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In the Book Bag, More Garden Tools

By **LISA W. FODERARO**

In the East Village, children planted garlic bulbs and harvested Swiss chard before Thanksgiving. On the other side of town, in Greenwich Village, they learned about storm water runoff, [solar energy](#) and [wind turbines](#). And in Queens, students and teachers cultivated flowers that attract butterflies and pollinators.

Across New York City, gardens and miniature farms — whether on rooftops or at ground level — are joining smart boards and digital darkrooms as must-have teaching tools. They are being used in subjects as varied as science, art, mathematics and social studies. In the past two years, the number of school-based gardens registered with the city jumped to 232, from 40, according to [GreenThumb](#), a division of the parks department that provides schools with technical support.

But few of them come with the credential of the 2,400-square-foot garden at Avenue B and Fifth Street in the East Village, on top of a red-brick building that houses three public schools: the Earth School, Public School 64 and Tompkins Square Middle School. [Michael Arad](#), the architect who designed the [National September 11 Memorial](#) in Lower Manhattan, was a driving force behind the garden, called the [Fifth Street Farm](#).

The idea took shape four years ago among parents and teachers, when Mr. Arad's son was still a student at the Earth School. The family has since moved from the neighborhood to Queens, but Mr. Arad, president of a nonprofit corporation that oversaw the garden, stayed on. The farm, with dozens of plants ranging from leeks to lemon balm, opened Oct. 19. Already, students have learned about bulbs and tubers, soil science and nutrition, while the cafeteria has cooked up fresh kale and spinach for lunch.

Mr. Arad said a conversation with his two children during an apple-picking trip spurred his interest in the farm. "They said, 'What? Apples grow on trees?'" he recalled. "A lot of kids don't get to go upstate. This is 365 days a year. It gives them an immediate, visceral connection to nature."

The Fifth Street Farm cost about \$1 million to build and used what Mr. Arad called "off the shelf" components, like fiberglass planters and galvanized fencing. "This has the potential to be a model for the rest of the city," he said. "If money is no object, you can do whatever you want —

hydroponics, a greenhouse. But you don't need an unlimited budget.”

Most of the funding for the Fifth Street Farm came from the office of Scott M. Stringer, the Manhattan borough president, who has provided \$3 million toward green roofs and gardens atop schools, including ones at P.S. 41 in Greenwich Village and P.S. 6 on the Upper East Side. Two years ago, his office organized a forum on the topic for teachers, administrators and parents.

“There were a lot of naysayers arguing that you couldn't transform these rooftops,” Mr. Stringer said. “To me, these are outdoor classrooms. These spaces are not ornamental. Kids are learning while they are planting.”

Since the 1980s, the [Horticultural Society of New York](#) has worked with more than two dozen schools on garden design, construction and curriculum through its Apple Seed program. Pamela Ito, the society's director of children's education, credited Rudy Crew, the former city schools chancellor, with promoting horticulture in the schools starting in the late 1990s.

The society, which shared plants and expertise with the Earth School, has lately made a push in Queens, where four ground-level gardens have opened in the past year, three of them this fall. Together, the schools have reaped about \$270,000 from the Greening Western Queens Fund, which is part of a settlement with Consolidated Edison stemming from a long power failure in 2006. All of the schools — P.S. 2, P.S. 70, P.S. 84 and P.S. 85 — were in the blacked-out area.

Each school has put a different spin on its garden. The one at P.S. 2, in Jackson Heights, for instance, focuses on edible plants and has a rainwater catchment system. At P.S. 70 in Astoria, students planted butterfly bush and other colorful flowers to attract butterflies and bees, and tree-stump seating was installed in the garden so teachers could hold classes outdoors.

The roof at P.S. 41 in Greenwich Village aims to introduce students to green technologies. The elementary school already had container gardens at ground level, but it wanted to expand on the roof. On Sept. 21, the school opened a 15,000-square-foot green roof, which uses trays with four inches of soil to grow sedum, a drought-resistant perennial, as well as herbs and other native plants.

Among other things, the school's 800 students will learn about the importance of diverting rainwater from the sewer system. A small wind turbine and three solar panels connected to a battery demonstrate alternative sources of energy. There is even a solar-powered fountain. “It's great for the younger kids because if they stand in front of it and cast a shadow, it stops working,” said the school's science coordinator, Vicki Sando, who, with the principal, Kelly Shannon, founded

the \$1.6 million project.

In the hope of extending instruction outdoors, the school is directing as many teachers as possible to the roof. Art teachers can bring students en plein-air to sketch the skyline. Math teachers can use the roof's outlines to explain concepts like perimeter, area and angles. This week, first graders studying the weather climbed to the roof to explore the wind by blowing bubbles.

Green roofs and gardens are not for only elementary schools, however. In Crown Heights, Brooklyn, the High School for Public Service has a one-acre farm, which is now in its third season. The farm takes center stage in a course about the nation's food system. Students also oversee a farmers' market and offer cooking demonstrations.

"The farm is on the school's front lawn, so you walk up and see tomatoes, corn, broccoli, sunflowers and 11 kinds of hot peppers," said Elizabeth Bee Ayer, a consultant with Green Guerillas, a nonprofit group that helps run the high school's program. "We were blown away because you don't often find an acre of land in the middle of Brooklyn."



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