



# SOCIETY OF PHYSICS STUDENTS

An organization of the American Institute of Physics

## Marsh White Award Report 2017

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Project Proposal Title	Demonstrating the “Phun” Side of Physics Through Hand on Projects
Name of School	New Mexico State University
SPS Chapter Number	SPS Chapters: New Mexico St University-ZONE16-SPSChapter4749
Project Lead (name then email address)	Alexandra Hartman ( <a href="mailto:hartman2@nmsu.edu">hartman2@nmsu.edu</a> ) Rachel Ridgeway ( <a href="mailto:raeridge@nmsu.edu">raeridge@nmsu.edu</a> )
Total Amount Received from SPS	\$100.00
Total Amount Expended from SPS	\$90.00

## Summary of Award Activities

The Society of Physics Students at New Mexico State University proposed that the Marsh White Award (MWA) would be used to purchase materials to construct and obtain new demonstrations for outreach events. The new additional demonstrations that our chapter was able to construct and obtain include a Faraday Cage, Translucent Polyacrylate beads, and a wooden trebuchet. These new demonstrations have been integrated into our outreach events.

## Statement of Activity

### Overview of Award Activity

The three projects are described as follows:

- Faraday Cage: The cage consists of 1X1 cm steel wire mesh that has been cut and shaped into a 15cm tall square cube. The Faraday Cage demo also includes a small battery operated AM/FM radio to show that the Faraday Cage does block out radio waves.
- Polyacrylate beads: The beads are placed in water and left for 24 hours in order for them to expand to their full diameter. Initially the beads are a few of millimeters in diameter. We hold the beads in a clear container to show that the fully saturated beads are completely invisible when submerged in the water, but once taken out of the water are visible.
- Wooden Trebuchet: The trebuchet is constructed of Pine wood and stands roughly 30cm tall, with the trebuchet arm extended it stands roughly 60cm tall.

For our chapter these three projects have given us an opportunity to come together to work with one another to plan, construct, complete, and present these projects to others. These projects have been integrated into the collection of demonstrations that our chapter uses for our community outreach events. Our community outreach events usually target students who attend schools in our community ranging from grades K-12, and Freshman/Sophomore college students. Because we have such a wide range of students it is very important to us that we have teaching tools and demonstrations that are accessible for the younger students, but also that will be interesting to older students. These three projects are conceptually appropriate for the majority of our target audience and are robust enough to be used as hands-on/interactive activities for outreach events.

### Impact Assessment: How the Project/Activity/Event Promoted Interest in Physics

The entire goal of these projects was for the projects to be integrated into our outreach efforts. Our chapter is very active in our community to increase and promote the interest in physics. When the projects were proposed the main goal was to invest in a project that we could use in the direct efforts of getting kids and adults alike interested in physics. Our chapter works very hard to show people in our community that physics is not just for the most brilliant minds, but physics is a field that is welcoming to all people who are willing to practice and work hard. We strive to show our community that physics is for people with all kinds of interest and backgrounds, and is a field that strives to be inclusive and diverse. Our chapter considers our goals accomplished and done so successfully. Our chapter will showcase our new projects at our SPS Summer Physics Camp in July of 2017.

## Key Metrics and Reflection

Who was the target audience of your project?	<b>Students K-12 &amp; Freshman/Sophomore college students</b>
How many attendees/participants were directly impacted by your project? Please describe them (for example "50 third grade students" or "25 families").	<b>15 SPS members Projects will officially be showcased in July of 2017</b>
How many students from your SPS chapter were involved in the activity, and in what capacity?	<b>15 members who all have worked together on each of the projects</b>
Was the amount of money you received from SPS sufficient to carry out the activities outlined in your proposal? Could you have used additional funding? If yes, how much would you have liked and how would the additional funding have augmented your activity?	<b>The amount of money that we received was more than sufficient to complete these projects.</b>
Do you anticipate repeating this project/activity/event in the future, or having a follow-up project/activity/event? If yes, please describe.	<b>Our chapter does plan on repeating the addition of new demonstrations in the future. New project proposals will be ready for submission in the Fall of 2017.</b>
What new relationships did you build through this project?	<b>The new relationships that our chapter has built through the completion of these projects were between new members of our SPS chapter and experienced members. By all of our members being involved in the completion of these projects together, our chapter grew closer and established a more defined sense of comrodery amongst our group.</b>
If you were to do your project again, what would you do differently?	<b>If we were able to do these projects again we would have delegated responsibilities more evenly. Also we would instead decide on two projects to work on instead of three.</b>

## Expenditures

### Expenditure Table

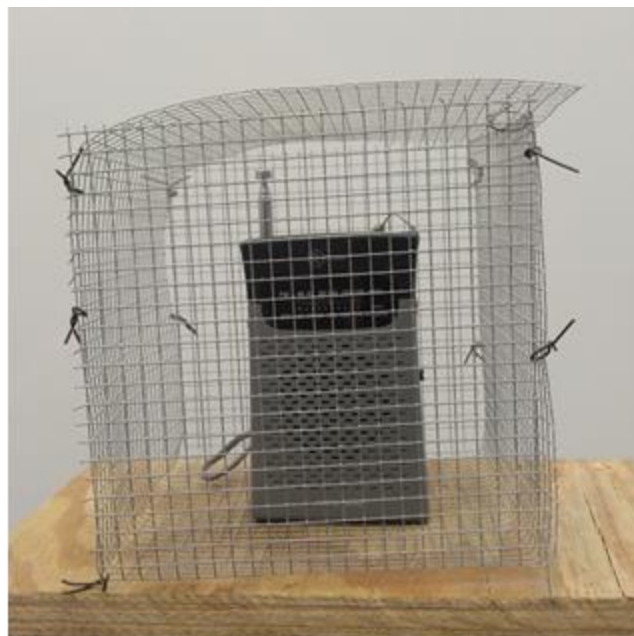
Item	Please explain how this expense relates to your project as outlined in your proposal.	Cost
1 yard of 1cmX1cm steel wire mesh	Used to construct the Faraday cage	\$7.00
Polyacrylate beads	Used to demonstrate properties of the index of refraction of light	\$15.00
Lumber (Pine)	Used to construct trebuchet	\$30.00
6inch bolt and nut	Used to construct trebuchet	\$6.00
AM/FM Radio	Used for Faraday cage demo	\$15.00
Plastic Demo Cups (6)	Used for Hydrogel demo	\$15.00
<b>Total of Expenses</b>		<b>\$88.00</b>

## Activity Photos

- A. The photo below is the steel mesh faraday cage. All sides were fastened together using some thin wire that was donated by one of the members, and the top able to open to place items inside such as the AM/FM radio, and cell phones.



- B. The photo below shows how the Faraday Cage is fastened and also demonstrates how the radio fits inside of the cage which completely blocks out the radiowaves for both the AM and FM settings.



C. The Photo on the bottom left is provided from the source where we purchased the Hydrogel beads [1]. The photo on the bottom right is to demonstrate how the hydrogel beads look before and after they are submerged in water [2]. These photos demonstrate the look of the Hydrogel beads. These beads will take on the index of refraction of water when submerged and completely seem to disappear when placed in water.



D. The photo below shows the Wooden Trebuchet, this picture is the most current. As of right now the Trebuchet is being worked on after some accidental damage was done during some calibration tests. Some of the additional pieces of the Trebuchet were removed while we are repairing it.



## References

1. Clear Hydro Orbs Water Beads. (n.d.). Retrieved from [https://www.100candles.com/i-4423/Clear-Hydro-Orbs-Water-Beads?affld=121&gclid=CjwKEAjw4IjKBRDr6p752cCUm3kSJAC-eqRt1jE6PPvpNXDqFApBnJFCV\\_POZ0yiiVdWVPzrcoLTjBoCrKnw\\_wcB](https://www.100candles.com/i-4423/Clear-Hydro-Orbs-Water-Beads?affld=121&gclid=CjwKEAjw4IjKBRDr6p752cCUm3kSJAC-eqRt1jE6PPvpNXDqFApBnJFCV_POZ0yiiVdWVPzrcoLTjBoCrKnw_wcB)
2. I. (2012, December 12). Retrieved from <https://www.youtube.com/watch?v=OtvSb5ycP4>



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