

# STEM and Sustainable Agriculture: Modeling an Interdisciplinary Approach in the High School Setting.

## Final report for YENC19-134

Project Type: Youth Educator

Funds awarded in 2019: \$3,954.00

Projected End Date: 02/28/2021

Grant Recipient: School Town of Munster

Region: North Central

State: Indiana

Project Manager:

[Kelly Hladek](#)

Munster High School

## Project Information

### Summary:

*Munster High School's STEM team will educate students about sustainable agriculture by collaborating across-disciplines to create a 21st century garden and orchard. A variety of classes such as art, botany, business, computer science, engineering, Family And Consumer Science (FACS), and math will collaborate to design, plant, automate, and harvest the garden while feeding our community and readying produce for the market. Approximately 350 students will engage in curricula to support sustainable agriculture and outreach through the integrative lens of STEM.*

### Project Objectives:

- 1. Increase understanding of Sustainable Agriculture practices through hands-on work in the vegetable garden and orchard.*
- 2. Expose students to ways in which Sustainable Agriculture integrates with other STEM disciplines such as Computer Science, and Engineering.*
- 3. Provide business experiences and community service opportunities to students through the hosting of a community dinner and the sale of produce at the Munster Farmers market.*
- 4. Share project with educators, students, and the general public at professional conferences, in the local paper, as well as online with social media and a student produced website.*

## Cooperators

- [Ann Massie](#) (Educator)  
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Farmer, president  
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President

Munster Education Foundation

## Educational & Outreach Activities

**3** Published press articles, newsletters

**3** Webinars / talks / presentations

**4** Workshop field days

### **PARTICIPATION SUMMARY:**

**1** Farmers/ranchers

**350** Youth

**6** Parents

**10** Educators

**7** Other adults

Education/outreach description:

Education and Outreach description

From February through March 2019, Munster High School Botany students planted vegetable seeds in the school's greenhouse. Art students completed conceptual drawings of the school orchard. Engineering students finalized a 3D model of landscape architecture unit with special attention paid to sustainability of space as a multipurpose urban farm. Art students began producing serving ware for a fall community dinner. On March 30, planting day at the high school, STEM team students and the Lake County Purdue Extension Educator conducted soil analysis, and 24 staff, student, and parent volunteers planted orchard trees in the central courtyard. On the same day, the Purdue Extension Educator facilitated a Fruitful Futures activity and gave the first of three nutritional outreach/attitude surveys to planting day participants.

From April through May 2019, program volunteers transplanted raised garden beds in the north courtyard. Students built and tested a small scale automated rainwater irrigation system. On April 12, the Purdue Extension Educator facilitated another Fruitful Futures activity and gave the second of three nutritional outreach/attitude surveys to Botany and Family and Consumer Science (FACS) students [Fruitful Futures Program - March 30 and April 12 surveys](#). On April 24, 2019, an article appeared in The Times [online](#) "Munster High School plants orchard for Project GREEN," which highlighted the school's planting day activities. On May 8\*, an article titled "Munster schools' Joshua Craig receives sustainable agriculture STEM grant" appeared in The Times newspaper. The article publicized the SARE grant that the school received.

From June through mid-August 2019, Munster High School staff and Robotics club

members talked with community members about the role of automation in modern sustainable agriculture. Staff member Joshua Craig presented "Project GREEN" to Northwest Indiana educators at the South Shore eLearning Conference on June 5, 2019. The high school Robotics team was instrumental in the building and planting of vegetable gardens at Eads Elementary School where elementary students were actively involved in weeding and harvesting the produce. The vegetables they harvested supplied a bounty table for the staff at the elementary school. The Robotics Club also worked with school maintenance staff to build the FarmBot that was purchased through the SARE grant. They use the FarmBot to help maintain the garden beds.

From mid-August through October 2019, Munster's FACS students coordinated menu items for the upcoming community dinner on Oct. 5. On Sept. 11\*\*, an article appeared in The Times newspaper, publicizing the Munster High School/Rotary Club of Munster co-sponsored dinner-theater event showcasing menu items inspired by the Project GREEN garden and orchard. On Sept. 17, Principal Mr. Wells, and a group of teachers presented an Indiana Department of Education webinar titled "Project GREEN: A School Wide PBL" (PowerPoint: [Munster HS's DOE WebX 2019 presentation](#); YouTube: <https://www.youtube.com/watch?v=BdaBPVpU528>) for participants around the state. On Oct. 5, 2019, Munster High School STEM students and the Rotary Club of Munster co-hosted "The Addams Family" dinner-theater community event. Project GREEN-inspired food items were featured on a menu designed by Theater students and served on the ceramic serving ware made by Art students.

Since January 2020, Botany students have planted petunia, impatiens, marigold, geranium, carrots, radish, and tomato (3 varieties) seeds in the greenhouse. Plans include coordinating a small-scale farmer's market at the high school, where students will sell flowers and vegetables. This smaller model will be a test run prior to the large-scale model in the subsequent summers. Physics students built the wind turbine, which will generate electricity to power the web-based solenoid water-release mechanism and data collection system programmed by Computer Science students. On Jan. 30, Lake County Purdue Extension Educators facilitated another Fruitful Futures activity and gave the third of three nutritional outreach/attitude surveys to Botany and FACS students [Fruitful Futures Program - Jan 30 survey](#). In February, the School Town of Munster School Board approved plans for the Munster High School to offer an Entrepreneurial Incubator Capstone Class through which students will create a business model for the farmer's market.

([Munster HS's DOE WebX 2019 presentation](#))

\*May 8, 2019 article in The Times:



\*\*Sept. 11, 2019 article in The Times



## Learning Outcomes

**362** Youth reporting change in knowledge, attitudes, skills and/or awareness

Key changes:

- Learning about more options of fruits and fruit varieties that they can consume
- Consuming more fruits and fruit varieties at school or at home
- Learning about food safety risks that can develop while growing/harvesting fruit

Results and discussion:

On five occasions--3/20/2019, 4/29/2019, 1/30/2020, 2/22-23/2021, and 3/3/2021-- Nicole Witkowski, a Purdue extension educator and master gardener, presented the Fruitful Futures program to Munster's botany and family and consumer science students. The presentation focused specifically on apples, and students learned

about different varieties of apples and their unique characteristics with regard to size, color, taste, texture, etc. Students were allowed to taste the different kinds of apples. They also learned about how apples are grown. Of the 362 (total) students who were present for the presentations, 252 said they learned more about the fruit options and varieties available to them; 220 said they would mostly likely consume more fruit at school or at home; and 265 said they learned about the food safety risks that can develop while growing/harvesting fruits.

## Project Outcomes

### 3 Grants received that built upon this project

Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the view of the U.S. Department of Agriculture or SARE.



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