

## **Bioscience High School's Sustainable Transportation Project** by Cory Waxman



Bioscience High School in Phoenix is taking project-based learning to a new level with an impressive all-school sustainable transportation project. The core component of this project is the construction of a three-wheeled diesel-electric hybrid car, the XR3, designed by Robert Q Riley. While some student groups collaborate to build this vehicle, others are taking on related projects such as designing and fabricating a solar charging shade structure to power the electric batteries and producing biofuels for the car's diesel engine. These projects are woven into students' courses, capstone projects, and extracurricular club endeavors. A junior engineering student, Luis Valenzuela, takes a break from welding a stand for the biofuel testing engine and excitedly communicates "It's great to learn, to get our hands dirty, to experience teamwork and take responsibility."

Bioscience High School was founded with purpose. Years of planning, research and focused dialogue with community members, post-secondary institutions and leaders from business and industry acquiesced into the following mission: to prepare tomorrow's scientists, engineers and medical professionals by providing students a unique science education through intensive collaboration with the academic and scientific communities in downtown Phoenix. Rather than focusing on standardized test scores, Bioscience is focusing on integrating real world science and engineering projects into the curriculum, and in doing so, students are ranking at or near the top in Arizona's science and humanities standardized tests.

The curriculum at BHS is as unique as the physical features of the high tech building. Intentional decisions have been made to offer unique courses, challenging the status-quo of contemporary education and offering students opportunities to personalize their learning. Freshmen at BHS take an integrated physics and algebra course for math and science.



Professor Cory Waxman (behind student in red tee-shirt) poses with students and their XR3 chassis.

This integration provides a seamless opportunity for students to use the skills and learning they gain in the combined class. At the sophomore level, the integration continues as students enroll in a Biology / Chemistry block course as well as the integration of World Literature and World History. Combining classes in such a way provides students with the necessary conceptual frameworks for richer dialogue, discussion and learning of the material. When students enter their junior year at BHS, they begin their "pathway" programs which are similar to a major and include Engineering, Biomedical Research and Biomedical Technology. The engi-



XR3 designer, Robert Q. Riley, (near center), visits with students in Cory Waxman's (to right in photo) class at Phoenix Bioscience High School.

neering pathway offers courses in advanced physics and engineering design. The senior year has students finishing their required studies within integrated courses while also placing students in the real world. Internships provide students a glimpse of where their pathway might lead them. Placing students with researchers, practitioners and experts in their field allows students an experience not typically found in the high school curriculum.

Capstone projects such as the XR3 Hybrid Car and the Solar Charging Shade structure, are conducted with the help of volunteer engineers. Students oversee all aspects of projects including planning, fund raising, and city permitting. "This school is not for everyone," says physics teacher Cory Waxman "these students want to be here and are generally willing to face complex challenges. We challenge them and ourselves to continually strive for an educational experience with rigor and relevance. It's not an easy path for staff nor students, but it's exciting and fun." To lend support, email Cory Waxman at: [Waxman@phxhs.k12.az.us](mailto:Waxman@phxhs.k12.az.us).

Reprinted from SAE Arizona-Nevada Section Newsletter, March 17 2011

See XR3 Hybrid page - <http://www.rqriley.com/xr3.htm>