

SWEP of Greater Philadelphia 2015 Environmental Grant – Summary Report

George W. Nebinger School, 601 Carpenter Street, Philadelphia PA 19147

Project Leader: Science Teacher: Dr. Javier Dominguez; Principal: Anh Brown
Project Focus: Watershed Stewardship

Located in an urban neighborhood near the Delaware Estuary, this K-8 school has a strong focus on environmental stewardship and school to college and career. This project provided an opportunity for students, with special emphasis on girls, to examine and learn about the impact of water retention, soil erosion and water runoff on the health of the Delaware Estuary and serve as good stewards of their environment by constructing planter boxes and planting bulbs around trees located by the street in front and on the side of the school.

While the fourth grade students conceived of this project and conducted some initial planning of the planter boxes, the project was shifted to our Science Teacher who decided to continue the project with the 6th, 7th, and 8th grade students. Approximately 79 students participated to varying degrees in the project.

In the Spring of 2015, students decided to create planters around six trees along the road on both the front and side yard of the school. During the spring and fall, they drew designs and identified materials that would be needed. In the spring of 2016, students were on-site and assisted hands-on in the construction of the six tree planter boxes. Treated lumber was utilized for the planters. Although they initially planned to design, draw and paint the planters, the use of treated lumber was not conducive to painting. In the fall of 2016, students researched and planted perennial bulbs in the boxes (tulips, daffodils, irises, and crocuses).

Students studied aspects of earth, physical and life sciences by doing inquiry based studies and experiments, utilizing Foss Kit-Landforms. They learned about models and maps, topographic maps, stream tables, stream flow studies, soil, water saturation, erosion, deposition, water cycle, various landforms, and ecosystems. Leading up to this project, the students have been involved in an environmental science curriculum provided by the Water Department, learning of the water cycle, the Delaware Estuary and strategies to sustain this fragile ecosystem. They observed a storm water drainage system installed in their school yard and the planting and role of the rain garden which has matured over that last few years. Students conducted water sampling in the rain garden to see first hand the environmental benefits of a rain garden.

Utilizing soil water sensors, students collected data from the soil around one area that did not have a planter because of the presence of a complicated root system that has uplifted the sidewalk (2), and compared this with the soil that was contained within the planter boxes (1,3,4). They collected samples after rainfalls and looked for evidence of soil runoff into the street.

Water Content Percentage (% WC)

Date	1-Planter Box on Carpenter Street	2-No box on Carpenter Street	3-Planter box on 6 th Street	4-Community Garden Box front of shed
10/17/16	4.4% WC	5.2% WC	3.7% WC	1.4% WC
10/18/16	3.1% WC	4.0% WC	12.4% WC	3.1% WC
10/20/16	0.2% WC	1.5% WC	3.5% WC	3.7% WC
10/21/16	2.4% WC	6.2% WC	0.4% WC	1.9% WC
10/26/16	0.2% WC	3.6% WC	6.0% WC	1.9% WC
10/28/16	6.1% WC	12.7% WC	2.6% WC	5.1% WC
10/31/16	0.3% WC	3.9% WC	2.0% WC	4.9% WC
Average Water Content % (WC)	2.39% WC	10.44% WC	4.37% WC	3.14% WC

In charting their data, the students found that the area that had no planter box located on Carpenter Street had the most percentage of water content (average of 10.44% WC). Students discussed that this makes sense since this was the area, which contained a complicated root system that could not be removed by the city. The city had removed an old dried dead tree but left this root system which is currently uplifting the sidewalk and showing great erosion of soil with every rainfall visible on the sidewalk and street. The other boxes (1,3,4) have less percentage of water content (average of 2.39% WC, 4.37% WC, and 3.14% WC respectively). The area surrounding these planter boxes have less to no erosion present on the sidewalk or street.

Students participated in the Canoe Mobile Philly Canoeing and Watershed program on the Delaware River. They explored the Delaware River at Penn's Landing by canoe and conducted land-based experiments to include learning about squid through dissection, building a boat to float and creating nautical knots. Discussions involved the cultural history of the river, water quality, water safety, river ecosystem and wildlife, and river recreation and safety.

A walking field trip to the Delaware River Estuary Pier 53, Washington Avenue Green is planned for Spring 2017. This was postponed due to weather and the school schedule giving importance and focus on instruction and standardize testing on literacy and math. This Pier 53 experience includes recognizing natural vegetation and habitat along the Delaware River. Signage and learning opportunities are prevalent along the trail and waters edge.

Students have had opportunities to plan for the school-yard development in discussion with the Landscape Architect, Lois Brink, enhancing access to the rain garden and identifying the type of recreational equipment that would be optimal in this out-door classroom environment. Environmental Soil Scientist, Virginia Brown, is preparing a video presentation for these and future students on her career field.

Project Outcomes

- Students:
 - recognized an environmental problem at their school negatively impacting their local watershed and ecosystem, the Delaware River Estuary, and conceived of a project to address it;
 - participated in inquiry based projects and experiments to learn about the water cycle, water saturation, soil erosion and ecosystems;
 - planned the construction of tree planters, took measurements and developed material lists;
 - participated hand-on in the construction of tree planters; and
 - took water saturation samples within protected tree and vegetable planters and compared this to an unprotected soil area, charted and compared data, and analyzed their results. They concluded that water retention resulting in soil erosion with runoff into the street within the unprotected soil area was clearly supported by data. Their solution of tree planters was effective in virtually eliminating this environmental hazard.
- Students also experienced a recreational canoeing activity in the Delaware River, noticing the beauty of the area and natural wildlife. They visually examined and discussed the impact to the ecosystem resulting from trash in the water.
- Non-traditional environmental careers for women were discussed. The woman Landscape Architect who has been engaged in the school yard design which incorporates the rain garden and water drainage system, had obtained input from students on recreational equipment to support their out-door classroom.

- We await a video presentation under development from a woman Environmental Soil Scientist, based in Texas, who will introduce her field of work.

Finally, students were curious, engaged and empowered throughout this project. We suspect this will leave a lasting impression on both their environmental stewardship and career possibilities.