

Engaging Elementary Students into Horticulture with Cooperation of Master Gardeners Through Multidisciplinary Approaches in Rural Kentucky

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INTRODUCTION

The UKREC Botanical Garden is a 5-acre setting located at the University of Kentucky-Research and Education Center, Princeton. It was created in 1980 to evaluate and select superior environmentally sustainable plants for enhancing Kentucky's environments and landscapes. The garden is visited by master gardeners, extension county agents, students and residents of nearby communities. Being an enclave in a rural region, with limited resources; the garden has the potential as a learning center to teach science-based knowledge and outreach. This project has offered hands-on activities for fourth and fifth grade students of Caldwell County and Lyon County Schools. Topics included plant diversity in different categories (natives, invasive, ornamentals, small-fruit crops, and

vegetables), insect-plant and plant-soil interactions, and the importance of environmental protection for a sustainable future. Science teachers and University of Kentucky Faculty and Staff have prepared, organized and delivered planned activities. These events scheduled in March-May and August-October coincide with the school year. The students will be aware of how plants affect their lives and *vice versa*. An extension agent and master gardeners collaborated during the students' visits. Training classes offered to enhance Master Gardeners' knowledge. The botanical garden scenery offers students an open classroom to learn through a direct contact with the different stages of plant development and interactions with its surrounding.

OBJECTIVES

The objectives are to foster scientific interest and curiosity in elementary students' minds to explore and protect their environments and be active life-long supporters of horticulture demonstration gardens in their schools for horticulture education and healthier nutrition.

SPRING VISITS TO THE UKREC BOTANICAL GARDEN

Caldwell County Elementary School (CCES) has six classes per grade level, fifth graders visited the UKREC Botanical Garden on April 11 and May 14, and fourth graders on April 12 and May 15.

Lyon County Elementary School (LCES) has three classes per grade level, all classes visited the garden on April 17 and May 21. Students were grouped such as each visit had about 75 students, two visits were held a day: 9:00–11:00 AM and 12:00–2:00 PM for CCES.

ACTIVITIES

Instructors and Master Gardeners received students and their science teachers and divided each group of 75 students into five subgroups. Each subgroup was assigned to a working station and every 20 min, they rotated until finished visiting the five stations.

Hands-on activities were delivery on diverse agricultural topics:

- April: Soil types and conservation; soil biology: compost and vermicomposting, carbon footprint calculation; plant hunter (plant morphology); planting vegetable seeds and seedlings (Figure 1).



Figure 1. Earthworms for vermicomposting.

- May: Plant diseases: pathogen and symptom description; flowers and pollinators; mimicry and camouflage; insects: pests vs natural enemies; raised bed vegetable garden (students observed crop development after the first month) (Figure 2).



Figure 2. Pollinators are more than Monarch butterflies and honeybees.

School on-site Activities

- Caldwell and Lyon County Elementary schools were provided with four raised beds; 4 ft (1.22 m) wide by 8 ft (2.44 m) long by 12 in. high (30.48 cm).
- Lyon County Elementary school added 8 raised beds to provide the gardening experience for all classes (Figures 3 and 4).



Figure 3. Students planting raised at beds LCES.



Figure 4. Multiple raised beds at the LCES.

SURVEY

At the end of the second spring visit, teachers (17 CCES, 6 LCES) and students (300 CCES, 150 LCES) were surveyed to assess their experiences and receive their input to plan fall activities. Evaluation sheets were presented to students and teachers and the results are in Figure 5. A majority of the students, up to 86.2%, have gardened. Plant hunter morphology was the least favorite among the science teachers. Fourth grade teachers from both schools considered that activities on pollinators and soil fit their curriculum in large extend. Carbon Foot Print calculator activity did not match CCES

curricula for fourth and fifth grades, besides this session evidenced that a very low number of students recycle at home, and recycling is barely done at the schools. It might have been the reason for those students evaluated it as the least favorite of all the learning sessions except for the Lyon County 4th grade. The insect mimicry and camouflage were highly ranked by students and teachers. In general, students enjoyed learning most of the activities; particularly LCES 4th graders. LCES science teacher is very active and committed to use gardening as a tool to complement her lectures and teach students to work and maintain their garden.

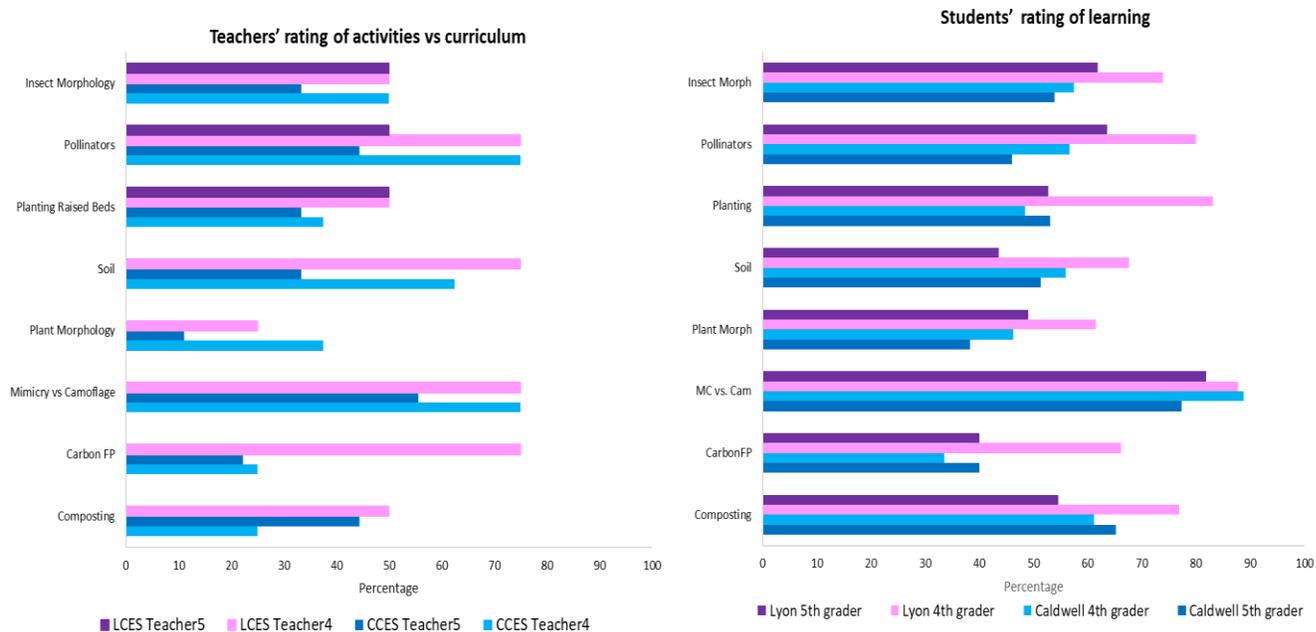


Figure 5. Teacher's and students' evaluations of activities offered in 2018 spring.

The quality of the events varied according to the schools, all LCES teachers judged the events as excellent (Figure 6). The majority of CCES fourth grade teachers considered that the activities were excellent. However, CCES fifth grade teachers thought that the activities were just good for their students. Students' evaluation was similar regardless the school, fourth graders rated the

events as excellent. Based on this information, and considering that the fourth graders would be our fifth graders in the fall program, we planned totally different approach. The main goal of fall program was to provide students the opportunity to learn how to evaluate fair tests, use laboratory equipment, write a report and give a presentation. Different elements of their curriculum will be integrated, such math, analysis and writing.

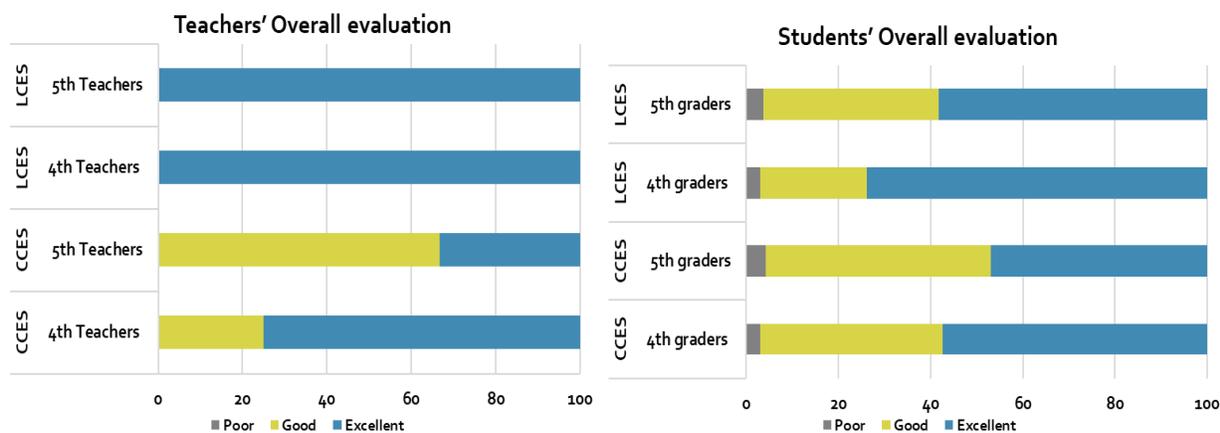


Figure 6. Overall evaluation of the 2018 spring events at the UKREC Botanical Garden.

Fifth graders had an excellent experience according to their teacher Mrs. Megan Radivonyk, who said “This has been quite a learning experience for our students.... I don’t think most of them have ever done something like this before. They have all really enjoyed it”.

MASTER GARDENER ADVANCED TRAINING

Lyon County Master Gardener Association has contributed to the field days of this program through helping instructors delivering information, keeping students in groups and helping them to move between working stations. This program is also aimed to cooperate in the professional developed of master gardeners. Advanced Master Gardener Training included hands-on and interactive sessions on pruning techniques (Figure 7), natural enemies of garden pests, plant disease identification, and UKREC Soil

Laboratory Tour. A total of 24 master gardeners from 5 counties attended the event that was classified as very good for most of them.



Figure 7. Master Gardeners advanced training pruning workshop.

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