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

Future Faces of Physics Award Report

Project Proposal Title	3…2…1…Blast off! It really is rocket science.
Name of School	Henderson State University
SPS Chapter Number	2798
Project Lead (name and email address)	Matthew Taber mtaber107@gmail.com
Total Amount Received from SPS	$400.50
Total Amount Expended from SPS	$400.50

Summary of Award Activity

3…2…1…"Blast off!" brings rocket science to low-income, minority, and female students, introducing them to the excitement of physics through rocketry. Henderson State University's SPS chapter held a workshop for rural-area high school and middle school students to introduce them to the fundamentals of flight, culminating in a big launch!

Statement of Activity

Overview of Award Activity

We proposed a project that is exciting, fun, and full of physics; we pulled it off. Our project involved low-income, minority, and female students, as well as students from districts that do not have physics classes.

Description:
"3…2…1…Blast off!" was an afternoon rocketry workshop and launch. While we had 26 students sign up to attend, split evenly among male and female, high school and middle school, only 10 showed up, with one 10th grader, one 8th grader, seven 7th graders, and one 6th grader. Of these students, 4 were female. Each student received their own Estes rocket to build and keep. The workshop and launch did not cost anything for those who participated. SPS members Matthew Taber, Joshua Jasper, and Todd Baum worked with the students in groups to construct their rockets. We stressed the importance of safety when building and launching rockets and taught the students about each step from construction through launch.

Goals of the Project:
This project introduces physics to a demographic who does not have the opportunity to explore physics in their own schools. We showed our guest students that physics is accessible, physics is applicable, and most of all that physics interesting in ways they might not have imagined before.

Our goals included:

1. Introducing physics to a young audience who would not normally be exposed to this science in high school.
2. Encouraging our young audience to focus on their academic studies and pursue higher education, since many do not have role models who have achieved a college degree.
3. Stimulating students to investigate in a scientific manner.

Background and Context:
Our university recently became involved in high-powered rocketry. Not only is this incredibly exciting, it provides so many opportunities to explore physics, atmospheric science, and engineering design. We have held a few local model rocket launches and even a model rocket build event. These events appeal to kids of all ages, from our youngest participants in 4th and 5th grade to our "grown-up" kids. Because of the excitement and appeal of rocketry, we believe rocketry is a great hook for a target audience who generally are not exposed to physics at all.

This semester, our SPS chapter held a picnic on October 6th to enjoy some fellowship and burgers and to become familiar with our rocket launch systems. We learned about inspecting rockets for safety, loading rockets, and setting up the launch pads and launch controls. Following this event, we worked with over 350 boy scouts at their Camporee event to construct and launch over 200 rockets.

Our final rocket event of the semester was our Future Faces of Physics rocketry workshop. By this point, we are all very familiar with loading and launching rockets and some of us are pretty good at building them too!

We saw a particular interest in the students to question the design of the fins and shape of the rocket. This is an excellent response since this seems to promote the kind of curiosity we wish to instill with these workshops. Many kids wondered how the flight would be affected if we used curved wings, or a thinner body, or rockets out of different materials. Many kids also wondered how different parachute material, and if the timing of the parachutes would affect the rockets decent. So not only did we provide the opportunity for learning under the Future Faces of Physics Rocketry workshop, we saw genuine gain of interest and inquisitiveness. – Matthew Taber

Working with the youth during this workshop was a great opportunity for us as students to practice our leadership and teaching skills. Also, our improvisational abilities were put to the test, but we were able to overcome; pull together as a team, and work as a well oiled machine. I personally believe it was a very refreshing for us to see young people generally interested in Rocketry and Physics. – Joshua Jasper

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

Our surrounding community consists of many low-income and minority families. Many students who attend our university are first generation college students. We wanted to reach those people through this activity. We hope that, by showing these students that women, minorities, and first-generation college students can be successful, we will inspire those who attend.

Our goals included:

1. Introducing physics to a young audience who would not normally be exposed to this science in high school.
2. Encouraging our young audience to focus on their academic studies and pursue higher education, since many do not have role models who have achieved a college degree.
3. Stimulating students to investigate in a scientific manner.
4. Having tons of fun!

While we did not have the number of students we had hoped for, we did introduce some young minds to physics through rocketry. These students were brought to our college campus to experience the atmosphere. Hopefully, they will remember this and view college in a positive light in the future.

In our original proposal, we stated: “In order to be successful as a chapter event, we would like 5 or more chapter members to participate. In order to be successful for the students we serve, we want to be sure that all 20 spots are filled.”

According to these metrics, our event was not really successful – we only hit approximately 50% of each number we suggested; however, everyone who attended (even the SPS members who were teaching) learned something

new, we reached a group of students who wouldn't normally be exposed to physics at all, and we introduced those students to the university campus and a college environment. So, although we didn't meet our metrics for a successful event, we did have a positive outcome.

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

By promoting and inciting the curiosity of the students, we came to better understand ourselves. Events such as these reinforce the reasons many of us chose to enter the field of physics. These events also showed students some practical applications in the sciences. These opportunities remind us that although we are helping to create the future faces of physics, we are ourselves students seeking to become future faces of physics. We learned with the students how to build more advanced rockets for future demonstrations and flights. We realize that this workshop was an opportunity for all involved to grow intellectually and advance our interest in the sciences.

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?	**We had 1 African American student participant (and 1 African American SPS member participant). We had 4 female students participate (and 1 female SPS advisor participate). We had 10 students from rural demographics that do not have strong physics programs in their schools.**
How many attendees/participants were directly impacted by your project? Please describe them (for example "50 third grade students" or "10 high school volunteers").	**10 middle school and high school students**
How many students from your SPS chapter were involved in the activity, and in what capacity?	**3 SPS members were involved in carrying out the activity. (5 total were involved in the planning)**
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?	**Funding was sufficient. We had plenty of supplies for our participants.**
Do you anticipate repeating this project/activity/event in the future, or having a follow-up project/activity/event? If yes, please describe.	**We would like to repeat this event in the Spring semester, using our remaining rockets.**
What new relationships did you build through this project?	**We strengthened relationships with Arkadelphia School District science teachers, we strengthened our relationship with the Educational Renewal Zone Director at HSU, and we built a new relationship with a science teacher in Magnet Cove (a nearby city).**
If you were to do your project again, what would you do differently?	**When we repeat this project, we will break the students into groups based on the type of rocket they are building. It was a little confusing to have students building multiple types of rockets within the same group.**

Expenditures

Expenditure Table

Item	Please explain how this expense relates to your project as outlined in your proposal.	Cost
Rocket Purchases	We purchased a total of 28 Estes rocket kits to each student to build. (we purchased a few extra so that SPS members could build in case we had any missing parts)	213.83
Launch Pad purchases	We purchased 6 Estes launch pads to ensure that we could have a successful launch.	142.00
Rocket Engines	We purchased 1 bulk pack of A8-3 rocket engines and 1 bulk pack of B6-4 rocket engines	96
	Total of Expenses	451.83

Activity Photos

The following photos were taken by Dr. Shannon Clardy, SPS Advisor

Participants opening rocket kits.

Participants opening rocket kits, with Magnet Cove science teacher

SPS president Matthew Taber helps students pack their rockets for launch.


SPS member Todd Baum helps student Lizzie Horton load her rocket on the launch pad

Go for Launch!

The following photos were taken by parent of a student participant Dr. Cindy Fuller

SPS member Joshua Jasper helps participant Ayden Hewitt load his rocket on the launch pad.

SPS Advisor Dr. Shannon Clardy helps students pack rockets for launch.

Students Jenna Holmes, Marissa Brodnax, and Macee Harper recover their rockets after launch.

The following pictures were taken by SPS member Joshua Jasper

The students pose with their rockets before we go outside for launch.

More pictures and videos are posted on the HSU Society of Physics Students facebook page.

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