SOCIETY OF PHYSICS STUDENTS
An organization of the American Institute of Physics

Future Faces of Physics Award Report

Project Proposal Title	CSUSM for Diversity in Physics
Name of School	California State University, San Marcos
SPS Chapter Number	0853
Project Lead (name and email address)	Carina Maciel Macie009@cougars.csusm.edu
Total Amount Received from SPS	$500.00
Total Amount Expended from SPS	$500.00

Summary of Award Activity

The joint activity between CSUSM and Palomar set out to provide students from underrepresented minorities in STEM and socially disadvantaged communities a day of learning at Palomar. Students from San Marcos Middle School and Woodland Park Middle School had the chance to not only get exposure to a planetarium show but also hear stories of the journey of students through STEM fields, learn about plasma, watch a chemistry demonstration, and speak with a representative of JPL.

Statement of Activity

Overview of Award Activity

The activity consisted of taking 8th grade students from San Marcos Middle School (SMMS) and Woodland Park Middle School (WPMS) to the planetarium at Palomar College for a day of physics and STEM related activities. The first part of the project was held on 5/28/19 where 200 WPMS students would be attending. This date had been switched with SMMS due to a scheduled event WPMS had on the 30th of the month. SMMS thus attended on 5/30/19 with 110 students.

The day started with the volunteers from CSUSM and Palomar meeting at Palomar at 8:30 am to check in and receive the schedule for the day. The buses from WPMS arrived around 9:25 am and the students were split into six different groups where they met up with their volunteers. Due to the large number of students and the limited seating in the planetarium, the students were split into A group and B group. The volunteers then led the students to either the classrooms or the planetarium where half the students would take part in a full dome show while the other half, split in three subgroups, would rotate between

three breakout sessions. After the show ended, the students would then switch and repeat the process as shown in the schedule below.

	Group A1	Group A2	Group A3	Group B1	Group B2	Group B3
10 am - 10:20 am	**Planetarium Show** 10 am -11:15 am			**NS-137**, video chat with NASA Representative Oscar Avalos	**NS-139**, CSUSM Chemistry Club	**NS-138**, Student experience panel with Joel Marroquin and Jesus Perez
10:25 - 10:45 am				**NS-138**, Student experience panel with Joel Marroquin and Jesus Perez	**NS-137**, video chat with NASA Representative Oscar Avalos	**NS-139**, CSUSM Chemistry Club
10:50 - 11:10 am				**NS-139**, CSUSM Chemistry Club	**NS-138**, Student experience panel with Joel	**NS-137**, video chat with NASA Representative Oscar
					Marroquin and Jesus Perez	Avalos
11:10 - 11:25 am	**Bathroom break at Planetarium**			**Bathroom break at NS Lobby**		
11:30 - 11:50 am	**NS-137**, video chat with NASA Representative Tom Nolan	**NS-139**, CSUSM Chemistry Club	**NS-138**, Student experience panel with Joel Marroquin and Jesus Perez	Planetarium Show 11:30 am- 12:45 pm		
11:55 - 12:15 pm	**NS-138**, Student experience panel with Joel Marroquin and Jesus Perez	**NS-137**, video chat with NASA Representative Tom Nolan	**NS-139**, CSUSM Chemistry Club			
12:20 - 12:40 pm	**NS-139**, CSUSM Chemistry Club	**NS-138**, Student experience panel with Joel Marroquin and Jesus Perez	**NS-137**, video chat with NASA Representative Tom Nolan			

After the full rotation, the students would have lunch and then return to their buses. The schedule for SMMS was similar, however the volunteers would start the day at the middle school. After splitting the students into six groups, the teachers and volunteers would walk the students to Palomar where the groups would separate with half going to the planetarium and half to the breakout sessions, following a similar schedule as WPMS. After the students' lunch, everyone walked back to the middle school to end the activity.

Palomar was able to provide clinch bags for the students, who were also able to receive pens, pencils, CSUSM folders, NASA stickers, and flyers with information on the university, SPS, and information on

taking classes at Palomar College. Many of these were gifts or leftovers from previous years and thus not included in the budget.

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

With the purpose of promoting physics across cultures, we decided to work with some local middle schools that we knew had a high number of students from cultures underrepresented in physics based on the student enrollment listed below:

Student Group	Percent of Total Enrollment
Black or African American	1.2%
American Indian or Alaska Native	0.1%
Asian	2.8%
Filipino	2.3%
Hispanic or Latino	81.2%
Native Hawaiian or Pacific Islander	0.5%
White	11.9%
Two or More Races	0.0%
Other	0.0%
Student Group (Other)	**Percent of Total Enrollment**
Socioeconomically Disadvantaged	78.2%
English Learners	22.6%
Students with Disabilities	16.2%
Foster Youth	0.1%

Student Group	Percent of Total Enrollment
Black or African American	2.3%
American Indian or Alaska Native	0.4%
Asian	4.7%
Filipino	2.8%
Hispanic or Latino	48.4%
Native Hawaiian or Pacific Islander	0.4%
White	41.1%
Two or More Races	0.0%
Other	0.0%
Student Group (Other)	**Percent of Total Enrollment**
Socioeconomically Disadvantaged	48.7%
English Learners	9.0%
Students with Disabilities	15.3%
Foster Youth	0.1%

(Left: San Marcos Middle School Accountability Report of the 2017/2018 school year, Right: Woodland Park Middle School Accountability Report of the 2017/2018 school year

In order to accomplish our goal, we set out to encourage students to pursue studies in STEM through different means. The planetarium show was set to not only provide the students with an experience they may not have had before, but also to inform them about different aspects of the universe and opportunities for future visits if interested.

One of the key points we wanted to emphasize to the students was the different paths one can take after high school whether it is a university or community college first. We did this by having two students give their stories of their journey to where they are now and where they are headed. One of the students discussed how he made it through university and got accepted to a PhD program. The other student discussed how he made it to college despite being born out of the country and managed to transfer over to a university. Following each student's story, they presented a lecture and demo for the students. One consisted of a demonstration on plasma using a tesla coil and neon tubes and the other on pop rocks and soda. The students were meant to serve as people they could relate to as one of our volunteers was a former student of SMMS. The students' talk was set to encourage the middle schoolers to keep studying in STEM fields by discussing the struggles and work put to achieve their goals. The demonstrations were set to provide examples of different topics in the STEM field as one focused on physics and the other on chemistry.

The last breakout session was similar to the student panel but with the perspective of a representative of JPL. We had four representatives of different cultures, one being of Hispanic background, discuss their work and paths to how they got where they are now through video chat. After each session, the students had a chance to ask questions to the representatives and student leaders.

Impact Assement: How the Project/Activity/Event Influenced your Chapter

The project helped to form and strengthen relationships not only among our SPS members but also between departments and schools. Our collaboration with Palomar introduced us to their new outreach coordinator and stem center representative. We also had the chance to meet and plan the event with them alongside the middle school teachers of each school. The help we received from our chemistry department also helped to strengthen our relationship with the American Chemical Society on campus, especially since one of the volunteers is the club president.

This project helped to improve our members social skills to communicate with all those involved. The meetings held to plan the event also served to build on leadership skills to serve as representatives of the school, and problem-solving skills when an issue or bump would occur in the midst of planning the event. The group of students that helped organize the event are:

Jesus Perez – 2018/2019 SPS club president and now graduate of CSUSM. Co-representative of CSUSM that took part in planning the event, recruiting volunteers, and leader of the info sessions for the volunteers.

Carina Maciel – 2018/2019 SPS club vice president and graduate of CSUSM. Co-representative of CSUSM that oversaw communication with representatives of Palomar College and JPL.

Andrew Gonzales – Recent graduate of CSUSM. As a student studying to become a teacher, helped in creating the pre and post surveys that were distributed to the students.

Key Metrics and Reflection

The Future Faces of Physics Award is designed to promote projects that cross cultures. What cultures did your project attempt to bring together? (Please be as specific as possible.)	The goal of our project was to provide outreach towards students from socially disadvantaged and underrepresented minority groups in physics and other STEM fields. The middle schools involved showed a high number of our target groups such as SMMS which had 81.2% hispanics and WPMS that had 48.4%.
How many attendees/participants were directly impacted by your project? Please describe them (for example “50 third grade students” or “10 high school volunteers”).	There were 310 students from the two middle schools, 11 volunteers from our university’s physics and chemistry department, and 8 volunteers from Palomar.
How many students from your SPS chapter were involved in the activity, and in what capacity?	We had 2 members organize the event with representatives of the other schools. 7 active members were in charge of leading the students throughout each session and one of the members took part in leading a breakout session.
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?	The amount received from SPS covered a part of the total budget. The rest was mainly provided by other departments of the university which was $2000.
Do you anticipate repeating this project/activity/event in the future, or having a follow-up project/activity/event? If yes, please describe.	Hopefully we are able to repeat this project next year as this was the third time planning this event and many of the representatives and

	students from the different schools seemed to enjoy it. We hope to have left an impact on the teachers, students, and volunters to repeat the project or at least keep the relationships we made as many of the officers have graduated and will be moving on.
What new relationships did you build through this project?	We managed to build relationships with new members from Palomar, CSUSM, the local middle schools, and even members of JPL that helped out on this project and other events prior.
If you were to do your project again, what would you do differently?	This project involves a lot of people and time to organize but the interest of the people involved was what pushed us to continue it. One thing we wish to incorporate is more interactive demos for the middle school students, which would require more funds, planning, and time on the day(s) of the event.

Expenditures

The budget for the project included planetarium tickets for the 310 middles school students, volunteers, and staff. Each ticket costing $4 each. Additional funds were provided by the Department of Inclusive Excellence at our school. The amount requested had been greater than needed due to the original expected number of students, for which some could not make it to the day of the event. Palomar College was able to provide clinch bangs and other goodies for the students.

Expenditure Table

Item	Please explain how this expense relates to your project as outlined in your proposal.	Cost
Planetarium Tickets	Cosmos film + presentation	$500.00
Planetarium Tickets	Cosmos film + presentation	$860.00
District Buses (4)	Transportation of WPMS students	$300.00
Food for Volunteers	Food	$205.00
	Total of Expenses	$1865.00

Activity Photos

ACS members talk about their journey from Palomar to CSUSM before their chemistry demonstration.

Students watch a short video on plasma and tokamak prior to the tesla coil demonstration

Students and volunteers split into their respective groups

If you have any questions, please contact the SPS National Office Staff
Tel: (301) 209-3007; Fax: (301) 209-0839; E-mail: sps-programs@aip.org