

## BETC: Bionomic Education Training Center

What began as a simple request for information by teachers at Southern High School (SHS) to the staff at the Durham County Soil & Water Conservation District has grown into a new approach to environmental education. Geared to teach water quality issues, strengthen STEM education, provide Green infrastructure workforce training, introduce agriculture/agribusiness skills back into the school system and be self-sustainable, the program is a program for a changing environment. The Bionomic Education Training Center (BETC; pronounced "Betsey") is the result of an initial \$30,000 grant obtained by the Durham District in 2011 and piloted at Southern School of Energy and Sustainability to help students understand Bionomics, the relationship of oneself in the environment and the impact of urban land use on water quality. BETC introduces new technology and provides school faculty with pertinent curriculum and experiential learning opportunities for their students, including data-collection and scientific methodology, while demonstrating the relevance of classroom science and math instruction to teachers and students.

BETC is a workforce development training program with curriculum that addresses water quality via stormwater retrofit design and implementation. Two units of curriculum were developed for the BETC program. One 30 day unit on engineering rain gardens and cisterns for water quality improvements and an 11 day unit on soils and water analysis. Students also have access to Data Hubs, soil moisture meters and rain gauges. Each week students record the amount of water collected in the rain gauges, record the soil moisture with the sensors and collect other environmental data such as humidity, wind speed and solar radiation using the Data Hubs. This gives students the experience of collecting and analyzing data they can relate to and then use to evaluate other systems that have been installed at the school, such as the irrigation technology upgrades on the athletic fields. The curriculum provide students an opportunity to obtain hands-on work experience in STEM, encourage them to pursue careers in Green Infrastructure Technology and develop entrepreneurial skills.

With its location in the headwaters of two major watersheds and intense pressure for nutrient reductions, Durham is a prime location for stormwater improvements. The BETC program taps into this need to further education the students on water quality issues and ensure its sustainability by developing an agribusiness where students learn to grow, sell and install native plants for rain gardens and riparian buffers for homeowners across Durham, improving Durham streams' water quality. This work has sparked a collaboration between the local City and County governments, the school system and the community that works to reduce the financial burden of the nutrient reductions on taxpayers, while also empowering and educating youth for possible green industry careers.

At Southern, students have become spokespersons for community efforts to improve their waterways, which empowers them as leaders, broadening their future job opportunities that will ultimately change their socio-economic status. They have develop a strong sense of community pride and accountability; respect for relationships between ecosystems and Bionomics and individuals; and desire to be good upstream stewards of natural resources. The students have become the messengers of environmental stewardship within the school and this has not gone un-noticed.

With the success of the initial pilot, other schools in Durham County are looking closely at Southern High and contemplating BETC for themselves. Though the pilot program was a high school, the curriculum can be adapted for high school or middle school use. The Durham County Soil and Water Conservation District and staff are currently working to help Lowes Grove Middle School and Jordan High School implement BETC for school year '15-16 with additional schools are implementing in school year '16-17.