Learning by Doing: Introducing Robotics into Science at Park

BY DOROTHY RICHARDSON, Park Parent Editorial Board

our mission is to program your robots to travel the exact distance between the black line and the green line – without overshooting the green line. GO!" directs Grade VI science teacher and Chair of the Science Department Karen Manning.

Immediately, 14 enthusiastic and engaged students settle into problem solving in pairs, gathering the tools they need for the task: laptops, Lego robot kits, and



science journals with graphing paper for recording data. Considering their data collected in earlier test runs, students calculate the number of seconds it should take for their uniquely designed robots to go this assigned distance, and program new calculations on their laptops.

A team of two girls is the first to put its robot design and calculations to the test, finishing within four inches of the finish line. The next team of boys has a robot that moves much more quickly, but overshoots the mark by four inches: immediate jeopardy. "Go back, look at your data and see if you can get even closer," the teacher encourages.

A third team makes the mark precisely; its robot moves more slowly. Since speed is not the goal, this team wins the class objective!

This pilot project at Park, initiated in

Grades VI and VIII this spring, involves students in a critical design/build/test sequence that is foundational to engineering and the development of broader problem-solving skills relevant to multiple disciplines. It was launched as part of an overall review of the School's science curriculum, and it reflects the more recent state and federal science frameworks aimed at integrating engineering more widely into the curriculum at every grade level.

All the Park science teachers participated in training through Tufts University to learn how to use the robotics unit with middle school students. The unit uses the educational version of the commercially available Lego Mindstorm NXT kits containing gears, motors, and software to program the robots. Well-suited to differentiating instruction for children who learn in different ways, robotics can be integrated into any subject matter. The project enables



students with more experience in robotics to work at their own pace and create more complicated design elements while still benefiting from the team approach to problem solving.

In addition to the in-class robotics work, students in Grade VI this spring also explored the historical and ethical use of robots and how robots are currently being used in the nuclear radiation crisis in Japan.



In Grade VIII, students used robotics to illustrate the conservation and transformation of energy in their physics class.

Moreover, students were engaged and having fun with learning. As one Grade VI participant reported, "It's a lot more interesting to learn through teamwork and problem solving, instead of being told a bunch of facts."

The science teachers highlight the exciting possibilities for rethinking the way science is taught at Park. Next year, more robotics and other pilot programs will be implemented; the eventual goal is to include some aspect of robotics at every grade level. "We want to emphasize the value of teamwork and process as much as product," Karen explains. "Our aim is to broaden the way students think and solve problems, not just about science but in every discipline."

