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## Delaware schools: Hands-on learning and solar-powered go-carts

Middle schoolers get excited with new activity-driven class

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Eleven-year-old Mariel Mitchell laughed and chatted with her sixth-grade classmates as they took turns Thursday driving a solar-powered go-cart in the back parking lot of P.S. du Pont Middle School in Wilmington.

This was one school assignment she did not mind at all.

"I've never had a class like this," Mariel said. "Here, you get to do things. Sitting in a classroom is boring, and you really don't understand what they mean by stuff until you actually get to see and do it."

The hands-on learning with a solar-powered vehicle -- measuring things such as speed and distance, and preceded by lessons on alternative energy -- was part of a new class at the school called STEM, or Science, Technology, Engineering and Mathematics.

Brooks Twilley, 30, whose previous employment included jobs such as working as a civilian engineer testing weapons at Aberdeen Proving Ground in Maryland, was brought to the school as his first teaching job to help create enthusiasm in children for science and technology through real-world activities.

School Principal Lincoln Hohler said the STEM class, which also employs the input of Delaware Technology Adviser of the Year John Singer, appears to be doing the trick.

"They're creating that little spark, and it becomes a great flame," Hohler said. "Seeing kids who might not be engaged all of a sudden like going to school makes all the difference in the world."

Twilley teaches five STEM classes encompassing all grades at the school. It is taught in half-year increments, with the second half set to begin in January.

Other classroom activities have included building weight-bearing bridges out of newspaper and Scotch tape and protecting eggs with vehicles made of bubble wrap and foam, as they plummet on a zip-line. Each project lasts two to three weeks and incorporates STEM lessons that springboard from the activities.

"You learn by doing," Twilley said. "I think the kids get engaged quickly and stay engaged because it's hands-on learning. It's a nontraditional environment in that it isn't a lecture followed up by homework followed up by a test.

"STEM is a national initiative to keep America competitive. We're losing a lot of technical ground to other countries. To keep us on the cutting edge, we need to start a little earlier."

Twilley has been especially heartened to see inner-city children who are not typically exposed to some of the activities, as they discover things and their faces light up. The same goes for girls who have for years lagged behind the boys in seeking careers in the STEM fields.

"The girls are pushing the boys out of the way to get their hands on what they're working on," he said of the class. "This generation, I see the girls breaking the paradigm. I think with boys, it's natural to get

into things. I think with girls, it doesn't always present itself all of the time, and this gives them the opportunity to get into it."

Kids in the class refer to themselves as STEMgineers. And on a STEM Web site, their photos depict students holding clipboards and wearing nerdy pocket pen protectors and glasses with the requisite Band-Aid wrapped around the nose guard.

Twilley's goal is to create a keen interest in problem-solving in the children.

For the second half of the year, he plans to have them learn about buoyancy through floating objects in water, study wind power by observing a turbine that will be erected atop a 30-foot tower behind the school and grow vegetables in a 50-square-foot, hydroponic greenhouse.

Twilley, who used to work for a biomedical developer and manufacturer, said he decided to become a teacher as a way to reconnect with others and to help make a difference.

"Even when I was at Aberdeen blowing things up, it just seemed so removed from humans," he said. "Sitting in a lab in the business world, you lose that passion for math and science."

So far, he has not regretted the career switch, especially when he gets through to one of the hard-to-reach children.

"I like to see that light bulb go on with kids where it's not expected," he said. "It gives me goose bumps thinking about it."

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