YES Report
University Prep Science and Math High School
Team Zooloo
6-2-2011
Team Introduction

University Prep Science and Math High School is a brand new charter school located in downtown Detroit. As a new school we only have 100 ninth grade students with plans to expand each year by adding one additional grade. We are a year round school with a focus on STEM. The STEM focus supports the activities of High School Enterprise and helps drives the initiative to create projects.

Some of our High School Enterprise members beginning work on the Autonomous Barbie Jeep
**Project Summaries**

Throughout this year we have focused our attention on two major projects. The first project consisted on designing and building an autonomous Barbie Jeep. The second project centered around the creation of a Remotely Operated Vehicle.

![Group members assembling the Barbie jeep](image.jpg)
More work on the Barbie jeep. Above the frame is almost completely assembled. Below students work on the wiring.
The autonomous Barbie Jeep was sparked by Square One and drove the students to problem solve electrical circuits, computer programming and mechanical devices. The project is still a work in progress with the hopes of acquiring help from the American Society of Mechanical Engineers. The hardware is constructed, the difficulties lie in the computer programming. The jeep will hopefully drive itself, while avoiding obstacles, using GPS coordinates typed in by the user as well as ultrasonic sensors.

The ROV project was recently introduced to the group of High School Enterprise students. While visiting Michigan Tech during the expo, members of UPSM’s HSE club were drawn to the other ROV projects. As a result the club decided to build their own ROV.
Although the ROV will be built for competition it is ultimate goal is to serve the community. Currently students are working on establishing connections with Belle Isle as well as the local Coast Guard. We hope to provide these two organizations with ROVs and assist them with their everyday tasks.

Above students are working on their ROV designs. Everyone was required to come up with two sketches and a final design would be assembled using ideas from each.
One great connection our group has established is with Dr. Doug Levin, a geologist with NOAA. Dr. Levin has been working with our students to help them build our ROV. He has supported us through design ideas, parts and possible activities for the ROV. As our most promising lead we plan to continue our work closely with Dr. Levin.

Students work on measuring parts for the ROV. Using these measurements they would create their ROV in Inventor before assembling it by hand.
Team Accomplishments

The major accomplishment for this year was establishing the club. As a new school we had to recruit members, decide on projects, and create a cohesive group. The club is run by a core group of students and is quickly gaining momentum as we continue through the year.

As stated previously, we have begun work on the autonomous Barbie jeep. Although this is a work in progress, the students have gained valuable understanding of electronics, system integration and team member collaboration.

Additionally, the remotely operated vehicle has accomplished very much in a short amount of time. In less than two weeks the students designed and built the frame, ordered additional parts, made contact with the National Oceanic and Atmospheric Administration, and plan to make the ROV wireless.
Roadblocks and Solutions

Despite our accomplishments, our students have encountered several roadblocks. The two greatest roadblocks include member attendance and the school calendar. Team member attendance has been difficult due to a small student body and so many clubs offered at our school. Students are eager to participate in many clubs but find themselves stretched thin and limited on time. For long term projects to successfully be implemented it is necessary for students to show up consistently and make progress each and every day. To combat this issue the club has relied heavily on the core students to carry the load and continuously recruit other students to assist with assorted tasks. In addition, providing snacks during club meetings has proven to bring in participants and keep the members coming back.

The second roadblock has been the school calendar. For example, as a year round school we have the months of December and April off. The jeep project was introduced at the end of November. Initially we had high spirits and enthusiasm toward the project. However, with the month of December off students lost their momentum and struggled to rebound. We quickly reassembled and continued to make progress until the month of April came. Once again during April students lost that drive to complete the project and we had to reorganize once again. To help combat this issue students have learned to be more efficient with the time they do have as well as determine what work they can take
home over the long breaks. Thus they can continue their progress when returning to school.

**Student Learning**

Through the multitude of projects we have participated in this year students have gained valuable experience in a variety of areas and much student learning has ensued. The following list highlights the greatest forms of student learning.

Students learned:

- How to work in teams
- How to schedule a project
- How to solder
- How to read a wire diagram
- How to complete research efficiently
- How to negotiate pricing with companies
- How to interact with governmental workers
- How to cut PVC
- How ROVs work (buoyancy, propulsion, etc.)
- How ultrasonic sensors work
- How to recruit new members
- How to manage financial matters
- How to complete professional presentations

**The Future**

The future of High School Enterprise at UPSM High School looks bright. As we add more students next year we plan to recruit to our club. With additional workers we hope to grow our project base and provide more deliverables to our school and community.

More specifically, we plan to continue work on our Barbie jeep with the aid of the American Society of Mechanical Engineers. We also hope to create many more ROVs to perform different tasks and possibly team up with local agencies that may have a use for our ROV.

Finally, we hope to make connections with the University of Michigan to help High School Enterprise grow in southeast Michigan.