

Seminole High School Landscape Architectural Project

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Abstract

The Landscape Architectural Project, an environmental awareness project funded by NOAA Planet Stewards, enabled students to take ownership in designing, creating, and maintaining natural gardens around Seminole High School (SHS). Students had, and continue to have, opportunities to earn service hours, and become leaders within the school community. Approximately 350 – 400 students, 8 educators, a high school administrator, and 2 outside horticulture experts were involved from Pinellas County Schools Gardens and the University of Florida (UF) Urban Horticulture Extension. Restoring Florida native plants to the campus and expanding access to the gardens by educators who have used them for lesson enhancements for their students are measures of success for this project.

Monarch on milkweed plant.

Photo Credit: Billy Skaradek

Introduction

Seminole High School (SHS) is a 64-acre campus that has minimal vegetation on it. The Landscape Architectural Project was designed for students to build a native landscape promoting shelter and food for native wildlife, biodiversity, and stewardship of nature, and will increase the aesthetic value of the student's educational experience (NOAA, 2021).

A variety of Florida native plants might grow optimally within the 64-acre campus at SHS and provide many benefits. Native plants provide nectar, pollen, and seeds that are important food sources for regional species of butterflies, insects, birds, and other animals (Pitchford, 2019). Native landscaping provides local habitat that is necessary for species that are indigenous to the area (Florida Wildflower Foundation, 2021). Additionally, native plants do not require fertilizer and reduce the need for pesticides. These plants require less water as



Image 1. Seminole High School garden before planting Photo Credit: Jerry Cantrell

well as prevent erosion (e.g., water runoff and flooding in the local area will be minimized) (US Forest Service, 2021). Finally, native landscaping reduces carbon from the air, which in turn assists in reducing air pollution.



Image 2. Seminole High School propagation garden space prior to improvements Photo Credit: Jerry Cantrell



Image 3. Seminole High School propagation garden space with clearing Photo Credit: Jerry Cantrell

The Project

The Landscape Architectural Project has engaged many educators at SHS and their students in activities relating to the gardens. SHS has used the Landscape Architecture Project to direct a focus on high school-wide STEAM (Science, Technology, Engineering, Arts, Mathematics) education.

The vision of Seminole High School's STEAM program is to develop specialized and innovative skills through exploration, critical thinking, and problem solving (Webster University, 2022), (The Glossary of Education Reform, 2016), (UMass Chan Medical School, 2022). The Secondary STEAM offerings at SHS are rooted in the interdisciplinary application and interaction of all STEAM fields. Real-Life approaches to STEAM-oriented issues are gained through hands-on STEAM challenges and implementation of the engineering design process (Back, 2017). Participation in the STEAM program allow students to:

- Address specific design challenges.
- Use a variety of technologies to enhance their understanding of STEAM tasks.
- Practice communication and leadership skills.
- Explore STEAM careers and their associated pathways.
- Provide avenues for students to use interdisciplinary skills to accomplish learning goals.
- Provide opportunities to compete in the Pinellas Regional Science and Engineering Fair and the Florida State Science and Engineering Fair.

All 85 teachers and 2,000 students have access to use the gardens to teach cross-curricular connections of environmental sustainability as they relate to science, engineering, math, the Arts, and related technologies (Royal Academy of Engineering, 2014). SHS is Pinellas County Schools' first school to initiate STEAM for the entire High School.

The Sustainable Engineering Academy of SHS uses the gardens to teach unmanned aircraft system operation: filming, light differentiation, ESRI ArcGIS integration based on vegetation as well as water quality data. Language Arts continues to use the gardens to explore nature and interpretation of nature through an author’s lens. Foreign language uses the gardening for students to teach how to give directions in Spanish. Visual arts students add artwork to the garden: on the ground, in the trees, and on the walls. Science uses the gardens to demonstrate real world examples of species population and their associated life cycles.

There have been 80 students actively involved in maintaining and cultivating the gardens every week. The species planted are listed in Table 1.

SHS is expanding the gardens this year to include a hydroponics garden. Pinellas County Schools worked with the Sustainable Engineering Academy to build out a space that will house the hydroponics system. The goal this year is to begin working on obtaining materials to have students build a greenhouse over the vegetable/propagation garden.

SHS has added CAPE Certifications (industry specific certifications) to its offerings partially because of the Landscape Architectural Project. We offer USI Safety Level 1 Unmanned Aircraft Certification opportunities to students; 33 certifications were obtained last academic year and 60 additional are expected in the 2022 – 2023 academic year. In the next academic year, the Sustainable Engineering Academy is adding ESRI ArcGIS Desktop Entry Certification, AutoCAD Certification, Aquaculture Certification (hydroponics), and Ecology Conservation Certification.

School year timeline:

- Students discussed the launch of the project on May 26, 2021.
- Soil sampling took place throughout the 64-acre campus of Seminole High School. Environmental analysis probeware through Vernier was used along with the student’s phones to determine soil pH levels. Students mapped the pH measurements and communicated these to Theresa Badurek of UF. Theresa provided input regarding the soil and plant species that are suitable.
- The soil was sampled in the summer of 2021 (Table 2). SHS worked in collaboration with the University of Florida to accomplish this task.
- Students decided that the Landscape Architectural Project will be called SHS Beautify at Seminole High School, August 2021.
- Florida Native Plant Society (FNPS) came to the school and worked with students and educators. FNPS provided guidance on the appropriate plants to place and the times of year to plant them. Additionally, valuable information regarding the vegetable garden and native species to plant was obtained in October 2021.
- Students from the Graphics Media course as well as STEAM Academy created videos for school publication, writings for the school newspaper, and

Table 1. Species Planted in the garden

Qty	Description
80	Native Groundcover
50	Native Vine
80	Native Wildflower
60	Butterfly Larval Host Plants
60	Butterfly Nectar Plants
30	Exceptional Pollinator Plant
30	Exceptional Bird Food Source Plant
30	Native Fruit Plants
100	Wildflower Seeds
30	Soil Amendments

Table 2. Project Data Collection Types

Type of Data	Data Collection Method	Amount
Soil pH	Probeware detecting pH	3 sites, 10 samples each
Survey of student’s interest	Verbal communication and data research for gardening.	40 students
CO2 Sequestration	Measurement and estimation	10 students and 2 teachers

communications through the school's The Morning Show to inform and engage students in SHS Beautify Project.

- August 2021, the students planted a butterfly garden and began creating a community space.
- October 2021, students began conditioning the soil of the propagation garden for planting. Students also cleared seashell from the gardens so they could plant the gardens.



Image 4. Seminole High School wildflower garden after planting in 2022

Photo Credit: Jerry Cantrell

- October 2021 - January 2022, (ongoing) students have worked with Wilcox Nursery to design, select, and plant three landscapes at Seminole High School. The students have planted one landscape in front of the school, created an improved memorial garden for students who have passed on as they attended Seminole High School, began creation of a student-centered community space and garden, began planting a shade garden near the auditorium, and began clearing space and improving the allocated vegetable/propagation garden space.
- September 2021, the students were surveyed regarding their understanding of the need for native plants in the local environment during this time (e.g., benefits, aesthetics, how to continue engaging students in activities, their desires to improve and continue gardening efforts).

- September 2021 - current, students are planting suitable sources of nectar and food for indigenous butterfly species
- November 2021 - current, students began propagating a small quantity of native plant species through its propagation garden.
- Academic year 2022 - 2023, students are maintaining the created gardens, building a vegetable garden, and researching aquaponics.

Student surveys were conducted in the fall of 2021 and the spring of 2022 to determine the student's level of interest. The spring survey was used to determine knowledge of the

students and was a baseline measurement that will be used as the program moves forward.



Image 5. Memorial Garden Photo Credit: Jerry Cantrell



Image 6. Wildflowers Photo Credit: Jerry Cantrell

Based on EcoMatcher's carbon sequestration formula, the carbon dioxide sequestered in one year was 13,408 lbs (Fransen, 2019). There were more than 570 wildflower plants, trees, shrubs, and vines planted. In the process of restoring native vegetation to the school's campus, 4.62 tons of crushed coquina shells were removed from the memorial garden.

Many SHS educators wanted to be involved in this project, but curriculum sharing and integration had to occur, so we have taken an approach of collaborating in cross-disciplinary teams. The goal of the teams is to better understand the student's needs and to provide STEAM-centered learning opportunities. A group of educator leaders and administrators met monthly to discuss moving this idea forward. One year's theme for education was "water" and many lessons incorporated a water concept. Each discipline within the school created a "water" project to present to the student body via our Morning Show, a student-created news aired on Wednesdays and Thursdays. There was also a cross-functional team of teachers working with educators regarding the process of building collaborative teams and brainstorm ideas. The educators now see that sharing/integration can be successful and are consistently looking for ways to integrate sustainability into their coursework.

Conclusion

Students have been successful in restoring native wildflowers on SHS's 64-acre campus. There are 5 distinct garden spaces, with plants established over roughly three acres of land. The gardens created at SHS offered valuable teaching experiences that cultivate the potential in every student to thrive as a global citizen by inspiring a love of learning, encouraging civic engagement, challenging and supporting every student to achieve academic excellence, while embracing the full richness and diversity of our community. SHS has used the Landscape Architectural Project to grow its STEAM concept which is improving the teaching and learning environment at Seminole High School. It is also promoting new, innovative, and captivating learning experiences for students.

The Landscape Architectural Project continues to be student-run, provides practical, hands-on experiences in farming and gardening, business management, community relations, and nature observation. Additionally, students are anticipating research projects, scientific inquiry, as well as places for reflection and creativity in the cultivation of the native plant habitat.

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About the Author

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