



SOCIETY OF PHYSICS STUDENTS

An organization of the American Institute of Physics

Marsh W. White Award Proposal

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Project Proposal Title:

ICy Snow Forts: Inspiring Engineering Through Imagination

Name of School: Ithaca College

SPS Chapter Number: 496

Total Amount Requested: \$268.40

ABSTRACT

To inspire future physicists and engineers, competing teams of young students will build a snow fort of their own design to be judged. The main constraint is each group must build their fort using a set of triangular, rectangular, pentagonal and hexagonal molds provided by Ithaca College's chapter of SPS.

PROPOSAL STATEMENT

We want to have groups of two to six students working together with all the molds to build a successful snow fort. Our budget only includes the creation of ten sets of four wooden molds: a triangular, rectangular, pentagonal and hexagonal. Ithaca College SPS members will craft the molds prior to the event. Each group will have a set of four molds to incorporate into their design. The students may only build their snow fort with products made from the molds given. The fort must have a roof and no holes in the walls other than doorways. They may sculpt with their hands and shovels, and receive some help from their parents and the SPS members to create their snow forts over the course of the daylong event. After, at a designated time, all of the snow forts will be judged and awarded by SPS members based on their appearance, style, size and the ability to withstand the punishing force of thrown snowballs. Students will be encouraged to think creatively with their partners, given their limited resources and time. Upon completion of the event there will be a small village of uniquely engineered snow forts!

Our main goal is to inspire young engineers to take an interest in physics through application and imagination. The construction of their forts will expose the students to stable configurations of geometric shapes. The project will also give young students a chance to talk to, work with, and play along side SPS members who want to show them how fun the application of Physics, Engineering, and general problem solving can be! Special focus will be placed on problem solving and task managing in a group setting, and also on planning to tackle a project that is to be judged in multiple ways.

Target participants are students in middle school, because they have the interest in building and working with their hands in the snowy Ithaca weather, and they are old enough to develop their own ideas for the snow forts. This event will be designed around teaching these students how to work together in groups to complete a project that is judged on multiple factors, and done with limited resources. As stated previously, SPS members will place special focus on these concepts as they help out throughout the day. Hopefully all the participants, volunteers and parents will be positively impacted by the creation of the snow forts.

Inspiring physics in students is an intrinsic value of our chapter of SPS. Our chapter hasn't done any event like this or heard of any event quite like this but we feel that the originality of this event will provoke participation by students and their parents. We are well positioned to carry out this event because many of our SPS members do early teaching fieldwork as part of Ithaca Colleges teacher education program at the Ithaca public schools. Also, professors here at Ithaca College are frequently involved with events at the schools.

Through activities like these we hope that students will be more likely to take physics class in high school. However, the tools that the students will need to utilize to solve such problems (building an snow fort with given specific resources and certain constraints) are necessary for every physicist to operate and solve

problems in the real world. 2 By thinking about multiple factors before considering a solution, by working closely with other students to finish a big task, and by managing time and schedule for a project, students at the middle school level will be developing essential tools for not just physics and engineering, but solving any sort of problem that presents itself in their future. All of these tools are vital in solving Context-Rich Problems in our undergraduate introductory physics courses, and ICy Snow forts puts students right in the context of the problem!

Noon on a Saturday will give us optimal parent and student availability to come to the middle school and participate with ample day light for snow fort construction. Also, some time in late January or February will be the most ideal time in Ithaca for snow, therefore, the best time for the event. Come December before Ithaca College's winter break starts or as soon as we receive funding we will start cutting and connecting lumber to make the molds for the event.

Personnel

- Ivan Tso , Kyle Stapleton will lead of the planning of the event , Frank Conde, Katherine Kennovan and Stefan Gurgurich will also aid in the planning of the event along with the guidance of a few physics professors at Ithaca College who have involvement with the Ithaca Central schools.
- Ivan Tso will monitor the progress of the event; Ivan will also be keeping up with the weather forecast to determine the ideal date to hold the event when there is enough snow on the ground. Also, I will oversee the production of the parts necessary to hold the event by involving myself in their creation.

Marketing

- We will partner with the teachers in the schools and the principles to broadcast this event to the school.
- We will produce a PDF flyer giving information about the event to be sent to Ithaca central schools to be posted inside the school buildings.

SPS member participation

The entirety of the Ithaca chapter of SPS will aid in the production of the molds. A staff of at least ten SPS members plus those interested in and studying education will be assisting groups in the event.

Expertise

We will be recruiting the expertise of professors, students on the physics education track at Ithaca College along with Ithaca Physics majors and Ithaca public school teachers to help aid and advise participating groups of young students building their snow forts during the event.

EVALUATION PLAN

Participation numbers

We will count the number of participants when the event is held. Before the event we will approximate how many will attend by having a sign-up sheet/email list.

Surveying participants

We will administer paper and oral surveys to the students in each group, the SPS members and volunteers aiding each group and the parents who involve themselves in the creation of the snow fort. Then take note

Questions asked will be:

- Did you enjoy yourself?
- What did you like/dislike about this event?
- What problems did you run in to?
- How did you fix them?
- What would you change about the event for the next year?
- Which was your favorite shaped mold?
- Would you be interested in further design and structure building in the future?

Feedback from key participants

Our main priority for evaluation will be to ask for feedback from the young students and ask for the assessment of the SPS members, volunteers and Ithaca College education students.

BUDGET JUSTIFICATION

We've picked 11 twelve-foot planks to be cut down into one foot and half-foot sections to produce the sides of the ten sets of cookie cutter-like molds for making the snow bricks. These sections are then waterproofed with the Thompson's WaterSeal applied by the brushes and then screwed together to allow them to be used in the snow without being weathered by the snow and also make it so the bricks do not stick to the molds. The snow shovels will be used to gather snow from the parking lot/playing field for the bricks and to sculpt the snow forts. The hot chocolate and cups will be used to further provoke participation to an outdoor winter event and keep the participants warm.

Without these supplies the event will not be able to successfully inspire young students to take interest in physics through application.