

Sharing Physics Through Sound: Undergraduate Outreach

Holly Fortener, SOCK Intern

Brad R. Conrad

Society of Physics Students, American Institute of Physics



RICE



SOCIETY OF PHYSICS
STUDENTS



MARQUETTE
UNIVERSITY

AIP | American Institute of Physics

The Goal of Outreach

- Share excitement
- Open career pathways
- Learn science
- “See someone like me”
- What is a physicist?
- Learn physics & astronomy
- Planning & leadership skills
- Service

SPS helps over
100,000 kids
per year!



2017 Astronomy on the Mall with Jacob Robertson (2017 SOCK Intern)

SPS Outreach Resources

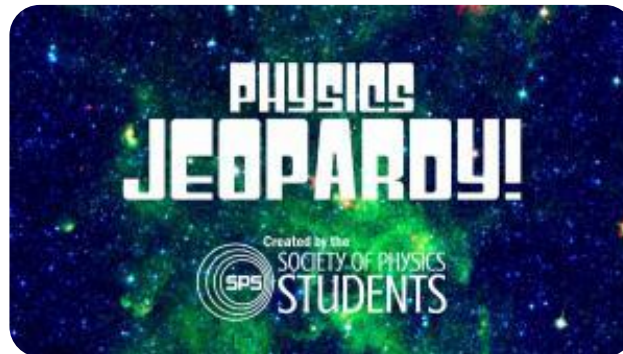
Demonstrations

- Comprehensive and inexpensive
- Perfect for at home or in the classroom



Jeopardy/Trivia

- Games available for download
- Physics and astronomy content
- Custom templates



SOCK

- Outreach kit for SPS chapters
- Available to all chapters while supplies last



Astronomy	Acoustics	Optics	General Physics	Mechanics	Electricity & Magnetism
Eclipse Model	Straw Oboe	Variable Index of Refraction	Borate Glass	Density Column	Ferrofluids
Composition of the Universe	Tuning Fork Workshop	Polarization of Light	Liquid Nitrogen Ice Cream	Egg Drop	Cell Phone Charger
Fabric of the Universe	Chladni Plates Violin Bow	The Speed of Light	Vortex Cannon	Egg Crusher	Homopolar Motor
Fabric of the Universe 2	Chladni Plates Speaker	Reflection & Refraction	Passive Pasta		Eddy Currents
Pinhole Projector	Ruben's Tube	Light Fountain	Slimy Spaghetti and Meatballs		Simple Motor
Gravitational Waves	Rijke Tube	Hair Diffraction	Ice and Salt Slushies		Audio Amplifier
Cakeraters	Oscilloscope & Microphone				
	Longitudinal & Transverse Waves				

Passive Pasta Demonstration

Insulated travel mug, hot water, and noodles, oh my!



- Household or easily accessible items
- Energy conservation with passive cooking
- Less than \$20
- Elementary, middle ages/general public

Ice and Salt Slushies Demonstration



- Melting and boiling point of water (H_2O)
- Less than \$20
- Writeup available
- Elementary, middle ages/general public

Ice and Salt Slushies Demonstration

SOCIETY OF PHYSICS STUDENTS

Ice and Salt Slushies

Demonstration

Explore the freezing point of water with these delicious slushies! This demonstration uses salt to lower the freezing point of ice and turn one's favorite fruit juice into a delicious slushy.

Number of Participants: 3-5

Audience: Elementary (ages 5-10) and up

Duration: 10-20 mins

Difficulty: Level 2

Materials Required:

- Gallon sized plastic bag
- Quart sized plastic bag
- Large towel
- 4 cups ice
- ¼ cup table salt (NaCl or equivalent)
- Fruit Juice
- Water (H_2O)

Setup:

1. Open a gallon sized bag and fill with 4 cups of ice and ¼ cup of table salt. Place the filled gallon sized bag to the side.
2. Open a quart sized plastic bag and fill with your choice of juice to approximately ½ of the way full. Seal the quart sized bag.
3. Place the sealed quart sized plastic bag into the gallon sized plastic bag containing table salt and ice. Seal the gallon sized bag.
4. Wrap the sealed gallon sized bag with a large towel for protection and to keep

Figure 1. Demonstration final product.

Science Outreach Catalyst Kit (SOCK)

Yay
Physics!

- A major resource for SPS chapters in outreach
- Designed for ALL chapters
- Contain an exploratory physics and science activity



Amanda Williams, 2018 SOCK Intern: 2018 Astronomy on the Mall

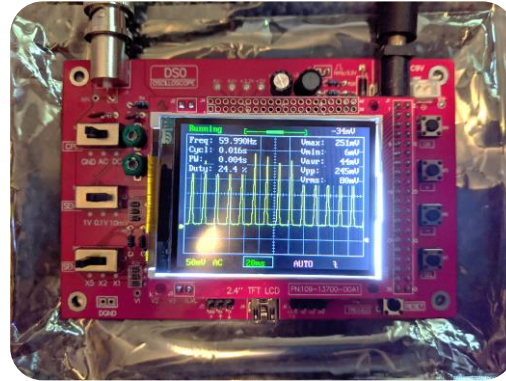


2018 Astronomy on the Mall with Brad Conrad and Amanda Williams (bright blue bucket hat)

- 2020 Theme:
International Year of Sound
- Supported by AIP and the
Acoustical Society of America
- 200 Kits
- Available to SPS and ASA
chapters



What comes in the SOCK?



- Portable oscilloscope and microphone
- Slinky and tuning fork
- Waveforms and spectrograms in Audacity
- Soundscapes
- Insightful and engaging diagrams

Hannah Pell during 2015 SOCK testing



Questions?

Thank you to my fellow SPS Interns,
Kayla Stephens, Mikayla Cleaver,
Keeta Jones, and Brad Conrad!