Clarkson GK-12 Fellow Helps Skate Boarders Design and Build a Skate Park

The Clarkson University GK12 Project-Based Learning Program embodies the school's motto, "Defy Convention!" by creating unique and authentic learning experiences for middle and high school students. The GK12 Fellows integrate rigorous STEM content into relevant solutions for real life problems.

GK12 Fellow Steven J. Kennedy (MS Mechanical Engineering) is changing the conventional image that engineering is boring, the proverbial "all work and no play." Because skateboarders were having problems in the community, the superintendent of a local school district facilitated a series of stakeholder meetings. The outcome was that the village would support the idea of a skatepark if the students would design the park and present a formal proposal to the Village Board. As the former captain of Clarkson's lacrosse team and an avid skier, Steve welcomed the challenge of leading a group of students through the engineering design process for a skateboard park. Students, ages 11 to 18, applied the concepts of kinetic and potential energy, rotational kinematics, friction, force, velocity and acceleration, as well as mathematical formulas to the design of the park. Weighted objective tables were developed to decide the composition and layout of features and the location of the park. Steve brought his research on the tensile strength of aluminum into the discussion on feature composition. During visits to regional skateparks, including one in Canada, students were required to take measurements of individual features and overall area, and make scale drawings for future design considerations. The students, with their graduate student mentor as cheerleader, presented on two occasions to the Village Board. The first focused on their plan to spend the summer on the project, including learning the physics and math. The second presentation showcased their dedication and commitment to the project. They fulfilled the design requirement, complete with a 3-D model. As a proud mentor, Steve noted, "Working with the kids and sharing my technical knowledge was an awesome experience! They learned more than just the engineering content. They learned that engineers work with municipal boards and departments of transportation and recreation. Most importantly, they learned how engineering relates to their own lives. And it is not boring!"

Fellows in Clarkson GK12 Project-Based Learning Program are trained in the summer to integrate their research or aspects of their discipline into rigorous and relevant real-world projects for the classroom. High school Chemistry and Physics students teamed up to propose nanotechnology solutions to a water contamination problem. Eighth graders created concrete stepping stones using waste product aggregates to raise funds for a local charity. Technology students designed and built prototypes of prosthetic arms from common materials for children of war. The middle and high school students experience the value of engineering to society and the world.

The GK12 Fellows gain a lasting sense of worth through the realization that their work has importance and is significant. Fellows bring their research into the classrooms during the who-I-am introductory lesson and by integrating it into the lessons and curricula they teach. In the words of Mark Z. Venczel (PhD Environmental Science and Engineering), "Actually using the knowledge I've gained through my graduate research to develop a curriculum reassured me that my work does have some tangible applications…few experiences in my life have been as satisfying.".