



# SOCIETY OF PHYSICS STUDENTS

An organization of the American Institute of Physics

## Marsh W. White Award Proposal

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Project Proposal Title	Science Olympics
Name of School	Henderson State University
SPS Chapter Number	2798
Total Amount Requested	\$497

### Abstract

We would like to host a Science Olympics to create an unforgettable scientific experience for high school students in the primarily rural schools surrounding our area. This experience will incorporate the fun of hands-on science with the stimulation of competition engaging students in lessons they will remember for a lifetime.

# Proposal Statement

## Overview of Proposed Project/Activity/Event

The Society of Physics Students at Henderson State University and its dedicated members have decided to host a Science Olympics along with our partners in the biology, chemistry, and math clubs at our university. The purpose of this event rouse interest primarily in physics, but also in the other sciences, among High School Students.

We chose our target group to be high school students because it is a very opportune time for them to be exposed to ‘outside the box’ physics. Our objective is to provide them with a fun and educational one day experience, and encourage them to pursue the study of physics, since they are on the verge of starting college, and deciding majors.

The event will include a variety of competitive activities. There will be eight different events school teams can choose to participate in – two in each subject area. In the area of physics, one event we will hold is a toothpick tower building event. Teams will use a box of 750 round toothpicks and a 4oz bottle of Elmer’s white glue. They will build the tallest free standing tower that they can build that will support 200 grams of mass at the highest point. Points will be awarded for tower height, support of the required mass, ingenuity of design, and the ability to support additional masses. Our other event will be to have teams build rockets that can carry an uncooked egg in a special section of the rocket. The rockets must function on Estes C6-5 rocket engines to carry the egg on its flight and return it safely to Earth without harm. The rockets cannot be built from kits. Teams will be allowed two launches, so they may take the better of the two (as long as their rocket allows!). This event will be judges on the survival of the egg, ingenuity of design, and duration of flight. We may also have an overall skit event in which teams put together skits that incorporate a list of terms from each of the sciences in a creative why.

We will be approaching high schools in surrounding areas, and each school can have multiple teams consisting of 4-6 members each. Team members can rotate in, competing for different events. However, the maximum number of students on one team is six. The winners for each individual event will be awarded with trophies and ribbons, and the team that acquires the highest overall score will be awarded the Team Trophy. The winning school will also receive prizes from companies like Pasco or Vernier who choose to sponsor our event. For our Physics Olympics held in 2012 (funded by a Marsh White Award), Vernier donated gift certificates for the classrooms of the winning teams. All participants will receive certificates of appreciation. After the competitions, there will be a Planetarium show at the University Planetarium, and schools can stay until after dark to watch the stars in our Star Party, which is another of our regular Marsh White Outreach events.

We would combine funds from the Physics Department at Henderson, SPS funds, funds from the other science clubs and the Marsh White Outreach Award to make this event a success. We will also approach local businesses for support in providing food. Most of the Marsh White award will be used in buying trophies and certificates, as well as providing lunch during the event. A more detailed Budget Plan is in the Budget Estimate Section.

The interest in hosting this event arose in our chapter because our current vice president, Matthew Taber, participated in the Physics Olympics we held with his high school team. He wondered why we have not held another. As discussion continued, members of the biology, chemistry, and math clubs expressed interest in holding events as well. The event will be organized by our chapter of SPS. Our advisor will handle team registration. SPS will reserve rooms, provide lunch, and run the logistics. The other science clubs will be responsible for prizes in their areas.

## How Proposed Activity Promotes Interest in Physics

This project will invigorate many of our nearby high school physics classes. It will give teachers an opportunity to have students create hands-on projects while discussing topics such as force due to gravity, stress and strain, air resistance, acceleration, terminal velocity, pressure, and thrust. The stimulus of competition will allow students to have fun while encouraging them to test their ideas and really understand the material. In addition to introducing physics topics, this activity encourages scientific exploration and inquiry by its very nature. By engaging students, and all of their five senses, in learning, we are creating the opportunity for an unforgettable experience.

Our university is based in a rural community. Many of the surrounding schools do not have a physics class or have very limited resources for hands-on science. By creating this event, we are giving students an opportunity for hands-on science, while holding a very visible event. The visibility will hopefully be a catalyst in the community to draw interest in science. This event could be that one experience that turns the light bulb on for some of the participants and fuels their love of science for a lifetime.

## Plan for Carrying Out Proposed Project/Activity/Event

- The officers of our SPS chapter will be in charge of the logistics of this event. The SPS advisor will recruit judges from Henderson science faculty.
  - The officers will work with officers in the other participating clubs to set a competition date, finalize event rules, and create a website where high schools can get specific rules and information. This should be completed by the time we come back from winter break (mid-January).
  - The SPS advisor will work with our local STEM center and use the math/science state-wide listserv to send the information to all science teachers throughout the state.
  - The officers will then order certificate paper, prize ribbons, and discuss a winning team plaque with a local business to ensure that all prizes are in order. This should be completed by 3 months before the competitions (mid-February).
  - The officers will contact businesses like Vernier, Pasco, SparkFun, and Edmunds Scientific to request donations for team prizes. This will happen throughout the month of February. We will recommend that chemistry, biology, and math clubs contact companies in their areas as well.
  - The officers will build their own projects following the rules of the competition to gain a better appreciation for the challenges they have put before the high school students. They may show their projects in an exhibition at the actual event. This will happen through the spring semester leading up to the event.
  - One month before the event, the officers will ensure that food services are lined up for the Olympics. We will make sure that lunch is planned to incorporate any dietary restrictions that participants may have.
  - The week before the event, SPS members will communicate with the participating teams to ensure that everything is in place for a fun and successful event.
- The officers of the other science clubs will provide awards for their events. These awards will be coordinated with the physics awards.
- Marketing will be done through the state-wide math/science listserv by an email from the SPS advisor to all science teachers. In addition, the university's officer of Marketing and

Communication will put out a press release. All information about the competition will be on a public website, as well.

- SPS members will serve as monitors for each of the events, runners with scores, guides around the university, for set up and clean up, and as liaisons with each competing team. We expect that at least 8-12 SPS members will assist. Biology, Chemistry, and Math club members will fill similar roles for their events.
- Our vice president, Matthew Taber, is our only SPS member who has experienced an event like this before (the one held by our own chapter years ago). However, our advisor has good records of the previous event, since it was recorded by previous officers, and has evaluation forms from the previous event, so we are able to start from that information and adjust our planning.

### **Project/Activity/Event Timeline**

- The event will occur in late April or early May.
  - One week before the event, SPS members will contact each participating team to ensure that they have been working diligently on their projects and to ensure that they have all the information necessary for a good experience.
  - One month before the event, SPS officers will ensure that food arrangements are made.
  - Two to three months before the event, SPS officers and the SPS advisor will contact scientific supply companies and ask for donations for the participating classrooms.
  - Three months before the event, SPS officers will select an assortment of awards for individual events and teams, as well as certificates for participation. These will be ordered after we have a better idea of how many teams will participate. We will also price and prepare a plaque from our local printing place for the winning team. The plaque will not be finalized until the day of the event when all of the results are in, so a group of SPS members will have to present the plaque to the winning team at their school following the event.
  - Three months before the event, the SPS advisor will contact schools in person and via the state-wide math/science listserv to find interested teachers who will coach the teams at their schools.
  - Four months before the event, the SPS officers and officers of other clubs will finalize all of the rules and events, and put these up on a website so that the information is easy to find.
  - Throughout the time before the competition, each science club will also work on the projects they have assigned in their area, following their own rules.
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- At the end of the event, we will ask participants, judges, and science club members to fill out an evaluation of the event for future reference. We will follow up with all schools involved in the weeks following the event to see if there are other ways our SPS members can serve as role models and mentors to their students.

## Activity Evaluation Plan

At the end of the event, we will ask student participants, judges, and science club members to fill out an evaluation, similar to the one we have from our Physics Olympics. This will allow us to know what went really well, what could use improvement, and what the participants enjoyed the most.

We will keep records from the event including companies contacted for donations, from whom the food was purchased and what it cost, information on prizes, survey results, judging forms, and attendance numbers. In addition, we will have people assigned to take photos.

We will consider the event successful when we are able to draw in five or more teams to compete, we have eight or more members from our SPS involved, and we see that everyone is having a great time while doing something related to physics. This should be a learning experience for everyone involved.

## Budget Justification

Because we are located in a rural area, we would like to be able to invite schools to participate in this event without an entry fee. Teams would have to provide their own materials for each event, but hopefully, that would not be a prohibitive expense. We are requesting funds only for awards, certificates of participation, and to help fund lunch for everyone involved. After initial pricing, we estimate a total cost of those items at around \$497. We realize that these prices may change slightly if we have more or less participants (hopefully more!). Additional funds will come from the Henderson Physics Department to help cover food expenses (since we are certain this will cost more than \$4 per person), from our SPS chapter to publicity, and from the other participating clubs to fund awards in their areas. In addition, we will ask scientific supply companies to donate experiments, gift certificates, or supplies to be awarded to the classrooms of winning teams. Previously, Vernier, Pasco, and SparkFun have been generous enough to donate to our Olympics.