



# SOCIETY OF PHYSICS STUDENTS

An organization of the American Institute of Physics

## Marsh White Award Report Template

Project Proposal Title	ICy Snow forts: Inspiring Engineering Through Imagination
Name of School	Ithaca College
SPS Chapter Number	496
Project Lead (name then email address)	Ivan Tso ( <a href="mailto:itsol@ithaca.edu">itsol@ithaca.edu</a> ) Kyle Stapleton ( <a href="mailto:kstaple1@ithaca.edu">kstaple1@ithaca.edu</a> )
Total Amount Received from SPS	\$268.40
Total Amount Expended from SPS	\$257.11

## Summary of Award Activities

ICy Snow Forts is a collaborative outreach activity designed to engage students from the Boynton Middle School in an engineering competition using specific geometric shapes to create snow forts, aided by SPS members from Ithaca College. The structure of the event was communication with BMS administration and faculty, planning of tutorial instruction and fort creation, development of geometric mold prototypes, testing of those prototypes, and collaboration with BMS faculty to implement the outreach event. While the first 4 steps were taken, communication issues with faculty and time constraints set by weather prevented the outreach event from taking place at Boynton Middle School.

## Statement of Activity

### Overview of Award Activity

#### Description:

The project was an outreach event designed to get Ithaca College SPS members to participate in instruction and outreach outside of the campus on South Hill in Ithaca, NY. The planning of instruction, communication with faculty and administration at BMS, and construction of molds was done by SPS members at Ithaca College over the course of the winter, and the implementation of instruction and event participation was supposed to happen at the end of the winter season while snow was still on the ground.

#### Outcomes

Throughout the course of Winter 2015, the ICy Snow Forts team/club was able to complete communication with faculty and administration at BMS, completion of tutorial instruction packets for students to use before the event, completion of mold prototypes for use during the event, and prototype testing for the event. Due to communication and time issues with BMS, the snow fort construction event was never implemented.

#### Audience

The target audience for this project was middle school students in math and science courses at Boynton Middle School, the Ithaca City School District. Ithaca College SPS wished to engage students in the community with an engineering project that would stimulate planning with basic construction ideas and with geometric shapes, group work and task delegation, and fun in the snow.

#### Context

One of Ithaca College SPS chapter's goals to improve this year was to increase the level of outreach off of the Ithaca College campus. Given this goal, we designed ICy Snow Forts so that it would first include a portion of instruction and tutoring through a tutorial and planning stage. At this stage Ithaca College SPS members would travel to BMS and work with math and science students over a period of the winter. After this, outreach off of campus would also take place when the fort construction event happened, at which point Ithaca College SPS members would travel with BMS students to an outdoor environment to construct the snow forts.

### Impact Assessment: How the Project/Activity/Event Promoted Interest in Physics

Our goals were to create molds to be used to form structures out of snow, encouraging young students to gain an interest in physics, engineering and geometry. Creation of the molds was successful but unfortunately we did not gain compliance from the bulk of the Boynton middle school faculty. Many

believed that we were not going to get much snow like the year before so did not put an effort towards the activity. The tech department of the school decided to apply our ideas into their curriculum and have the students create molds themselves and build a snow fort during their tech class period. In a way this was a success in itself because we gained interest by Boynton middle students and their teachers to engineer structures and tools to make these structures.

On our end after we created the molds. We went outdoors on to Ithaca College campus and started to construct a sundial and life size castle walls. While we were doing this many students around campus decided to join our efforts and get involved with construction. This promoted interest in the IC physics department and sps events.

- Project Goals (Preliminary):
  - \_\_\_ Contact Boynton middle school administration and instructors to receive support in outreach project.
  - \_\_\_ Develop curriculum that fits with agenda of Boynton middle school science and math instructors.
  - \_\_\_ Obtain materials and construct polygonal prism prototypes to plan for molds of project.
  - \_\_\_ Construct several unique polygonal prism molds, finished and safe for student use for project.
- Project Goals (Implementation):
  - \_\_\_ Group identifies advantages and disadvantages to polygonal molds of their choice for project.
  - \_\_\_ Group develops construction plan: material use, job assignments, and order of construction.
  - \_\_\_ Group implements construction: follows the order of construction planned and uses molds.
- Assessment of Project (Specifications of Snow Forts):
  - \_\_\_ Fort has at least 3 walls and a partial ceiling.
  - \_\_\_ Fort used all molds that group chose to use in their activity.
  - \_\_\_ Fort withstands snowball barrage from other groups.
- Assessment of Project (Evaluation of Activity):
  - \_\_\_ Groups all handed in a construction plan and followed through with their idea.
  - \_\_\_ Groups that met some difficulties in construction made revisions with group leader.
  - \_\_\_ Groups developed and followed the safest procedure possible for fort construction.
- Results from the Project Assessments: (N/A)
  - \_\_\_ Because the event was never implemented at Boynton Middle School, project assessments cannot be made on student participants.
- Results from Prototyping Assessments:
  - \_\_\_ Right Triangle Mold: meets integrity, safety, and snow block requirements for future use.
  - \_\_\_ Square Mold: meets integrity, safety, and snow block requirements for future use.
  - \_\_\_ Hexagon Mold: meets integrity, safety, and snow block requirements for future use.

### Key Metrics and Reflection

Who was the target audience of your project?	<b>Young students interested in science</b>
How many attendees/participants were directly impacted by your project? Please describe them (for example “50 third grade students” or “25 families”).	<b>20+ Ithaca College students</b>
How many students from your SPS chapter were involved in the activity, and in what capacity?	<b>5 - two project leads, three mold constructors and four planners</b>
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 and how would the additional funding have augmented your activity?	<b>The money received was sufficient. We ended up buying screws and waterproof wood glue. Additional funding would have covered the screws and glue costing around 20 dollars.</b>
Do you anticipate repeating this project/activity/event in the future, or having a follow-up project/activity/event? If yes, please describe.	<b>Yes, next year’s Ithaca College SPS will receive the molds made for this project and them aim for faster communication with a local school.</b>
What new relationships did you build through this project?	<b>We built relationships between Ithaca College SPS and the tech and science departments of Boynton middle school.</b>
If you were to do your project again, what would you do differently?	<b>I would rather aim the outreach to the community of Ithaca rather than Boynton middle school. If the event was staffed by only Ithaca College Teaching and Physics departments, willingness to complete the project will solely rely on the faculty and students envolving themselves with the project.</b>

**Press Coverage (if applicable)**

N/A

## Expenditures

All of our expenses went toward the creation of snow proof molds to be used by middle school students. We also bought snow shovels to keep the students hand out of the snow whenever possible.

### Expenditure Table

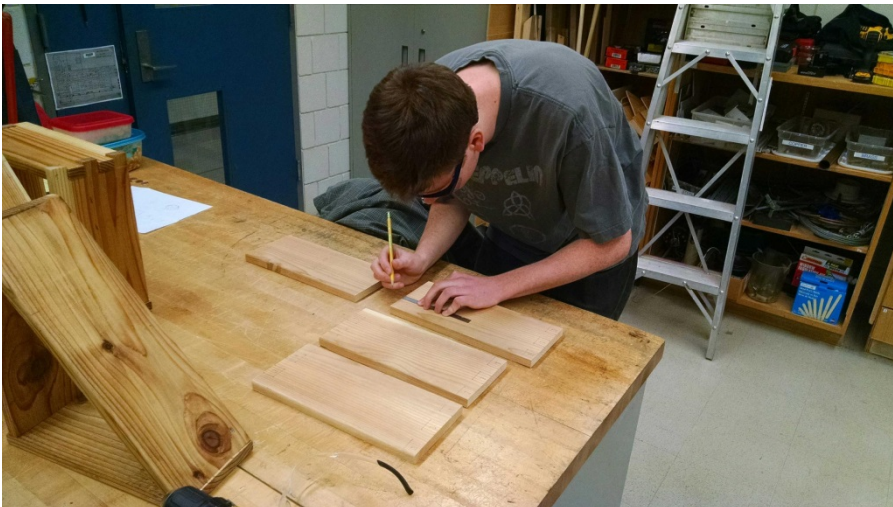
Item	Please explain how this expense relates to your project as outlined in your proposal.	Cost
4 paint brushes	To apply waterproffing	31.92
1 Gallon Thompsons waterproofing	To water proof wooden molds	16.47
11 - 12 foot Cedar Planks	To craft walls of wooden molds	175.78
3 Hopkins 9.5 inch plastic shovels	To fill molds with snow	32.94
<b>Total of Expenses</b>		<b>257.11</b>



## Activity Photos



Left: Senior Ivan Tso applies the water seal to each mold piece before construction. The molds had to be weather resistant due to the amount of ice and melted snow that they are exposed to, and once connected the molds were sanded for safety purposes.



Left: Senior SPS VP Kyle Stapleton measures out screw positions and cutting positions for the mold construction. Where square cornered molds were easy to connect, acute and obtuse internal angles needed modified edges to the ends of planks to create molds with strong structural integrity.



Above: Senior SPS VP Kyle Stapleton collects snow for packing into one of the hexagonal molds. Snow was taken from a circular area in the science building quad, and formed into molds to create a sun dial using the hex molds as the spine for the center structure.





Above: (from left) Ivan Tso, Kyle Stapleton, Rafael Ferreria, Matthew Oberst, and Jacob Adler pack snow into square and triangle molds from the mound of snow in the center of the sun dial prototype area. Square and triangle molds were used for the ticks of the dial.



Left: The triangle mold full of snow. Right: (from left) Rafael Ferreria, Jacob Adler, Ivan Tso, Kyle Stapleton, Joseph Quinn, and Evan Conley pose in front of the completed sun dial at IC.



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](mailto:sps-programs@aip.org)