



## **Getting Started with 100 Gardens**

An Overview of Our High School Aquaponics Programs



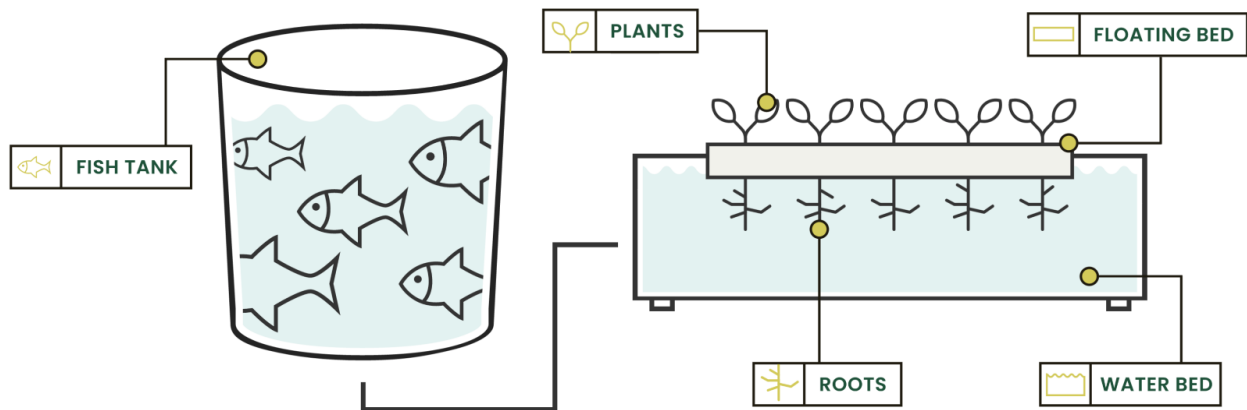
## Who We Are

100 Gardens provides experiential and engaged learning opportunities by creating comprehensive aquaponics programs in schools and institutions serving in diverse communities.

## What is Aquaponics? And Why?

Today's youth will lead a world that by 2050 will have less freshwater, face the total depletion of major seafood species, and have 10 billion people to feed. 100 Gardens aquaponics programs create the awareness and the skillsets to succeed in that world.

Aquaponics is a method of farming that raises edible freshwater fish and vegetables together in a symbiotic environment. Fish create nutrients in the water through their waste. The vegetables use the nutrients to grow and return clean water back to the fish. This facilitates the recycling and conserving of water. In addition, it takes pressure off the oceans by farming fish while growing fresh vegetables for an increasing human population.



## The Ultimate Link Between Hands-On Learning and Environmental Stewardship

100 Gardens Aquaponics Learning Labs bring unforgettable learning experiences to students and teachers. Our K-5 and high school curriculums intersect the operation of the aquaponics system with North Carolina Education Standards for science, math, and several Career and Technical Education (CTE) classes.

### A Quick Glance

- Water quality management and data analyzation
- Daily feeding of the fish and observing fish behavior
- Weighing fish and tracking fish growth
- Humane harvesting of fish, fish processing, and culinary preparation
- Weekly starting of seeds for plant production
- Weekly harvesting and selling of leafy green vegetables
- End of school year fish fry events where students share their experiences with community members



High School Aquaponics Programs	
*Development of the Aquaponics Lab™	✓ x
Professional Development for Teachers	✓ x
Aquaponics Standard Operating Procedures	✓ x
100 Gardens™ Earth and Environmental Science Labs	✓ x
100 Gardens™ Entrepreneurship Curriculum	✓ x
Service visits and Teacher Mentoring	52 Weekly Visits
Ongoing Aquaponics System Monitoring	✓ x
Pre/Post Surveys and Evaluation	✓ x
Regular Harvesting and Distribution of Fresh Produce	✓ school
Volunteer Management	✓ x
EOY Fish Fry Celebration	✓ x
Aquaponics Supply Kit	✓
Homegrown Tomato Festival Tickets	20
Program Marketing and Promotions	✓ school
On-site coordinator	School employee stipend: \$5000 (school)
Standard Annual Program Cost *not including development of the Aquaponics Lab™	\$23 - \$30k
Additional Options	
After School Club	Custom
Summer Program	Custom



## Our Services and How We Partner with Schools and Institutions

100 Gardens is an educational 501c3 non-profit organization. We seek long-term partnerships with our school partners. This requires both the school and 100 Gardens to bring passion, commitment, and resources to the program.

- 1. Development of the Aquaponics Lab™:** Working directly with the partner, an Aquaponics Lab is designed and built in a greenhouse or indoors using artificial plant lighting. 100 Gardens installs the aquaponics system within the new facility using our staff, volunteers, and student interns.
- 2. Professional Development for Teachers:** 100 Gardens trains teachers to implement standard operating procedures (SOP's) for the lab and standards-aligned lesson plans to inspire a new way of thinking about learning, food, and the environment. 100 Gardens also provides regular technical and instructional support.
- 3. Aquaponics Standard Operating Procedures:** Each Aquaponics Lab™ includes detailed standard operating procedures (SOP's) for system operation.
- 4. High School Aquaponics Curriculums:** Our Entrepreneurship CTE and Earth and Environmental Science (EES) curriculums are included with our high school programs. The Entrepreneurship CTE curriculum serves as the anchor for the program, it handles daily tasks and produce sales. The EES curriculum includes (6) 2-day labs that align with NC Essential Standards.
- 5. Service visits and Teacher Mentoring:** Weekly visits by 100 Gardens staff ensure that all mechanical parts are functioning properly, fish and plants are healthy, conduct activities with classes, and ongoing support is provided to teachers. Visits are typically 3 hours, which allows for potential interaction with multiple classes each visit.
- 6. Ongoing Aquaponics System Monitoring:** 100 Gardens uses Aquaponics AI for tracking aquaponics system performance. Students enter critical data daily into the app. This allows 100 Gardens to remotely monitor system performance. Data is used by students to make decisions regarding system operation. Results are discussed with teachers and students during each weekly service visit.
- 7. Pre/Post Surveys and Evaluation:** To continuously improve programming, 100 Gardens administers surveys to both teachers and students before and after the programming cycle for the school year. At the conclusion of each school year, 100 Gardens and the school will meet to discuss outcomes, and how to best improve programming for the next school year.
- 8. Regular Harvesting and Distribution of Fresh Produce:** Students and volunteers regularly harvest fresh vegetables from the aquaponics system. The total program includes food safety practices, harvesting fresh vegetables, tastings, cooking demonstrations, donation of produce to shelters/food banks, and sales to local restaurants.
- 9. Volunteer Management:** 100 Gardens manages volunteers that assist in harvesting and maintaining the aquaponics labs year-round. This includes summer break, holiday breaks, and teacher workdays. Volunteerism is a great way to engage parents and the community.
- 10. End of Year Fish Fry:** Each school can raise their fish to harvest size by the end of the school year. Once the fish are ready to harvest, 100 Gardens will co-host a community fish fry with the school to celebrate the achievement by students. We also engage the community in



conversations around education, food, and the environment. Donations are solicited at the event to raise funds for the next school year's programming.

- 11. Aquaponics Supply Kit:** This kit includes all of the fish feed, juvenile fish, pH buffers, seeds, cleaning supplies, and water quality testing supplies for each school year.
- 12. Homegrown Tomato Festival Tickets:** Each 100 Gardens partner school receives 20 tickets to the annual Homegrown Tomato Festival. The event is typically held on the last Saturday of July. It is the primary fundraiser for 100 Gardens. This event showcases our school programs.
- 13. Program Marketing and Promotions:** 100 Gardens actively promotes programs with news outlets to raise awareness and support for our programs.
- 14. On-Site Coordinator:** This is a crucial position and is best filled by a teacher at the school. Their role is to be the onsite contact, champion the project, and facilitate the use of the aquaponics system for teachers, coordinate with community "clients" and liaison with 100 Gardens. 100 Gardens provides a \$5,000 per year stipend for their service.
- 15. After School Club:** An after-school club can be established to offer students additional learning opportunities. This program is not included in standard programming but can be designed with the school and added to the annual programming costs.
- 16. Summer Program:** A summer program can be established to offer students additional learning opportunities. This program is not included in standard programming but can be designed with the school and added to the annual programming costs.

## How The Funding Works

The standard high school Aquaponics Program costs between \$22k - \$30k annually.

- Annual funds raised from selling leafy greens and herbs = **\$7k - \$15k**
- Annual funds provided by the CTE or the school = **\$15,000**
- **Annual funding = \$22k - \$30k**

## A "Win-Win" Outcome

This partnership will provide a one-of-a-kind, STEM-based approach to the current Marketing CTE classes and the rest of the school. Here is how all parties benefit:

- Students receive an immersive experience in entrepreneurship and develop both STEM and career skills.
- The school receives additional educational and technical support staff from 100 Gardens.
- The school, students, and 100 Gardens are cross-promoted by the partner restaurant, which places a narrative on their menu describing the program.
- Students develop relationships with potential employers via the sales of the produce and other events.
- 100 Gardens keeps the Aquaponics Lab operational during the summer and holiday breaks, ensuring smooth system operation and allowing for potential internships for students.



## Roles of Stakeholders

### School or institution:

- School provides the site, teachers, and students who will interact with and operate the aquaponics system and implement the curriculum. The site can be an indoor location or outdoors in a greenhouse.
- Recommends a person for the role of on-site coordinator, preferably from the existing faculty or staff.
- Authorized use of the 100 Gardens logo and name in marketing and promotion.

### 100 Gardens:

- Provides designs and installs the Aquaponics Lab.
- Provides educational services according to the chosen partnership agreement.
- Facilitates connections to aquaponics industry information, developing technology, and thought leaders and innovators.
- Where applicable, assists in securing licensing or permits for fish species selected for growing.
- Participates in fundraising activities with presentations, tours of facilities, community networking, and grant writing support.

### On-site coordinator:

- This role is to be the onsite contact and champion the project. The on-site coordinator facilitates the use of the aquaponics system for teachers, coordinates with community "clients", and serves as the liaison with 100 Gardens.
- Supported and trained by 100 Gardens.



## The High School/University “Aquaponics Learning Lab”



### Features:

- 30' x 60' Climate Controlled Greenhouse
- (4) 440 gallon fish tanks with viewing windows.
- 192ft<sup>2</sup> of floating raft growing space
- Water pump and plumbing
- Air pump and plumbing
- Rigid sign panels describing system functions
- Digital water chemistry monitor for transferring live water data to the cloud.

The full scale Aquaponics Learning Lab for High Schools and Higher Education provides real world experiences in STEM, jobs, business, and marketing. It includes full implementation of 100 Gardens curriculum materials.

The system produces 150-200 bunches of leafy vegetables per week and 200 pounds of fresh fish per school year. It is a small enterprise run by students. Schools that partner with a local restaurant can often cover more than half of the program expenses from the sales of the vegetables.



## 100 Gardens Curriculum

Our curriculum is a collaboration between experienced educators and the 100 Gardens team. We currently have (6) two-day lab activities for Earth and Environmental Science. In addition, we are developing a course for Entrepreneurship CTE and various other science and math classes. All systems include our Standard Operating Procedures to guide successful operation.

### Earth and Environmental Science Lesson Plans

100 Gardens provides (4) 2-day lab activities for Earth and Environmental Science, each lab aligns with an Essential Standard.

**Day 1:** Lesson focused on vocabulary and a Case Study to drive scientific comprehension.

**Day 2:** Lab/ Experiment in the Greenhouse. This is a worksheet based lab report (Honors/ AP can differentiate by following up with a full lab report activity). Additional differentiation can be made for ELS, EC, and OCS students.

### Entrepreneurship CTE

Students who enroll in the Entrepreneurship CTE class(es) get real-world experience operating a business. Students track inventory, create cropping schedules, work in teams, complete daily standard operating procedures, write invoices, and sell produce directly to restaurants. Through this experience, students develop job skills, work ethic, and communication skills. Beyond Entrepreneurship CTE, the Aquaponics Lab can be utilized by various other CTE classes such as Culinary CTE and Horticulture CTE.



*Students at Webb St. School harvest 168 heads of lettuce each week to sell to Webb Custom Kitchen in Gastonia, NC.*

Please visit [www.100gardens.org](http://www.100gardens.org) or contact [sam@100gardens.org](mailto:sam@100gardens.org) for additional information.

