NY SUN WORKS PROGRAM

HYDROPONIC LABS FOR SCHOOLS

NY Sun Works is a non-profit organization that builds **hydroponic science labs** in city schools to teach the science of sustainability through urban farming. We envision a generation of environmental innovators empowered to create solutions to global resource challenges.

Our science labs are equipped with hydroponic farming technology to provide year-round hands-on, project-based environmental science education for K-12th grade students. While they grow food right in the classroom, students learn science and sustainability concepts, including plant biology, ecology, hydroponic technology, how humans impact the environment, climate change, nutrition, conservation, and sustainable development.

The Hydroponic Classroom operates as an integrated part of the school's curriculum and prepares children to exceed NYC's science standards.

THE NY SUN WORKS COMPREHENSIVE PROGRAM INCLUDES:

- Classroom Design and Hydroponic Equipment Installation
- Comprehensive K-12 Curriculum and Teacher Training
- Ongoing Maintenance Support of Hydroponic Systems

IS IT A GARDENING PROGRAM?

NY Sun Works is a science and sustainability education program. What sets us apart from gardening programs is that our labs run throughout the school year and come with a curriculum that covers mandated science standards and STEM concepts. This means that it is not a supplemental program, but part of the school day as a traditional science class would be. With the Greenhouse Classroom, we not only offer hands-on science and sustainability education, but also address environmental issues around food production, aquaculture, and urban development, with the added value of having fresh and local produce available any season of the school year.

WHAT DOES A HYDROPONIC CLASSROOM LOOK LIKE?

NY Sun Works offers 2 classroom options: a classroom conversion and a full-scale greenhouse.

The **classroom conversion** is a retrofit of an existing classroom.

The ideal room has a sink and ample electrical outlets.

A **full-scale greenhouse project** involves building a greenhouse, usually on the rooftop of the school. This is a long-term process that involves architects, engineers, and builders before NY Sun Works can install and program the space.

EACH GREENHOUSE CLASSROOM INCLUDES:

- Hydroponic Classroom Growing Systems that are used to teach different science concepts
- NY Sun Works' Discovering Sustainability Science Curriculum
- Teacher Training and Mentoring
- Technical Maintenance Training
- Community Engagement
- Maintenance Support by NY Sun Works staff

WHAT ARE THE STEPS TO BRING THE GREENHOUSE PROJECT TO MY SCHOOL?

1. Contact NY Sun Works (Megan Nordgrén — megan@nysunworks.org)
2. Identify a Classroom for the Hydroponic Lab
3. Identify Sources of Funding and Project Partners (if using city capital funding, process will include the SCA)
4. Project Design (definition of hydroponic systems and services)
5. Construction and Classroom Installation
6. Teacher Training and Curriculum Implementation
7. Classroom Maintenance and Mentoring

WHAT ARE THE COSTS AND HOW CAN IT BE FUNDED?

There are many factors to consider when estimating the cost of a NY Sun Works Greenhouse Classroom including source of funding, size of project, existing site conditions, site ownership and programmatic goals, as well as maintenance and operations requirements.

Classroom conversions range from $35,000 (basic lab paid for with Galaxy Budget) to $175,000 (through capital funding, if including room renovation and technology).

Funding can come from a variety of sources:

- Capital Grants from Local Officials
- Principal's School Budget
- Small Grants
- Parent Fundraising/Crowdfunding

WHAT DOES A PARTNERSHIP WITH NY SUN WORKS OFFER MY SCHOOL?

BUILD

Project Feasibility:
NY Sun Works will meet with school representatives to discuss ideal equipment placement, programming, applicability of project to school community, budgetary considerations and fundraising.

Classroom Design and Installation:
NY Sun Works will design the layout of the hydroponic systems in the classroom based on electrical capacity and the existing conditions of the space, considering teacher requirements. Project budget will be defined based on the school's choice of systems and program support.

TEACH

Professional Development:
NY Sun Works provides one-on-one training with a curriculum specialist to help teachers integrate the Discovering Sustainability Science curriculum into their current school program. Additionally, we offer two citywide trainings per year to bring our partner school teachers together for for day-long professional development and a certified ASPDP course three times a year.

K-12 Discovering Sustainability Science Curriculum:
NY Sun Works provides a year-round, innovative, grade-specific interdisciplinary curriculum. The Discovering Sustainability Science curriculum is housed on the NY Sun Works Learning Center, an online hub for teachers and educators that also hosts training videos, community engagement guides and other resources to teach in the Greenhouse Project Classroom.

Maintenance and Mentoring:
NY Sun Works provides weekly on-site maintenance to make sure the hydroponic systems are fully functioning, while continuing to mentor the teacher(s) throughout the year. NY Sun Works will also provide troubleshooting training for custodial staff.

CONNECT

Community Engagement:
NY Sun Works will work with your school to "bring the harvest home," extending the concepts learned in the Greenhouse Classroom to the larger community. Through the Harvest Program, students and their families receive regular distribution of the fresh produce grown in their Greenhouse Classroom. The program will also support the development and running of community engagement events such as farm stands, taste tests and STEM nights, that aim to share the produce grown in the hydroponic systems and the science content taught in the Greenhouse Classroom with the larger school community.

Annual Youth Conference:
Partner schools are encouraged to attend and participate in NY Sun Works' Annual Discovering Sustainability Science Youth Conference, a live-streaming event showcasing student work from Partner Schools. The event features presentations on science and urban agriculture, as well as an exciting and diverse lineup of experts in science & sustainability fields.

WHO WILL TEACH THE STUDENTS IN THE GREENHOUSE CLASSROOM?

NY Sun Works requires Partner Schools to designate a teacher(s) who is responsible for the Hydroponic Classroom and related instruction. This is vital for the success of the program.

The designated teacher(s) will receive in-depth systems and curriculum training. The allocation of additional prep time is recommended, as teachers will need to monitor the systems at least once during the school day. NY Sun Works' Greenhouse support team will assist on a weekly or bi-weekly basis and our support staff are always available by phone.

WHAT IS THE NY SUN WORKS CURRICULUM?

NY Sun Works curriculum is housed in the NY Sun Works Learning Center, an online hub for teachers and educators that also hosts training videos, community engagement guides and other resources for teaching in the Greenhouse.

The **K-8th grade** Discovering Sustainability Science curriculum is specifically designed to complement both the unit themes of the **NYC Scope & Sequence and Amplify Science**. The curriculum is comprised of three sections: the FARMING FOUNDATIONS, the Greenhouse Classroom/GHC CONNECT and the SUSTAINABILITY EXTENSION. Lessons have been designed to inspire students to ask questions, investigate systems, make predictions, and design solutions. This hands-on curriculum emphasizes the student's perspective in the process of learning and promotes critical thinking and collaborative work. Our program provides meaningful opportunities to both learn about sustainability science and grow within a hydroponic Greenhouse Classroom.

The **9-12th grade** Discovering Sustainability Science curriculum is comprised of modules and subject-specific labs. The modules introduce students to hydroponic farming, offer students the opportunity to design and build their own hydroponic and aquaponic systems, and connect to topics covered in life science courses such as Living Environment, AP Environmental Science, and AP Biology. **The labs can be used to fulfill the 20 hrs lab time required for the NYS Regents exams**.

The **High School Hydroponic Farming Certification Program** is a job training certification program that provides high school juniors and seniors with the seed-to-harvest technical skills for growing food in an indoor hydroponic farming setting. The program provides students with the skills needed to directly enter the industry field (e.g., through an internships or job with a hydroponic farming company) or to pursue further study through an Indoor Agriculture post-secondary program. The program takes place either after school or on Saturdays and is taught by NY Sun Works Staff.

WHAT DO WE DO WITH ALL OF THE FOOD?

The by-product of a Greenhouse Classroom is large amounts of fresh produce throughout the school year! Through the NY Sun Works Harvest Program, students and their families receive regular distributions throughout the year of the fresh produce grown in the hydroponic systems.

Some schools also use crops in the following ways:

- Provide fresh produce for school food pantries
- Donate crops to local community organizations
- Teach science-based nutrition and cooking classes
- Run a student-operated farm stand