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| **Project Proposal Title** | **“Trickery of the Eye:<br>The Physics of Optical Illusions”** |
| **Name of School** | **University of the Sciences** |
| **SPS Chapter Number** | **5619** |
| **Amount Requested:** | **$500** |


**Abstract**

Our eyes often play tricks on us, forming illusions in our minds that aren’t true. This educational outreach will highlight how optical illusions use patterns, colors and light to deceive us to view images that don’t exist, motion where there is none, and other trickery that can be explained by physics concepts.

**Proposal**

Section I: *Overview of Outreach Event*

In previous years, our group has participated in the Philadelphia Science Festival, however, with the COVID pandemic still looming, the festival has been cancelled. This alteration in venue has caused our team to cumulate a plan for a "traveling exhibit" of optical illusions, which could be presented on campus, or other locations to be determined closer to the event. The project itself will be an interactive illusion exhibition consisting of several exhibits to get the public immersed into a reality altering experience. The exhibits will include:

1. Tables set up with 3-D demonstrations of optical illusions (including an impossible table, holograms, a praxinoscope, LED lamps and more)
2. Panels of 2-D optical illusions for the participants to analyze on their own or with friends.
    a. Panel A will present optical illusions of patterns and colors
    b. Panel B will present optical illusions of cartoons and photoshop
3. Interactive demos will also take place where the group will explain the physics behind the illusions to the public as well as construct a do-it-yourself project with the participants.
4. The group will use their understanding of the physics behind optical illusions to construct and present their own reality altering pieces.

The project aims to immerse the public into a reality-altering experience while educating on the physical principles at work behind the illusion. We are reaching out mainly to college students, as well as professors, the general public and middle and high school students from several schools belonging to the Philadelphia STEM Collective. The setting will be on the USciences campus, however, the event is open to anyone who has a desire to learn about physics.

Section II: *How Event Promotes interest in Physics*

In an age where social media and internet browsing has become very prevalent, the information at our fingertips is endless, and some of the content is a mere illusion. Illusions in the media and society have formed a gap between reality and perception, and it is up to us to determine what is truth and what is fiction. This experience aims to convey the malleability of perception through visual and interactive aids in order to depict that there are many ways to perceive reality, and only through deeper analysis could we find the trick behind the illusion. Through conducting a fun event that has real world connections and applications, participants will understand the physics of illusions and the malleability of the mind when presented with illusions in society, social media, advertisements and nature.

Section III: *Plan for Carrying out the Event*

Personnel - A committee of four students are involved in the core planning of this project. Progress will be monitored through the acquisition and construction of exhibits for the event, along with the ability to explain the physics behind the illusions. This team of four students will be expected to have a well rounded understanding of the concepts in order to clarify any questions the public may have.

Marketing - Marketing for the event will be done primarily through social media and internet correspondence through email to relay the message to the student population of Usciences and neighboring schools.

SPS member participation - Several other SPS members will be available to help execute the event. Their responsibilities will differ from the core four as they will be more involved with setting up and ensuring the event runs smoothly behind the scenes as the main committee presents demonstrations.

Expertise - Our team is artistically inclined and feels that the best way to convey information to the public is through visual means. In addition, the majority of personnel have participated in previous outreach events, and are well equipped with how to peak the participant's interests and keep them engaged.

Section IV: *Event Timeline*

Projected In Person Plan: As mentioned earlier, the festival at which the event normally takes place is not occurring this year. Therefore, there is no scheduled date yet for the event, however, it is planned to take place sometime in April. The week before the event, the group will meet to finalize the exhibits and set them up the previous night for the event. By March, all the demonstrations should be in the group's possession, and after rounding up the demonstrations, the group will meet to delegate responsibilities of demonstrations, and practice. The order for the demos will be placed as soon as funding is received, if granted. Between the placement of the order and the acquisition of goods, the group will proceed with researching the demonstrations to gain a well rounded understanding of the physics behind the illusions to convey to the public.

Emergency COVID Virtual Plan: The exhibit is meant to be enjoyed in person, however, with the given circumstances, the exhibit can be made virtual over zoom. Instead of panels of 2-D optical illusions, we can present them on the screen, asking the audience to make comments about their observations. The demonstrations can also be videotaped and then explained over zoom, or presented over zoom entirely, depending on the nature of the demonstration. Alternative interactive demos will be constructed using household items in case the event is remote.

| Activity Evaluation Plan |
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| In order to evaluate the success of the event, several steps will be taken. Attendance or participants will be logged either manually or through the form of a QR code. At the end of the event, a survey will be conducted to determine which station was the most impactful, which image resonated the most, which demonstration was most enjoyed, and what this experience taught the participant about perception and reality. The survey will help assess the strengths and weaknesses of the event, and will give a clear sense of which demonstrations impacted with the public most, and which need to be re-evaluated or better explained in the future. |
| **Budget Justification** |
| The ultimate use of the funding is to educate the public on the physics of optical illusions while immersing them in a reality altering experience. The majority of the funding will go towards physics demonstrations to act as teaching tools for the public. In addition, a portion of the funding will be allocated to purchasing materials to design and construction demonstrations by the team. Furthermore, to save costs, the team will be using some equipment our SPS chapter purchased in previous years, such as an infinity mirror and disappearing beads. Lastly, a portion of the funding will be used towards shipping costs as well as refreshments for the event. We also plan to do more fundraising for the event through Giving Tuesday. |