

Introduction

This year's outreach program has been an exhilarating learning experience for all that have been involved. We have developed and presented two shows this year, "What Not To Do With Your Mother's Microwave" and "Thrilling Thermodynamics and Eye-Popping Pressure." The Brigham Young University – Idaho Society of Physics Students chapter has reached audiences from kindergarten to adult community members. We have hosted events on campus for the University and community, traveled to elementary and secondary schools, and visited local Cub Scout and church youth groups. Our audience has been wide and diversified. We have also presented on our Outreach programs and activities at the American Association of Physics Teachers National Winter Meeting in Chicago and the Brigham Young University – Idaho Undergraduate Research Conference.

Groups visited or demonstrations given:

- Brigham Young University – Idaho students & community – Rexburg, ID
- Adams Elementary School – Rexburg, ID
- Union-Lyman Elementary School – Rexburg, ID
- Archer Elementary School – Rexburg, ID
- Madison Junior High School – Rexburg, ID
- Cub Scout Troop #216 – Grand Teton Council
- Cub Scout Troop #817 – Grand Teton Council
- Bonneville High School - Idaho Falls, ID
- LDS Church Youth group career activity – Rexburg, ID

SPS Member Involvement

We encourage each SPS member to participate in these activities and specifically tailor these experiences to Physics Education majors and other students interested in education. We have had a large variety and number of students and faculty participate throughout this year. Speaking about the SPS Outreach program two SPS members who have participated stated;

"Science doesn't exist without curiosity. We're just trying to keep that curiosity alive"

- Matt Zachreson, a BYU-Idaho SPS Member

"Exposing people to what physics really is, the science behind life, is very fulfilling. Most people don't realize that physics explains why things happen the way they do in the world around us"

- Breck Harris, a BYU-Idaho SPS Member

Interactions

We have also encouraged elementary and secondary students that we visit to ask questions of the physicists and physics students that share the demonstrations with them. Some of the amusing and though-provoking questions and comments from these students are listed below.

How does cold boil?

Is that how a thermometer works?

How do you do that without killing him?

How do you get air so cold?

I wonder what it would do to eggs.

Why does the wheel spin them around?

Why is the pressure lower when it is faster?
What would happen if you spun the wheel
the other direction?
Would it matter if the heels were stilettos
or wider shoes?

Is the air faster on top of the ball too?
Would it change if you had different clothes
on, would it poke your skin?
How many times can you reuse the balloons
in the liquid Nitrogen?

We've been able to develop some important lasting relationships with many of the groups and individuals that we have shared our demonstrations with.

- 1) We have been able to expose potential physics students to the exciting world of physics and the Society of Physics Students.
- 2) We have made contact with a high school physics/chemistry teacher who has expressed interest in collaborating with the Physics Education Research group at Brigham Young University – Idaho (Research In Science Education (RISE) led by BYU-Idaho Physics Faculty member, Dr. Brian Pyper).
- 3) We have also begun to work out the possibility of the BYU-Idaho SPS charter assisting local high schools and high school students to participate in Quarknet, a particle physics research endeavor “supported in part by the National Science Foundation and the Office of High Energy Physics, Office of Science, U.S. Department of Energy” (see: <http://quarknet.fnal.gov/>) and is focused around the Fermi National Accelerator Laboratory.
- 4) We have built a relationship with a near by junior high physics teacher who has expressed interest to have demonstrations for his students at the beginning of each trimester to help his students generate ideas for a student designed project. We are very excited about this continuing opportunity to share demonstrations with these students.
- 5) We have also posted video from “What Not To Do With Your Mother’s Microwave” on www.youtube.com. (<http://www.youtube.com/watch?v=wJsDJkmOGHE>)

Expenditures

\$62.43 – *What Not To Do With Your Mother’s Microwave*
- Microwave, Soap, Glass Bottles, Steel Wool, Eggs, Carrots, Light bulbs, etc
\$12.72 - *What Not To Do With Your Mother’s Microwave*
- Compact Discs, ping-pong balls, Christmas lights, etc.
\$45.00 – *Thrilling Thermodynamics and Eye-Popping Pressure*
- Liquid Nitrogen
\$36.96 - *Thrilling Thermodynamics and Eye-Popping Pressure*
- Cinder blocks, balloons
\$124 – *SPS Recruitment*
- Magnets, lasers, robots, etc.
\$281.11 – Total

Remaining \$18.89 will be utilized for the continuation of SPS Outreach programs through the remainder of the year.

BYU-Idaho physics students demonstrate science principles at local schools



The BYU-Idaho Society of Physics students performed a science demonstration for approximately 200 students at Adams Elementary School in Rexburg on Jan. 12.

London Jenks, a senior majoring in Physics Education, and the Society of Physics Students (SPS) outreach officer, joined Dr. Brian Pyper, a BYU-Idaho physics teacher and Director of Physics Education, to demonstrate a set of entertaining science demonstrations and to give elementary students ideas for science fair projects.

The science demonstrations have two purposes. First, to give BYU-Idaho students teaching experience, and second, to inform younger students that science is not intimidating. "We want our BYU-Idaho students to gain experience in teaching and show off their knowledge about physics. We also use these demonstrations to teach kids that science is not scary, that it can be fun," Pyper said.

Jenks feels that it is important to reach out to the community and teach them about science. "As a country, it is important that we keep up with the rest of the world. The United States is falling behind in science. This helps in some small part," Jenks said.

At Adams Elementary, Pyper and Jenks demonstrated the Bernoulli Principle with a "Bernoulli ball," a beach ball suspended in an air stream from a leaf blower. Another demonstration was the "air shooter," a garbage can with a spring and diaphragm filled with fog that shot puffs of air across the room. Jenks and Pyper also demonstrated electricity, magnetism, inertia and heat.

The idea to visit local schools to educate and demonstrate science principles was an idea of the BYU-Idaho SPS chapter. "I enjoy the demonstrations and seeing the kids' reactions, but this was completely the SPS students' idea. I am happy to support their efforts," Pyper said.

Finally, a chance to blow things up in the microwave

The microwave: not only does this kitchen appliance provide students with pizza pockets, popcorn and other various forms of deliciousness, but it is also a medium the Society of Physics students specializes.

This Thursday, Jan. 29th, the SPS will be demonstrating some fundamentals of physics with an ordinary microwave and materials such as marshmallows, soap and glass bottles.

London Jenks, a junior studying physics education described the event, "basically an excuse to blow things up in a microwave and please crowds with the visual display."

The event will take place in Romney 172 during forum (2-3 p.m.), and again at 6 p.m. that evening. The event is free, safe and there will be refreshments as well as answers to questions students

might have.

Jenks and some of his fellow physics students conducted a similar presentation at the American Physics Society last April, and continue to present at local elementary and secondary schools.

This activity is a result of a government grant from the National Society of Physics Students, which is designed to help science education grow.

"This is an exciting part of teaching, because it involves all types of people," said Bryan Piper, a professor of the Department of Physics, about the success of the students.

The SPS is adamant about making learning fun. "We don't do meetings," said David Oliphant, a professor of the Department of Physics, said. "We explore life. It's important to us to

educate people about the importance of science, and also to show that it is fun as well as applicable."

The society does a wide range of activities, from exploring the ice caves, to microwave pyrotechnics and even badminton tournaments.

Students do not have to be a physics expert to join or participate, although physics majors are encouraged.

Students can get more information by contacting Jenks at jen06012@byui.edu or 208-419-6190.



Photo courtesy AP Images

Danielle Swenson The Society of Physics Students will be blowing scroll staff things up in a microwave on Feb. 29.