

## Maimonides students bring new meaning to 'doing the robot'

By Mike Rosenberg  
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The sun has set and the playgrounds are covered with snow. Maimonides School middle schoolers are well into their ninth hour of the school day, and homework in several subjects awaits.

Yet emanating from Room L-5 are sounds of student enthusiasm, excitement and accomplishment.

"This is not just technical stuff. This is also about having fun," said Grade 6 student Gavriel Warren, as about a dozen youngsters voiced their agreement.

The subject of their admiration was science and math teacher Ken Rosenstein's weekly after-school class in robotics, open to all students in the Middle School.

Rosenstein has a five-year plan for his class. "We already are beyond where we anticipated," he said. "And I will never be satisfied with where we are, because as soon as we get there we will want to go further."

Now in its third year, the robotics group meets for a two-hour weekly session. "We capped it at 10 students – but we are currently running at 19, almost all in 6th grade," Rosenstein said. "We are wildly oversubscribed; there's a waiting list."

The program is a "logical progression from [teacher] Katie Smith's work with the Elementary School robotics curriculum," Rosenstein said.

"We currently have robotics in 2nd grade," Smith said. "We use the WeDo Lego robotics. Students create and build animals and objects, program them, and then test them out. There is also room for creativity. Students can design something on their own and test it out as well."

"The Middle School robotics program is based on the Lego NXT platform," Rosenstein said. "Our concept is: We take mechanical ingenuity, combine it with coding knowhow and put them together to create machines that are capable of accomplishing successively more intricate tasks."

"We get to build something that we enjoy, and we have a partner whom we can talk to," said student Rachael Frisch, who emphasized that the program includes both girls and boys.

"You can see what other people do to help yourself improve," Gavriel added.

"We start with simple targets so that students can master a group of discrete skills," Rosenstein explained. "Once we have that, we are now in the process of doing moderately complex tasks. Kids need to modify their machines and come up with their own codes, using those skills, and then dealing with the curveballs that reality keeps throwing at them. ... It all looks so simple until the robot starts moving."

The students are enjoying the challenge.

Yonah Ingber said, "You can't have a perfect robot; there's always



Grade 7 student Raphi Kaplan of Newton confers with Maimonides School teacher Ken Rosenstein.

room to improve," adding that "my robot does a flip." Yaakov Baker, whose robot plays tic-tac-toe, noted that "it's really fun to build and program, and then you get to compete with your friends." Robotics, added Elie Scharf, is "a way to be creative."

Participants will confront a more complex task in the winter "for which they will need to not only remodel their machines but also have their machines begin working with other machines," Rosenstein said.

"Anybody can build a machine from a set of directions. Anybody can write computer code that resides strictly in a computer," Rosenstein added. "Our team will take building outside the box and find a plethora of problems when coding meets reality. We deal with those problems."

Rosenstein emphasized that "the process is more important than the result. Across the board, kids understand that frustration is part of the experience. There are stratospheric quantities of frustration involved – welcome to the real world."

Rachael's answer to frustration: "You work through it."

**The Middle School robotics team has begun a series of three cooperative contests with its cohort from Jewish Community Day School (JCDS) of Watertown. "The JCDS robotics program is led by Claire Caine, and she and I have been working since last summer to bring middle school robotics from an ad hoc basis to a cohesive Jewish day school-wide platform," Rosenstein said. "We thought through a three-to-five-year plan that we hope will encompass all of the area Jewish day schools in a robotics-based curriculum."**

"Although we are competing to see who can do a task faster, or score more points doing that task, it is far more important that we provide our students with the opportunity to build, write code, test it, improve it, and get better," he said.

Seventh-graders Nick Akerstein and David Sanders were

partners in a recent robotics meet. "Our hard drive crashed the day of the presentation, and we quickly had to make two new programs," David noted. "There was a lot of trial and error," said Nick.

"This is a shared experience, where each team gets stronger by learning from both the hardware and software used by all others on the field," Rosenstein said. "As the tournaments grow in length, we hope there will be time for teams to have

open discussions about problems they encountered, as well as mistakes and improvements they made."

He added that his students already have broken down their machines from the first challenge: "We will begin redesigning new machines, with new sensors, and begin writing new code. If we can accomplish this in an arena that brings together all of Greater Boston's Jewish day schools, allowing them to share a fun, positive STEM based

experience, we all come out ahead."

Smith said she hopes to bring robotics into kindergarten and Grade 1.

"We just received a grant to try out a new robotics program for the younger grades," she said. "We are excited to receive these kits in the spring and incorporate them into the kindergarten and 1st-grade classrooms. We are also hoping to bring the robotics into the 2nd-grade Judaic classroom."

Brian Cohen, director of the Maimonides Middle School, said he is pleased with what he's seen so far.

"The Middle School Robotics Program at Maimonides School has now drawn close to 20 students who enthusiastically work together to problem-solve, create, test, recalibrate, and challenge one another as they learn more and more about how robots work," said Cohen. "They are learning to communicate with one another – and a computerized program, for that matter – to achieve relatively simplistic tasks that require a good deal of analytical thinking. These are the first steps toward their potential futures as engineers. And they are having a lot of fun in the process!"

*Mike Rosenberg is director of community relations at Maimonides School in Brookline.*

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