



Tank to Table

MIDDLE SCHOOL AQUAPONICS SYSTEM
NOURISHES MINDS AND BODIES

Darting out of their English class, 8th Grade students were eager to read a book to the smallest members of the Trinity community.

But these weren't their Kindergarten Science Buddies. Instead, it was a tank of tilapia fish occupying an aquaponics system in the corner of the Dickson Upper Commons.

"The fish came to the front (of the tank) because they thought they were getting food," said Middle School Science Teacher Aprille Morris-Butler.

The 15 tilapia and the tank they've inhabited since October have provided hands-on lessons for 7th and 8th Grade science units. Students are responsible for monitoring the tank's water quality and feeding the fish, while seeing the oxygen, nitrogen, and water cycles in action.



The waste from the fish goes through a filter and then to the plant bed. It converts into ammonia and nitrates that help grow heads of lettuce that are harvested and delivered to the Dickson Dining Hall. The plant bed, meanwhile, filters the water and returns it to the tank for the process to begin all over.

The first lettuce seeds were planted a few weeks after the tilapia arrived. By early

December, the first batch of romaine and mixed greens was served in the dining hall salad bar. As of April, approximately 280 heads of lettuce had been harvested.

"I like how involved we get to be," said 8th Grade student Brooklyn Stanczak, from maintaining the water quality to cutting and packaging the lettuce.

The tilapia will be harvested before the end of the school year and used in a special meal for Middle School. A new delivery of fish will stock the aquaponics tank next school year.

Beyond the science lessons, the system also teaches food sustainability, said Brittany MacDonald, chef manager with Trinity's dining hall provider FLIK Independent School Dining (FISD).

Growing lettuce on campus reduces overall food costs and cuts the school's weekly lettuce delivery by 50 percent. Recirculating the system's water reduces the need for new water, and farming fish on land lessens the strain on the food supply from the ocean.

"The most exciting thing is that students get to learn where their food comes from and the work involved in producing it, which they don't really think about at their age," MacDonald said.

Watching the process, from seedling to salad bar, "is a tangible result that they take pride in," she said.

FISD's parent company Compass Group North America provided a two-year, \$23,000 grant for the aquaponics system in partnership with Charlotte-based 100 Gardens. It was FISD's first school aquaponics partnership in the region.

Trinity's aquaponics system was the 34th garden to be installed by 100 Gardens, which was co-founded in 2012 by Ron Morgan, the grandparent of former Trinity students Phoebe, Wes TES '16, and Sophie TES '18 Bolyard.

100 Gardens co-founder Sam Fleming said Trinity's aquaponics project had been 10 years in the making, but lacked the funding to move forward. "We've been wanting to do this project with (Trinity) for a long time," he said.

As it happens, Compass operates food service at the Innovation Barn, where 100 Gardens is headquartered.

"They (Compass) heard about us trying to partner with Trinity and stepped in," Fleming said. All three partners - Trinity, Compass, and 100 Gardens - share the same mission of "creating smarter, healthier, and more compassionate students," he said.

The student-managed nature of the system also aligns with Trinity's and 100 Gardens' philosophies of hands-on learning. "We want students running this," Fleming said.

Compass also partners with Trinity in composting food waste from the dining hall as part of an initiative to cut food waste across Compass programs by 50% by the year 2030. MacDonald said Trinity composts 150-200 pounds of food waste per week.

Philip Nash, vice president of operations at FLIK, hopes the sustainability programs create life-long habits for students. "It empowers them to think more critically about their role in building a more sustainable future," he said.



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When you learn how to run an aquaponic system, it helps you understand your place, your own planet Earth a little better, and what your role is.

SAM FLEMING

100 Gardens executive director and co-founder

There are elements of the aquaponics system that students can use beyond science class, Fleming said. "I'm convinced that we could teach any subject to aquaponics in some way or another," he said. "It really is a holistic tool for education."

Take history, for example. While it is new to Trinity, aquaponics has been in use for thousands of years. The Aztecs and ancient Chinese are credited with pioneering the type of symbiotic farming used in aquaponics.

The breeding of tilapia dates back even further – more than 4,000 years ago – to ancient Egypt, where the fish was seen as a symbol of regeneration and fertility. Over time, tilapia evolved to adapt to a range of water conditions, while their waste contains an ideal amount of ammonia for growing plants.

"They're very hard to kill (and) they multiply very easily," Morris-Butler said.

Next school year, Morris-Butler hopes to expand the aquaponics system to other curricula, such as social studies.

"I hope that it teaches our students that there are people in the world who don't have access to clean water (or) soil to grow things," she said. "I hope that it teaches them to be more compassionate and aware of things outside of their bubble."

Not only has the system been a learning tool, it has become a meeting spot for students and faculty members. Like their 8th Grade counterparts, Lower School students often park in front of the tank's window to read to the tilapia or to write in their noticing journals. Teachers work nearby with the trickling water as a peaceful soundtrack.

"I think it's been beneficial across the whole school," Morris-Butler said.



Adds Fleming: "My hope is that at the end of the two years, it's so valuable that there's no choice but to keep it going."