

Program Update
March 2009

the brookline high school 21st century fund

local solutions for national challenges in education

Welcome to the first online edition of the 21st Century Fund Program Update. We hope you will enjoy reading our monthly update on our programs and events. This month we are highlighting our Engineering by Design program.

Engineering by Design

By Gaelen Harrington, BHS English Teacher

The Friday before February vacation: let's be honest, kids are generally "bouncing off the walls"- even our most mature seniors. Every teacher knows to plan something "fun." You can't fight the distracted teenager energy, so you try to join it and shape it into something educational. Catherine Wolf, one of the Engineering by Design (EBD) co-teachers, concedes that seniors are especially distracted on that just-hours-away-from-vacation Friday because, "by February, they already have one foot out the door. They're looking at what's next, at what's coming after graduation. Some students have already received college acceptance letters, and it's becoming real to everyone that they're not high school students much longer." What's more, by second semester, the importance of grades for some seniors has slipped; a grade-driven work ethic, which might have motivated them during first semester's college application crunch, has waned.



So, on that Friday the 13th of February, expectations for Catherine Wolf and her Engineering co-teacher, Matt Giunta, were not especially high. (Okay, you might say they were relatively low.) Their students had just begun a new project: to design an automated water purification system. The final due date, March 10, was still almost a month away, so there was no looming deadline. Catherine and Matt were shocked, then, to watch every one of their students, upon arriving to class, put their book bag on the desk and head directly to the back of the classroom to the work area. *Every* student was present and on time (not a single absence, the day before vacation!). The room got loud fast, loud with work noises-the buzz of the band saw, the whining of the drill press, the hammering together of parts, the talk among students as team members coordinated their tasks. Everyone-**EVERYONE**-just came in and got straight to work. The students' focus left no space, and no need, for the teachers to say a thing. Matt and Catherine had not even

needed to give their students a start-of-class briefing of the day's goals and expectations. "This was a completely student driven class," Catherine recalls, "and on the day before vacation! It's positive proof of kids *owning* their education."

What makes these Engineering students take such charge? In large part, it's the fun of problem solving. Every unit in Engineering by Design tosses a real, hands-on challenge to the students: design that skyscraper! make that robot! create that soap! design that rocket and estimate its

trajectory! These are big problems with lots of little dimensions to be figured out along the way. Take the water purification system for example. Students had to ask themselves:

- How am I going to separate out the clear water at the top from the junk that has settled on the bottom?
- How much UV light or iodine should I use to kill bacteria?
- What's the best order for the steps of filtration (before or after coagulation and sedimentation)?
- What should we use in the filter-how much sand, what proportion of pebbles and rocks?

And this is just a sampling of the layers of questioning each student-team had to work through to design their unique approach to water-purification.

What's especially invigorating for students in EBD is that there is not a single answer to any one of the problems they're presented with; the students' ingenuity, their research and their teamwork determine the success (or failure) of the outcome. And yet, assessment is wonderfully clear: does our group's design *work*? The proof is right there.



And proof is here in this course that students can, and do, take ownership of their education. In such a beautifully designed course, under the guidance of committed and innovative teachers, students rise to the challenge-in fact, they surpass our expectations.

Thank you for your support of this superb program.

Engineering by Design is a project-based course introducing seniors at BHS to the field of engineering. This course was developed to address the alarming national decline in the numbers of students who pursue Science, Technology, Engineering or Mathematics (STEM) areas of study in college. Funding provided by the 21st Century Fund and Brookline High School. [Visit the 21st Century Fund website to learn more about this program.](#)

About the 21st Century Fund

The Brookline High School 21st Century Fund innovates effective local solutions to national challenges facing public high schools. The Fund is a nationally recognized non-profit organization that brings together educators, parents, alumni and philanthropists committed to academic achievement for all students. The Fund has invested over \$3 million in 14 programs; six have been fully integrated into the Brookline High School curriculum and several are already national models. The Fund is made possible by tax-deductible contributions and volunteer support from BHS parents, BHS alumni, and the broader Brookline community. [Visit the 21st Century Fund website](#) for more information or click the Donate Now button to make a contribution.



About This Newsletter

The *21st Century Fund Program Update* is produced by the Brookline High School 21st Century Fund office. For comments or questions, please contact Beth Carlson at beth_carlson@brookline.k12.ma.us or 617-713-5211.



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