

# Teaching aquaponics to the next generation

Hawley Environmental School retrofits its greenhouse



These dwarf eggplant and lettuce plants were grown at Imagine Aquaponics' controlled-environment test facility. The design of the system at Hawley Environmental School was based on the successes of those tests. CREDIT Imagine Aquaponics



Fourth and 5th grade students at Hawley Environmental School,

5610 W. Wisconsin Ave., are learning how to grow food indoors year round through the school's new aquaponics system.

Aquaponics is the practice of combining aquaculture (fish farming), microbiology, and hydroponics (growing plants without soil). The fish produce nutrients (their manure) that is absorbed by the plants. The plants, along with friendly bacteria, clean the water so the fish can thrive. The fish depend on fish food provided by the people who operate the aquaponics system.

Hawley teachers Mark Delaney, Casey McEvilly, and Lesley Zylstra are leading the school's Camp Hawley Aquaponics Club, which Delaney said is currently part of the after-school recreation program.

The school hired [Imagine Aquaponics](#) to install the system in the building's unused greenhouse. Business partners Jesse Hull and Molly Stanek, both Bay View residents, founded Imagine Aquaponics in 2011. Hull and Stanek worked together at the former Sweet Water Organics.

"We wanted to put the space to good use," McEvilly said of the greenhouse. "We thought aquaponics would give kids a lasting skill."

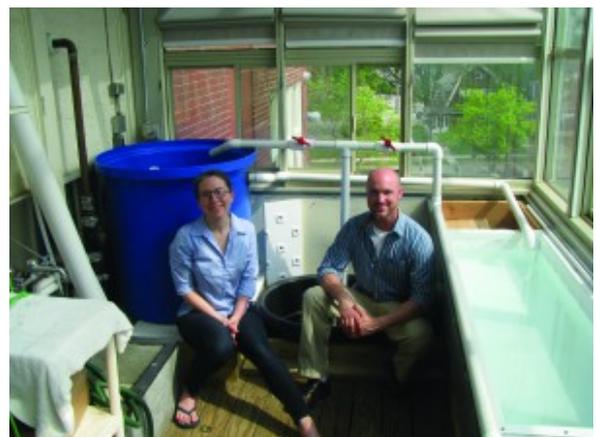
Hull and Stanek helped construct a 22-foot span, 200-gallon recirculating closed-loop aquaponics system in the 200-square-foot southeast-facing greenhouse.

The system, which is nearly complete, will produce lettuce, tomatoes, and kale. Unlike many aquaponics systems that grow fish for harvest, such as tilapia or perch, the system at Hawley will use koi and will not harvest them. "We chose koi for the fourth and fifth graders because the harvesting and processing of fish may not be suitable for everyone," Hull said.

McEvilly agreed. "We have some students who are vegetarians and

would be upset at the sight of seeing a fish filleted,” he said.

Hull said that all involved in the project are proponents of the humane treatment of animals, so maintenance of a suitable environment for the fish is stressed. “Koi have a wide range of pH and temperature, that they can survive in. They also live long and are quite beautiful,” Hull said. “They are very friendly and will come to recognize their owner(s) and can even be trained to feed from that person’s hand. A system with koi will not operate that much differently than one carrying food fish, and the system at Hawley is fully capable of supporting tilapia, perch, trout, etc., if that choice is made in the future.”



Molly Stanek and Jesse Hull in the nearly-completed aquaponics system that they designed and constructed in Hawley Environmental School’s greenhouse. The system will produce lettuce, tomatoes, and kale. CREDIT Imagine Aquaponics

## **The System**

Imagine Aquaponics’ past consulting work has mostly consisted

of larger hydroponic and aquaponics farms, such as 100,000 square-foot greenhouses in California and a series of commercial greenhouses in Kazakhstan. Hull and Stanek were eager to bring their experience to the local community, especially to schools, to teach the next generation the value of aquaponics.

“The system is a micro version of many of the larger commercial scale systems we’ve designed and maintained elsewhere. Sequential planting and harvesting of plants and fish, raft culture for smaller plants, media growing-beds for larger fruit bearing crops, water chemistry, and filtration are all things that will provide abundant and appropriate learning opportunities,” Hull said.

Hawley’s aquaponics system is designed with multiple fail-safes throughout. “It’s not a matter of *if* a pump fails, but *when*,” Stanek said. If nobody is present when a pump fails, it can result in the death of fish and plants if the problem is discovered too late. So the air and water pump components are built to back themselves up. Automatic feeders can provide a consistent source of food for the fish, and therefore nutrients to the plants. Over-sized pipes, gravity-fed drains, and overflow channels prevent clogging and maintain a safe water level in the fish tank if water is lost elsewhere in the system.

Delaney said that students and staff volunteer to maintain their outdoor gardens during summer vacation, and the aquaponics system will be no different. Likewise, the staff at Hawley will be responsible for regularly checking on the greenhouse and completing required tasks during school breaks.

Ryan Bourbon, who was a chemist at Sweet Water, also put in many volunteer hours to help Hull and Stanek construct the system. Hull said the greenhouse and fish water would be heated in the cold months to maintain a specific temperature for the fish and the plant roots. Conversely, an air

conditioner will cool the greenhouse during the summer months.

## **Preparing Children For A Changing Biosphere**

Aquaponics will teach the students at Hawley about sustainable food sources, ecosystems, engineering, and science.

“People have become far too disconnected from their food,” Hull said. “We’ve met children who didn’t even know where a tomato comes from or believed that ketchup is a vegetable.”

Future water scarcity is also a concern, Stanek noted. While the Great Lakes region has plentiful, reasonably priced water, that’s not the case in states like Texas or California, where devastating droughts have taken hold, wiping out crops and causing food shortages. “We’re preparing children for a changing world,” she said.

Aquaponics was a logical next step for Hawley. With a focus on environmental education, Hawley has been innovative in promoting sustainability and encouraging students to be good environmental stewards. The grounds are planted with native prairie-plants, raised-bed vegetable gardens with tomatoes, cucumbers, peas, and carrots, and a flower garden near the school’s entrance. Teachers, students, parents, and even members of the community have come together to care for the gardens.

In time, Delaney hopes the aquaponics program will be incorporated in more grades as part of the regular curricula.

The project was funded by a grant from the Aquaponics Association, of which Hull and Stanek are founding officers. Financial contributions also came from Jeff Hembrook of Miller Brewing Company and from Brian and Teather Fricano of Sustainable Supply Company in Milwaukee.

[Hawley Environmental School](#) is an MPS Instrumentality Charter School serving K5 through Grade 5.