



STEM Education through Hydroponics

How we can help in—and out—of the classroom!





Boswyck Farms uses hydroponics to share the art of urban farming with those who want better access to fresh, healthy

produce. We work with schools, social service organizations, and community-based organizations promote hands-on science education and create farms of any size in any space. Our company was founded in 2008, and is based in Bushwick, Brooklyn.

We believe that the future of sustainability rests in the hands of dedicated educators. It is for this reason that we've developed a series of programs intended to teach the sciences through hands-on applications for students of all ages.

This brochure contains a breakdown of the workshops and courses we offer, including:

- **classroom-based projects for K - 12**
- **event-based workshops**
- **farm visit field trips**
- **professional development for farmers and teachers**

Boswyck Farms is an approved NYC DOE vendor. Our programs align with New York State STEM Standards and support New York State Math and ELA Common Core Learning Standards.

We're looking forward to teaching you to grow!
For more information, please email us at education@boswyckfarms.org.

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K–2nd Grade

With unbridled curiosity, the youngest students are highly adaptive and use all five senses as their steadfast tools for exploring the world around them. The hands-on physicality of hydroponics is a naturally engaging introduction to science, math, and technology that can be tailored to any level of cognitive or physical ability.

Boswyck Farms offers educational experiences for students that support key inquiry skills outlined in the **K–8 NYS MST Standards**.



Observing

Becoming aware of an object or event by using any of the senses (or extensions of the senses) to identify properties

Measuring

Making quantitative observations by comparing to a conventional or nonconventional standard

Comparing and Contrasting

Identifying similarities and differences between or among objects, events, data, systems, etc.



Classes for K–2 Students

Soda Bottle Workshop (45 Mins)

Appropriate for farmers aged 5–105. Learn basic passive hydroponics through building a hydroponic planter from a 2-liter soda bottle. Good to illustrate concepts as well as to show that hydroponics can utilize repurposed materials. All participants get to take home their planter, seeds, and a starter nutrient pack. This is an easy introduction to hydroponics appropriate for classroom, after-school, or home settings.

Plants Have Parts! Baby Botany (30 Mins)

Learn the parts of a plant through a fun action game. Students work together to “perform” as a plant, miming the process of photosynthesis through simple physical gestures. Participants come away with a knowledge about what plants need, and how they use it.

Field Trips

Come visit a working hydroponic farm! We offer visits to our Research & Development facility (year-round), as well as to our outdoor rooftop farm (late spring, summer, and fall). Students will have a chance to see what we do firsthand, as well as to learn about hydroponic systems through sight and touch. We can accommodate 10 students at a time. All students must have appropriate adult supervision.

3rd–5th Grade

Elementary school students possess a more complex level of reasoning and critical thinking, giving them a deeper understanding of the information they process from experience and the ability to categorize this information for future problem solving. Using the concept of growing food in water as the starting point, elementary school students interactively explore how hydroponic systems have been developed and adapted throughout history, and learn how to construct their own!



K-8 NYS MST Standards: Inquiry Skills

Gathering and Organizing Data

Collecting information about objects and events which illustrate a specific situation

Classifying

Arranging or distributing objects, events, or information representing objects or events in classes according to some method or system

Interpreting Data

Analyzing data that have been obtained and organized by determining apparent patterns or relationships in the data

Predicting

Making a forecast of future events or conditions expected to exist



3rd–5th Grade Workshops

Plant and Play! (45 Minute Session)

Learn basic passive hydroponics through building a hydroponic planter from a 2 liter soda bottle. Good to illustrate concepts as well as to show that hydroponics can utilize repurposed materials. All participants get to take home their planter, seeds, and a starter nutrient pack. This is an easy introduction to hydroponics appropriate for classroom, after school, or home settings.



Hydroponics in the Classroom

This semester-long course is custom-designed by Boswyck Farms in conjunction with your school's science teacher. Boswyck Farms staff will come to your classroom up to two times per week to work with students to develop a simple classroom hydroponics project that will allow students to spend the semester monitoring plants, recording data, and eventually eating the results of their hard work. Course includes basic botany and horticulture as well as using hydroponics to meet age-appropriate STEM standards.

Field Trips

Come visit a working hydroponic farm! We offer visits to our Research & Development facility (year-round), as well as to our outdoor rooftop farm (late spring, summer and fall). Students will have a chance to see what we do first hand and learn about hydroponic systems and plant development. We can accommodate 10 students at a time. All students must have appropriate adult supervision.

6th-8th Grade

While balancing new challenges of physical, emotional, and intellectual development, middle school students begin to engage in more abstract modes of thinking. Hands-on design and construction of hydroponic systems are lessons that not only give students more autonomy in their learning experiences, but coincide with the science and mathematics curricula already at play in their other classes, creating a link to real-world applications of theory and concept.

K-8 NYS MST Standards: Inquiry Skills

Inferring

Drawing a conclusion based on prior experiences

Making Decisions

Identifying alternatives and choosing a course of action from among the alternatives after basing the judgment for the selection on justifiable reasons

Communicating

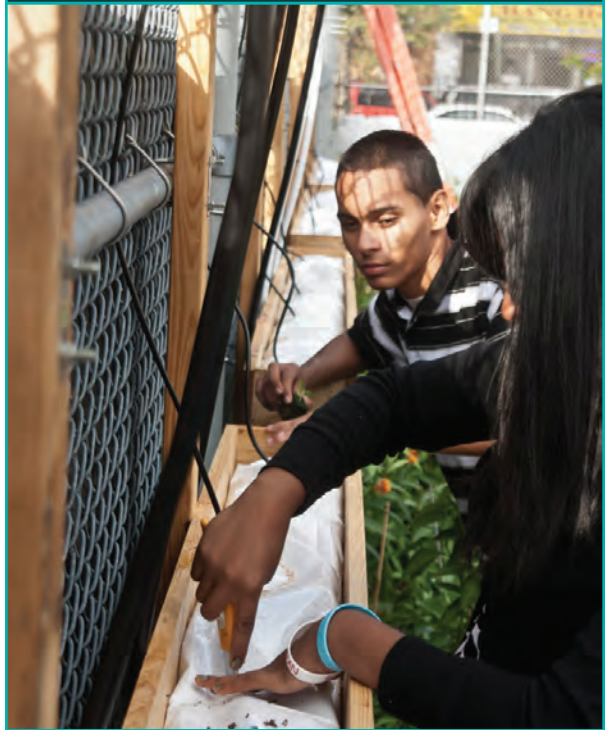
Giving oral and written explanations or graphic representations of observations

Creating Models

Displaying information, using multisensory representations

Hydroponics in the Classroom (Middle School)

This semester-long course is custom designed by Boswyck Farms in conjunction with your school's science teacher. Boswyck Farms staff will come to your classroom up to two times per week to work with students to develop an advanced classroom hydroponics project that gives students opportunities build systems, grow and monitor plants, recording data, and eventually eating the results of their hard work. Course uses hydroponics to meet age-appropriate STEM standards, including basic to intermediate level knowledge of botany and horticulture.



Visit a working hydroponic farm!

We offer visits to our Research & Development facility (year-round), as well as to our outdoor rooftop farm (late spring, summer, and fall. Students will have a chance to see what we do firsthand and learn about hydroponic systems and plant development. We can accommodate 10 students at a time. All students must have appropriate adult supervision.



9th–12th Grade

At the high school level, Boswyck Farms recognizes that students, especially at-risk students, desire learning experiences that are authentic and practical.

Hydroponic projects – from design to full construction – integrate skills and knowledge across many subjects, giving high school students a meaning-oriented classroom experience that piques curiosity and creativity while reinforcing key STEM principles.



Science Learning through Hydroponics

This semester-long course is custom-designed by Boswyck Farms in conjunction with your school's science teacher. Students work with Boswyck Farms staff to develop their own classroom hydroponics project, meeting STEM standards through hands-on work. Boswyck Farms staff come to your classroom up to two times per week and lead students through a complete hydroponic design-build process, followed with lessons on farm maintenance, harvesting, and sustainability. Course covers biology, chemistry, physics, engineering, botany, horticulture, and technology, as well as basic scientific writing and presentation skills.



Internships at Boswyck Farms

Boswyck Farms works with high school students for semester-long internships. This is an internship like no other: rather than serving as our assistants, interns practice necessary classroom skills through responsibility-oriented projects. In addition, we teach basic construction, simple scientific writing, and community-based outreach. Students must commit to working at least 10 hours per week for no less than 3 hours at a time. We are happy to partner with schools to arrange for full course or service-learning credit.

Field Trips for High School Students

Come visit a working hydroponic farm! We offer visits to our Research & Development facility (year-round), as well as to our outdoor rooftop farm (summer and fall). Students will have a chance to see what we do first hand, as well as to learn about hydroponic systems and plant development. We are happy to tailor high school field trips towards a particular field of inquiry: biology, chemistry, physics/engineering, botany/horticulture, or general sustainability. We can accommodate 12 students at a time. All students must have appropriate adult supervision.

Learning Opportunities Beyond the Classroom



Hydroponic Certification Course

An eight-session hydroponic intensive that includes 20 hours of service-learning on our hydroponic projects or on an independent study created by the student. Students will leave the course able to grow food hydroponically on a professional level. We cover everything from hydroponic system management to advanced botany and construction techniques. We offer this course three times annually: once in the fall semester, once in the spring semester, and once as a two-weekend summer intensive. Registration takes place directly through Boswyck Farms.

Teacher Training Courses

A four session teacher development course that explores hydroponic system design and curriculum development. Teachers learn how to transform NY State standards and STEM concepts into a hands-on learning experience through farming. Teachers take back a small “learning module” hydroponic system to their classroom that can also serve as the launch point for a larger school farm. Registration takes place directly through Boswyck Farms.

5-Gallon Bucket Workshop

Intermediate level workshop for adults 18 and up. Build a 5-gallon bucket system with a simple pump and drip system. This workshop includes a lecture on the history and methods of hydroponics and an intensive question and answer period. System construction involves a quick lesson in the use of power tools. This workshop is offered one Saturday per month at Boswyck Farms, and can also be given on demand for groups of 5 or more students. Workshop length: two hours.

Project-Based Courses

Boswyck Farms is also happy to offer project-based courses for clients who wish to build their own systems for home, community, or business use. We will tailor a workshop series and guidebook specifically to the system types and usage goals of your project. We also focus on teaching hydroponics to those with specialized skills, including senior citizens, adults with limited physical movement, and adults with mental illness. Courses also focus on the therapeutic and holistic benefits of farming.

Volunteering

Farms always need helpers, and there’s no better way to learn than through experience. We utilize volunteers year-round, assigning tasks based on individual interest. Come help us build systems, tend plants, harvest crops, or spread the hydroponic word at community events.

Internships

Boswyck Farms offers credit-based internships for college and graduate students. Interns are encouraged to develop independent research projects (with equipment and spatial support from Boswyck Farms) as well as to assist the farm with regular maintenance and development. Periodic internships are also available in small business marketing and communications, with a focus on urban sustainability.

