

AgWorks at CCA

Founded in 2003, Commonwealth Charter Academy (CCA) is a fully accredited public cyber charter school that serves families and students in grades K-12 across Pennsylvania. CCA serves nearly 9,500 learners throughout the commonwealth, with Family Service Centers strategically located for families to receive one-on-one assistance, meet with counselors and more. As a public school, CCA is committed to serving communities across the state by educating and developing students into responsible and productive citizens and working with communities by making CCA accessible to others.

The Program

When CCA purchased the building that now houses its Capital Campus in Harrisburg, it was faced with the question of what to do with a large atrium filled with sunlight. Since the Harrisburg location is central to the agricultural community, CCA had an idea to create a space to house a living, learning laboratory to teach and train students for careers in various fields, including agriculture; environmental science; electrical; plumbing; heating, ventilation and air conditioning; supply chain management; business management; engineering; STEM; computer programming; robotics; and information technology. From here, **AgWorks at CCA** was born.



Funded through a federal grant, **AgWorks at CCA** is an interactive, integrated agriculture lab that provides students with hands-on learning experiences in a 6,100-square-foot, state-of-the-art controlled environment agriculture center. This student-led facility enables students to learn about controlled-environment agriculture, including aquaponics, hydroponics, and aeroponics. With guidance from CCA teachers and professionals in the field, students learn how to operate the living laboratory, which can produce approximately 3,000 plants with the help of more than 400 tilapia, koi and prawn.

Aquaponics is the combination of aquaculture and hydroponics, where produce is grown from nutrient-rich water created by aquatic animals. The aquaponics cycle begins with the fish that are kept in tanks. Nutrients, in the form of waste water from fish tanks, flow through the system and into grow beds filled with plants, including leafy greens, flowering plants and trees. The nutrient-rich waste water has been converted into usable fertilizer, resulting in higher yields of produce than what can be produced through traditional agriculture.

Aquaponics is just one system used in the lab. **AgWorks at CCA** also uses hydroponics, in which a plant's roots are immersed in a nutrient solution, and aeroponics, which is the process of growing plants in an air or mist environment without the use of soil or an aggregate medium. Throughout the cycle, students observe and track plant growth through data sensors built into the grow beds. They can even watch the plants remotely with a camera trained on their plants to see how the crops are growing. These sensors also monitor the amount of photosynthetic light available to the plant. This state-of-the-art technology allows students

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across the state to view and analyze how different wavelengths and amounts of light affect growth over time.

Controlled-environment agriculture allows plants to grow and be harvested more quickly than in traditional farming. Food-grade crops are grown in an enclosed structure, which is monitored by technology and agricultural specialists to protect and maintain the best growing conditions. The produce harvested from **AgWorks at CCA** offers students the opportunity to learn about the business aspects of agriculture, such as supply chain management, pricing, marketing, quality control and trends in market demand. The produce grown in the lab is sold to local restaurants or donated to local food banks.

AgWorks at CCA strives to support a sustainable ecosystem. The facility is 100 percent powered by solar energy through panels installed on the building's roof. All of the produce sold or donated leaves the lab in biodegradable, compostable and recyclable clamshells or bags. When compared to traditional agriculture, not only does aquaponically grown produce result in higher yields per square foot, some crops have a higher nutritional value. They are also grown using 90 percent less water than traditional agriculture. **AgWorks at CCA** uses GMO-free seeds and, in place of harmful chemicals and pesticides, the lab uses biological controls to combat insects that find their way into the lab.



In addition to the facility, CCA has created a fully functional, smaller-scale, traveling version of **AgWorks at CCA** to visit communities throughout Pennsylvania, creating opportunities for all CCA students to participate in aquaponics activities and hands-on lessons. The mobile classroom offers several activities, including bird and astronomy observation, book fairs, water and soil testing and art exhibits.

Furthermore, CCA has created virtual experiences allowing students to engage with the **AgWorks at CCA** facility from afar through live cameras, high-tech water monitoring sensors and an online digital dashboard that processes real-time data.

Results

The goal of the lab is to expand the way students think about agriculture while providing them with a variety of career-ready skills that can be used after graduation. CCA wants to help students across the state see how aquaponics can be used as a sustainable farming method. Ideally, by participating in the lab, students will learn that farming is not only practiced in a traditional field setting, but can also use technology integration. Students see the plant and fish life cycle and learn more about the variety of careers available both directly and indirectly related to agriculture. CCA's innovations ensure that students interact with the real world and learn skills to make them career ready. **AgWorks at CCA** is open to all public and non-public schools, universities and nonprofit organizations to tour and participate in a variety of educational activities.

Thank you to Maurice Flurie, CEO and Commonwealth Charter Academy for sharing their story. For more information about **AgWorks at CCA**, visit agworks.ccaeducate.me. . If you would like to submit a suggestion for a future Innovation Spotlight , please contact Brandie Karpew at b.karpew@pacharters.org.