Research Garden Rehabilitation Project

#197 Math, Science, & Technology Prep

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Introduction

As part of the Buffalo Public Schools reconstruction project, the building housing the Math, Science, & Technology Preparatory (MSTP) school located at 666 E. Delevan Ave. Buffalo, NY. 14215 was equipped with a multi million dollar research learning garden during the first year of reconstruction. The entire project took two years to complete and in the process of the building remodel, the research learning garden was severely neglected by the district, resulting in a dangerous and unusable space. The space became a completely unusable area as it was completely taken over by thick, six foot tall weeds that were strangling and killing many of the bushes and shrubs in several areas as can be seen in Figure 1. The weeds were so dense in certain spots that they were covering light safety features and hiding teachable components of the garden such as the large raw material rock samples that correspond to the processed and polished stone pavers in the garden walkway as can be observed in Figure 2.

Materials and Methods

To complete this project, the team of teachers spent several weeks rehabilitating the learning garden area into a safe and usable teaching space. First, we made it a point to apply sunscreen and then spent many man hours in the blazing hot sun weeding each section of the garden by hand. Next, we applied preen weed inhibitor to help prevent further weed growth in select areas of the garden. Making sure to hydrate our bodies with water frequently, we then used garbage cans, shovels, and muscle power to transport and spread over eight yards of mulch which was provided by the district to rehabilitate and fertilize all areas in the garden. The process can be seen in Figures 4, 5, and 6. We did this in an effort to reestablish the micro climates originally designed and planted by the landscape architect. Lastly, we cleaned, pruned, and shaped over grown bushes and shrubs to make the walkways and student seating area more accessible. To promote proper tree growth of the saplings in the garden, we contracted a tree arborist, Mr. Greg Sojka of Greg's Tree Service, who pruned the tree saplings and offered pointers on their proper care and maintenance in the future.

Additionally, we worked to repopulate the pond with snails, guppies, tilapia, and koi. We happened upon these fish species fingerlings that hatched after the school year session ended in the Aquatics Room lab tanks. We feed them in the tanks and transferred them to the pond as needed. See Figures 7 and 8.

After the physical rehabilitation of the research learning garden, we invited other ISEP summer teacher participants from Riverside and Burgard high schools to visit and explore the garden. They collected water samples from the MSTP pond and stream to analyze and incorporate into their ISEP project. Together, we began to familiarize ourselves with the use of different types of probes including soil moisture (Figure 9), anemometers, and GPS satellite locators. We began to brainstorm and discuss how the various probes could be applied to currently used lessons and incorporated into future lesson design and application with our students.

Figure 1 – Tall Weeds

Figure 2 – Items Revealed

Figure 3 – Invasive Found

Figure 4 – Before Rehab

Figure 5 – During Rehab

Figure 6 – After Rehab

Figure 7 – Aquatics Tank

Figure 8 – Transfer to Pond

Figure 9 – Probe Exploration

Figure 10 – Natural Seating

Figure 11 – Pond Area

Figure 12 – Birds Eye View

Results

During the rehabilitation of the garden, we came across a suspicious looking plant that had a stem different from the rest of the weeds in the area that we were cleaning noted as the hot spot in Figure 1. We took great precaution when removing what we thought could be the invasive and toxic poison hemlock found in Figure 3 by carefully using long clippers to cut, hold, and directly bag the pieces. We were being extremely careful not to come into contact with the plant.
Through our efforts, the research learning garden was transformed from a dangerous and unusable space into one that could be used with students to enhance student learning opportunities through hands-on inquiry based activities throughout the school year. See Figures 10, 11, and 12.

*STEM = Science, Math, Engineering & Technology

Conclusions

In conclusion, the process of the garden rehabilitation gave us the opportunity to observe areas where plant life was thriving and where plant life had been lost. We plan to have students build and maintain a compost pile in a small area where all of the planted shrubs were killed by the weeds before our intervention. We also cleared out another small area devoid of planted life for a rain collection barrel that we are getting donated to the school's garden. Some of the activities we plan to complete with students in the research learning garden this year include, but are not limited to the following:

- Students will study asexual reproduction through the propagation of planted species in areas where they were destroyed by weeds, but are necessary for maintaining the designed micro climate environments. Students will work on the repopulation effort by taking clippings from the garden in the fall, growing them in light boxes in classroom labs during the winter, and then planting the established plant and shrubs out in the garden in the spring.
- Students will research, hypothesize, and test various household products like vinegar and dish detergent to make an organic weed killer. They will use their product on weeds in the learning garden to study and determine how effective their solution is on killing or inhibiting the growth of weeds in the garden.
- Students will work with scale as they design a terrarium representative of one of the micro climate ecosystems by scaling down components found outside in the garden into a miniature version that will fit inside a recycled plastic mayonnaise container.
- Students will use pH, dissolved oxygen, conductivity, and turbidity probes to collect data from classroom fish tanks and the outdoor pond which are both set up with snails, fish, and plants. Students will analyze the data from the indoor tanks and outdoor pond.
- Students will use computer tablets, printers, and a laminator to make nameplates and information cards as they work to identify and familiarize themselves with MSTP garden species.

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