



SOCIETY OF PHYSICS STUDENTS

An organization of the American Institute of Physics

Future Faces of Physics Award Proposal

Project Proposal Title	The Stuff in Space
Name of School	Saint Joseph's University
SPS Chapter Number	6186
Total Amount Requested	\$500.00

Abstract

Saint Joseph's University is beginning a partnership with local high school Motivation High School to encourage students from underrepresented communities to pursue physics. To initiate this, an outreach event will be held to peak the students' curiosity about phenomena in space using concepts they are learning in their physics classes in school.

Proposal Statement

Overview of Proposed Project/Activity/Event

- Brief description – SPS chapter will travel to Motivation High School to conduct an outreach event for the students there. Our theme for the event will be space and relating their current physics knowledge from their algebra based high school courses to fun applications relating to this. For each separate class of students, we will set up five different stations in which the students can engage in where there will be a demonstration, calculation, or explanation of some topic in space. Station 1 will relate the conservation of momentum to the function of rocket ships. Station 2 will show how the doppler effect is used to determine the age of the universe. Station 3 will use Newton’s second law to explain stellar thermal equilibrium and stellar collapse. Station 4 will discuss centripetal forces and its role in the discovery of dark matter. Station 5 will be an introduction to special relativity.
- Goals of the project – One goal of this project is to connect the material the students are exposed to in class to exciting real-life applications in physics research and engineering. This could provide the students with inspiration to perhaps pursue a field relating to physics since they will shortly be going to college. Additionally, this project will serve to initiate a mentoring relationship between our SPS chapter and the local high school.
- Intended audience – The audience is the physics students at Motivation High School. This outreach event should involve up to 105 students.
- Background and motivation – Despina Nakos, an alumna of the University of the Sciences (Saint Joseph’s absorbed University of the Sciences this year), reached out to our SPS chapters to see if we could partner with her high school right by our campus and begin a physics club or potentially take part in the IPYT in the next coming years, mentoring the kids along the way. This initial outreach event is to begin our institutions on this journey and start building a rapport between the two institutions.

How Proposed Activity Promotes Physics Across Cultures

This project incorporates many aspects of physics and turns them into engaging activities for the students at Motivation High School. A majority of the student population at this school identify with communities underrepresented in physics. A more in-depth introduction into these physics topics will serve to promote interest in pursuing physics further. Introducing the students with more “advanced” physics topics will inform them about what they have to look forward to learning in the future if they decide to take any upper-level physics courses. Ideally, these activities will be fun and spark interests in all of the physics topics that will be presented. This would promote the students to learn more about the physics topics, either on their own or in other classes, creating a positive relationship between these students and physics. These activities will be knowingly presented to an audience of multiple cultures, so each SPS member will keep an open mind when conducting their activity. Working with students from a variety of backgrounds will—hopefully—encourage these students to love—and maybe pursue—physics in the future. We want to show the students how fun physics can be and inform them about how much more there is to learn.

Plan for Carrying Out Proposed Project/Activity/Event

- Personnel - The current SPS President will work in conjunction with their successor, who will be elected this December, to oversee the planning and execution of this event. The SPS advisor will aid in ensuring that deadlines are met.
- Marketing – The teacher we are working with will provide the students all the information they will need. We will also make a flyer to hand out or email to the students so that they have a physical copy of the information.
- SPS member participation - At least five SPS members are confirmed volunteers to run the five different stations. An email will be sent out to our mailing list to recruit further volunteers for setting up and providing additional support in running each station.
- Expertise – The chapter members will consist both of those experienced in outreach and those who have the required knowledge of the topics through classes and other events as well as those willing to learn these things. The experiences of the newer members of our chapter will be imperative to establish a rapport with the students and teachers at this high school for future years.

Project/Activity/Event Timeline

January 2023 - By the end of the month, we will finalize the date that the event will run in collaboration with the school. This will be announced early in order to maximize the size of the audience.

February 2023 - By the end of the first week of the month, all of the demonstrations/ required items will be ordered to give the products time to be delivered, prepped, and ready to go. After each demonstration is delivered, a team member or project lead will make sure it is functioning properly and have it ready for training.

March 2023 - The whole month will be dedicated to training sessions at least once a week for the members involved. Each member will be responsible for proper use of the equipment, explanation of their concepts, and how it is relevant to the community. The training sessions will also contain lessons on how to engage with the audience and provide a fantastic and fun experience during the outreach.

April 2023 - During the first week, there will be a final training session where the whole program will be run through the allocated amount of time. This ensures the event will run as smoothly as possible. After the final training session, we will then be ready to launch the project and conduct the outreach at said school.

May 31, 2023 - Submit the final reports and any other dues by this date.

Activity Evaluation Plan

The success of the event will be determined based upon the responses received from the audience during and after the event. At each station, after the activity is complete, the SPS member running the stations will ask the students if they have any questions, if they thought the topic was interesting, whether or not they understood what was being taught, and whether or not they had fun. At the end of the event, we will have an open discussion with the whole section to see what they liked, what they didn't like, what they learned, suggestions for the future, and any other general inputs the students would like to make. After each event is held for each section of students, we will discuss how it went with the teacher to see what she liked or didn't like and her overall thoughts.

A survey will be sent out to the students to fill out asking questions regarding their interest in higher education, pursuing a career in STEM, their interest in STEM topics, and other questions like this. Then we will ask how they liked or didn't like the activity and how the activity might have impacted the answers to the previous set of questions. Questions like what activity has peaked the students interests or what has changed if anything about your future plans due to the activities will be put forward. We will keep a record of the responses.

Budget Justification

The proposed budget will be used to fund the equipment and supplies required to demonstrate and effectively describe each concept to the students. Visuals are extremely important to teaching physics. In learning new applications to previously learned physics topics, this is especially true. At stations where demonstrations are held, the supplies for these demonstrations need to be purchased to provide a proper hands-on experience. White boards will be supplied for each station so our SPS volunteers will be able to formulate calculations and other visual aids to further help in allowing the students to grasp these new concepts. Any other sources of money that this project receives will come from the Saint Joseph's University SPS Chapter if needed.