

# I-STEM Education in Practice

## AGUA

### *Aquaponics Generates Understanding and Achievement* Canton Elementary STEM Academy Dr. Judy Wright

At Canton ES STEM Academy, student learning and achievement undergoes a transformation from the ordinary to the extraordinary, as students enter and engage in a world of their own imagination, driven by Georgia Standards of Excellence (GSE) and S.T.E.M. (Science, Technology, Engineering, and Math) fields. Under the lens of S.T.E.M., 21st century learning marries content and practice, as Canton's teachers seek new ways to prepare students to thrive in a new world, as yet not envisioned. STEM lessons are developed by teachers and then modified to meet the needs of our students and their community. Engineering projects reflect not only state standards but are developed and utilized to address specific problems within our community. These projects take the form of many disciplines such as learning how geometric shapes can be applied in bridge building, bringing the pages of the book *The Lorax* alive by developing real world solutions to pollution, and extending the principles of magnets to design and build a MAGLEV train that will take students to new field trip destinations. Activities such as these embody the essence of STEM and have become at its heart the integration and application of Science, Technology, Engineering, and Math in ways that encourage students to become active creators of content, rather than passive recipients of knowledge.



Innovation and creativity are ideals that Canton teachers and students thrive on. Canton ES STEM Academy has developed Cherokee County School District's only Jr FLL Robotics Lego teams to supplement our existing FLL Robotics team. The FIRST LEGO League (FLL) is an international competition organized by FIRST for elementary and middle school students. In September each year, a new challenge is announced that focuses on a different real-world topic related to the sciences. Each challenge within the competition then revolves around that theme. The robotics

part of the competition includes designing and programming Lego Mindstorms robots to complete tasks. Students work out solutions to the various problems they are given and then meet at tournaments to share their knowledge, compare ideas, and display their robots. The problem this year asked students as a team to select a topic that would answer the question for this year's FLL WORLD CLASS challenge. During the 2014-1015 season, students won a trophy in the category of "gracious professionalism," exhibiting high-quality work, and valuing individuals and the community. The only CCSD School with a Jr FLL team, Canton ES STEM Academy focused on building an interest in Science and Engineering that is hands-on program and designed to capture young student's curiosity and direct it toward discovering how Science and Technology impact the world around them. This program features a real-world challenge, to be explored through research, critical thinking, and imagination. The Jr teams had two very different approaches to this problem. The Multibots team created a transportation museum complete with a smoking train and moving plane. The Lego Colts created a working iPad with a simulated swipe screen. This year CES Jr FLL teams won two trophies for innovative design and miraculous movement.



In addition to our various S.T.E.M. exploration activities, we have also created an Aquaponics “AGUA” Lab with the help of a grant from the Canton Rotary Club and Donor’s Choose. The AGUA (Aquaponics Generates, Understanding, & Achievement) lab is the only aquaponic system in the Cherokee County School District and one of only a half dozen such systems used in Georgia Schools. The AGUA Lab consists of three separate tanks that contain over 400 gallons of water that sustain a living ecosystem of dozens of fish and plants.

Canton ES STEM Academy pursues every opportunity to integrate rigorous curriculum content from within the context of designing solutions to real-world problems that pique the curiosity of students while establishing a foundation for success for the school and staff alike. Canton ES STEM academy, as one of this year’s 2015 Georgia TAG award finalists, has sought to instill a belief in staff and students that we expect every one of our students to want to learn and more importantly to understand as they create a world of their own making and discover that their dreams are only limited by the reach of their imagination.

