\$21.46
Total	\$334.39

Some photographs of the Partner's in Physics event follow and more can be found on our website at csmcps.org.



High school students Haley and Shannon work on a wave activity in the CSM Physics Learning Studio.



SPS volunteers Marty and Andrea show children how sound waves move through a spring using our new space phone.



Golden High School student Sean helps a group build space phones made from plastic cups and mason line.



SPS and high school volunteers work together to help children build straw kazoos.



What better way to learn about waves than by doing the wave?



Partners in Physics at Mitchell Elementary School was a great success. We had 28 elementary school students attend, and 11 volunteers including 4 high school students. The following volunteers helped us at this event:

CSM SPS volunteers

- Andrea Yocom
- Eric Weisgerber
- Marty Otzenberger
- Shirley Moore
- Zach Boerner
- Jacob Lapenna
- Caleb Spiers
- Amy Garland

High School volunteers

- | | |
|-----------------|---------------------|
| • Shannon Graig | Conifer High School |
| • Hayley Love | Golden High School |
| • Kayla Kutter | Golden High School |
| • Sean Beach | Golden High School |

Partners in Physics was a great event, and we always enjoy sharing physics with our friends at Mitchell Elementary School. A useful tip we learned in contacting schools for outreach events is to find parent volunteers or teachers to contact, because the school offices are less involved. Parents and teachers are often really excited and really help in communicating events with local schools. Next year we would like to cover another topic and hopefully have more involvement both with high school students and children. We would also like to extend this event to other schools in the area, hopefully by advertising earlier.