



SOCIETY OF PHYSICS STUDENTS

An organization of the American Institute of Physics

Future Faces of Physics Award Report

Instructions: Please complete each section after reading the purple text describing what should be in that section. Then delete the purple text.

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| Project Proposal Title | The TLU SPS SYS-STEM Program |
| Name of School | Texas Lutheran University |
| SPS Chapter Number | 7209 |
| Project Lead (name and email address) | Vanessa Espinoza |
| Total Amount Received from SPS | 250.00 |
| Total Amount Expended from SPS | 500.00 |

Summary of Award Activity

More than a dozen TLU SPS members had the opportunity to build mentoring relationships with more than 20 students from the Seguin Youth Services (SYS), a non-profit after school program that aims to assist at-risk students in meeting academic goals. The group met four times, with some hands on-lab activities on campus in TLU Physics labs, and one large group meeting at the SYS facility in Seguin, TX. After the first meeting, SYS students began calling TLU SPS volunteers by name. Students worked in small groups with 2-3 TLU SPS mentors on each lab activity.

Statement of Activity

TLU SPS volunteers engaged with 12-22 students from the Seguin Youth Services (SYS) in four after school “STEM sessions”. After meeting with the SYS director, Sheryl Sachtleben, we were able to better understand the mission of this afterschool care and determine a plan that would best suit the needs of the student participants. The four interactions occurred at both Texas Lutheran University and the SYS facility. The reason for interaction at SYS was to perform hands on labs that could incorporate physics into the students’ everyday activities. In addition to this, when having activities at SYS we were also able to interact with more children because of transportation issues. In addition to the visits on site, the visits to the TLU campus were important because they allowed for young students to experience the college atmosphere and promote the idea of these young minds pursuing higher education in the future.

Overview of Award Activity

Brief Description:

This program began with a visit to SYS in early February and introductions were made between the TLU SPS student volunteers and the SYS student participants. At this visit, multi-age hands on activities were presented. These group activities were centered on the daily events that take place at SYS, but do not necessarily connect with science. The activities were:

- Basketball: With this activity we used focused on variations of pressure by understanding the effects of inflation pressure on the basketballs. In this activity, students worked in teams to inflate the basketballs, and then perform an experiment to see how the change in inflation effected the bounce height.
- Collision Physics: Students were asked to compare the heights of different balls. With this comparison, the concept of different type of collisions and energy exchange was witnessed.
- Rutherford Scattering Simulation Using Marbles: This was a home-built version of the 2010 SPS SOCK kit. With this experiment students were able to simulate the idea behind the Rutherford scattering experiment.

Following this initial visit, two other visits were mini labs at TLU. The first visit included a light, optics, and color lab. The second visit was non-Newtonian fluids and cross-linked polymers lab.

Finally, we ended the visits with a demo show that displayed a variety of physics concepts. We ended this visit with cake and ice cream.

Outcomes:

There were many positive outcomes from this project. First and foremost, we were able to interest many young students in physics and STEM in general. From the beginning when we first met the students to the last interaction it was evident that all of the students’ minds were stimulated and they felt more inspired to engage in science. Through verbal interview, we were able to learn that many of the kids were now interested in pursuing a Future Faces of Physics Award, page 2

physics degree when they enter a higher education. In addition to this, many of our TLU volunteers were able to enhance their view towards community. We believe that this mentoring program has, and will continue to, encourage our undergraduate physics students to engage within their community and promote STEM outreach.

Audience:

The target audience was the 12-22 students that ranged between the 3rd and 6th grade.

Context of the Project:

The TLU SPS chapter regularly engages in outreaches within the Seguin community in an effort to promote STEM learning in these low-income, minority communities. With that being said, this project allowed our chapter to better engage with young students and develop a more substantial relationship with these students. This project also allowed our chapter to begin to develop a better relationship with SYS, so that we may be able to have more mentoring programs in the future.

Highlights and Stories:

Some stories that TLU SPS students spoke of occurred when a separate community outreach program occurred on campus. Two of the SPS students attended this event, and upon attending, they ran into a few of the students that were a part of this project. The young students immediately ran up to our volunteers, said hello, and began to enthusiastically explain to their parents the different things that they had learned in the “SYS Sessions”. Our volunteers said that this interaction was a very heart-warming experience and inspired them to continue this project in the future.

Another story that occurred during this experience was at the final demo show. While having cake and ice cream, many of the TLU volunteers were conversing with the young students. During the conversation they asked what they want to do when they grow up. More than a few of the students joyfully proclaimed that they “wanted to go to TLU and be physics majors” like us. This was very inspirational to many of the volunteers. This section should include:

Impact Assessment: How the Project/Activity/Event Promoted Physics across Cultures

Initial Proposal:

Basic Outline of the Program:

- We opened the program with a visit to SYS facility in February to make introductions between TLU SPS volunteers and SYS student participants. During this opening visit, we will presented multi-age group hands on activities centered on activities that they participate in regularly, but do not necessarily
 - connect with science: We used their pool table as a point of reference for two collision experiments. The first was in bouncing balls and measuring rebound height. The second was the 2010 SPS Sock kit Rutherford scattering simulation experiment. We also used the basketball court, and provided new basketballs for the activity, which we left with the facility.

For this activity, we used the idea of pressure to understand the effects of inflation pressure on the basketball. We also had students do an experiment to find out what the best starting point for

shooting a basket might be. n addition to this, we also did energy conversion with different sized balls.

- We then hosted smaller groups of 3- 5th grade students on campus in the TLU Physics labs for three STEM sessions. The first mini lab was about light , color and optics, the second was about “smart materials” including polymers and non-Newtonian fluids.
- The final meeting was a large group demonstration show, followed by a party where students sat with TLU SPS members to reflect on the semester long physics fun they had together.
- Most of the equipment and some of the materials and supplies were provided by the TLU Physics Department. We spend most of the award money on T-shirts for the volunteers and the SYS participants. Wristbands for the kids were also purchased with this money.

Overall, the goals of the project, to promote physics, and build relationships were met. The benefits of these interactions for both the SYS students and the TLU SPS volunteers is difficult to measure, but undeniable nonetheless.

Key Metrics and Reflection

Please answer the questions below. Please indicate if a question is not applicable to your project.

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| The Future Faces of Physics Award is designed to promote projects that cross cultures. What cultures did your project attempt to bring together? | Our project attempted to bring together underrepresented minorities that come from low-income families in the Seguin community. |
| How many attendees/participants were directly impacted by your project? Please describe them (for example “50 third grade students” or “10 high school volunteers”). | 12-22 3 rd -6 th graders. |
| How many students from your SPS chapter were involved in the activity, and in what capacity? | Approximately 15 undergraduated physics majors volunteered for each lab and demo show. |
| 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? How would the additional funding have augmented your activity? | Yes, but we could have used additional funding to assist in the trasportation, so that more students could have participated in the labs that occurred at TLU. |
| Do you anticipate repeating this project/activity/event in the future, or having a follow-up project/activity/event? If yes, please describe. | Yes, if we require funding again we plan to do a similar experience with new labs. |

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| What new relationships did you build through this project? | We were able to build mentoring relationships with the students and a relationship with the Seguin Youth Services. |
| If you were to do your project again, what would you do differently? | Have more labs because the students really seemed to enjoy them. |

Press Coverage (if applicable)

<http://www.tlu.edu/news/tlu-society-of-physics-students-honored-with-two-national-awards/>

http://seguingazette.com/news/article_e7c84390-e329-11e5-b47a-1fd7e3d0b10d.html

<http://meetings.aps.org/Meeting/TSS16/Session/B3.2>

Activity Photos

Please include captions and credits for each photo. By including photos below, you are giving SPS and the American Institute of Physics permission to use these photos in their online and printed publications.

We are not sure who took each picture, but for publication purposes “TLU SPS member” can be used.







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If you have any questions, please contact the SPS National Office Staff
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