

Utah Elementary Robotics (UTER)

Objectives

Get students excited about the math and sciences through teaching them elementary robotics. Through this, have the students apply basic engineering skills to meet the requirements for each task and have great success.

History

The Utah Elementary Robotics Lego Mindstorms project started in late 2008. This program was founded by three Boeing employees who wanted to make a difference in elementary students by getting them excited being an engineer. So they approached Wal-Mart and their company for funding to start a Mindstorms competition. From this, there was enough funding for three schools and 60 students. The three initial elementary schools involved were Bluff Ridge and JP Stewart in Davis County and Bunderson in Box Elder County. The Boeing engineers worked with 5th grade students from these schools and had them develop robots that could run a maze autonomously. On May 15th, 2009 we joined USU at Physics Day for our first competition. We were assisted by National Instruments field engineers who were our judges for this competition. The first year was very successful in making a difference in getting the students excited about math and sciences and learning about engineering a project.

From this, we started our next year project (2010), where we expanded into 6th grade and these students built a Sumo robot. That is a robot that attempts to push another robot off of a round table. Here we added one more school, A.C.Y.I in Box Elder County. At this year's USU Physics Day, we had just over 100 students competing in the Mindstorms competition. Another successful year.

Then in 2011, we added Centerville, Knowlton and Hill Field elementary schools from Davis County and then Foothill, and Mountain View from Box Elder County. In addition to the nine Boeing mentors, we had an additional mentor from Moore Good Ideas. We also did a trial program for 7th grade Mindstorms competition. Again, another successful competition at USU Physics Day. This time we had 191 students competing.

In 2012, 3 more elementary schools, Buffalo Point, Cook, and Fielding elementary and Legacy Junior High from Davis County joined the program. We also have picked up additional mentors from both Boeing and Moore Good Ideas. For 2012, we had 262 elementary students and 61 junior high students.

For 2013, we have expanded the junior high program to be for any student in junior high/middle school. North Layton Junior High joined the program this year. The junior high project for this year is a remote controlled soccer robot. For the elementary division we have added Endeavour and Tolman Elementary Schools to this program. 5th Grade is continuing to do the Amazing project and 6th grade are still doing Sumo wrestling. The program has run out of available mentors, so schools are now drawing from parents and other companies who have been great to step up to support this program.

How this is done

Once a school is identified that they wish to participate in Utah Elementary Robotics, a presentation is given to the students by the mentor for that school around the December time frame. Mentors from other schools can help a new mentor prepare for this, and also help with this presentation. From this, the students fill out an application and return this to their teacher. The reason for the application is that the school will only have so many robots, and the teams are limited to two persons per team. Special cases for three person's teams have been allowed, but it is highly recommended to only have two person teams.

Classes are generally started in mid-January and are conducted in an after school secession. Each class lasts between one and two hours depending on how the schools schedule their times. Also, the secessions are limited to fifteen meetings. This is done to keep all of the schools operating on a similar time frame.

The mentors and teachers are there to assist the students, but not to do it for them. There are problems to be solved, challenges to be met, and by the students solving these on their own, there is a great feeling of accomplishment.

For 5th grade, here is a sample schedule

1st meeting, explanation of the Mindstorms hardware and software.

2nd meeting, make it more. That is move the brick without wheels or gears.

3rd meeting, build basic robot

4th meeting, complete basic robot.

5th meeting, escape from a box, black line on floor with an opening

6th meeting, maze explanation, start to learn and teach robot wall walking

7th meeting, enhance wall walking

8th meeting, more wall walking, and start to look at what happens when you get to the end of a wall

9th meeting, wall walking, and end of a wall

10th meeting, wall walking, end of a wall and introduce hitting a wall ahead

11th meeting, software documentation, enhance software for running a maze

12th – 14th meeting, practice judging, and continual enhancements on software

15th meeting, parent's day, final day to work with robots, and a day to show off to parents.

For 6th grade, the goal is to have students that have already done 5th grade the year prior, so there is less instruction. The students are given a basic refresher on the software, and also the rules for Sumo are discussed. From this, the students are turned loose to come up with their Sumo creation. The mentor will advise to assure that students build robots that comply with the Sumo rules, and also give suggestions on the software.

To get involved.

UTER starts to work with schools in the late Fall and early Winter time frames. If a school is interested in participating in this project for next year, they can contact the UTER team at Utah_Elementary_Robotics@comcast.net.

