

**PSE&G ENVIRONMENTAL EDUCATION GRANTS**  
**PROJECT ABSTRACTS FOR YOUR CLASSROOM**

**Project Title: C.R.A.B. Club**

PSE&G Grant Year: 2005-2006

Grade Levels: 7 & 8

Number of students involved:

96 students directly

175 students through outreach activities

For more information, please contact:

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**Project Summary**

**Abstract:** In our community, we have access to three bodies of water, all of which have suffered the effects of urban pollution. In recent years, the water quality has shown improvement, and species that have been long absent are suddenly returning – a very good sign! “C.R.A.B. Club” offered students the opportunity to become actively involved in efforts to clean and protect our waters. Project activities were divided into three areas: learning/research, field work, and community outreach.

Seventh and eighth grade students were trained in proper field testing techniques and safety. We went out to two Rutkowski Park once a month. This is a newly restored wetland environment in our community, with boardwalks, bird blinds and teaching platforms. They conducted water quality tests on the Newark Bay and the Kill van Kull. They tested for dissolved oxygen, nitrates, phosphates, copper, Ph, ammonia, salinity, turbidity, and temperature. These tests were conducted in all weather, every month during the school year.

These students also conducted a site survey at Rutkowski Park. They recorded wildlife; recorded and identified plants; collected weather data, and observed and recorded pollution. They researched and created displays of the wildlife they observed for our annual Water Festival.

Two trips were part of our watershed study. We went on a trip to Sandy Hook, NJ. On this trip, students toured the facility, learning of its natural history. On shore, Students used a seine net and caught organisms. They created a mini-ecosystem.

Our other trip was to the Trailside Science and Environment Center, in Mountainside, NJ. Here, students toured the museum, hiked a trail with a staff interpreter, and learned about the Lenape Indians. They also competed in a scavenger hunt, finding wetland species and fun facts about wetlands all around the museum.

Our watershed study culminated in a water festival. Students, families and community members were invited to this carnival-like event. Each table had a hands-on activity, experiment, craft, or game related to water, along with an educational display. For example, students won prizes at our fishing game table, and learned about fish advisories for the Newark Bay complex. Our main table showcased the water testing and site surveys conducted during the year. Equipment was on display, along with photos taken by the students.

**Overall Purpose of Project/Project Description:** The primary goal of the “C.R.A.B. Club” was for students to become aware of the history and importance of our waterways, and to realize and practice their roles as stewards of our waters and environment. This project involved several objectives. First, students identified parts of our watershed, from its source to the ocean. They explained what types of human activity has polluted the system and described what is being done today to clean and protect our waters. Next, students recognized the essential link between our watershed and our daily lives. For example, students connected the watershed to our community’s history, our drinking water, and our recreational activities. They found and described the relationship between the watershed and the health and pollution levels of the surrounding environment and community. Students also demonstrated proper safety procedures, correct use of water testing equipment and chemicals, and proper field testing techniques, as they conducted water quality tests. Students analyzed data from field studies of our local waterway. They graphed the collected data and drew conclusions based on patterns and observations. They also related findings to seasons, weather, land use, etc.

**Activities:** Project activities were divided into three areas: learning/research, field work, and community outreach.

Learning/Research: These activities involve the students in gathering information about the watershed and creating presentations.

- Through a partnership we’ve developed with the Passaic Valley Sewage Commission, an environmental scientist spoke to students about the Passaic River’s role in our watershed.
- As a cross-curriculum activity between social studies and technology classes, students researched the history of our city as a waterfront community. They created a timeline, which was displayed at our water festival.

- Students researched various bird species that they observed during our site surveys. They created informative displays about these species for our annual Water Festival.
- Students researched aquatic animals and their habitats for an informative display at our annual Water Festival.
- Since Rutkowski is a salt marsh, they investigated the importance of salt marshes to the environment and created a display for our annual Water Festival.

Field Work: Hands-on activities and field trips will be the focus of this area.

- Water quality testing – this was a major component of this project. Students used a water quality test kit to conduct monthly tests at Rutkowski Park. Tests included: salinity, PH, nitrates, phosphates, carbon dioxide, dissolved oxygen, etc. Students researched what these parameters tell us about the water’s health and found out the acceptable levels, according to the DEP. Students created charts to draw conclusions and compare/contrast data from the different test dates. They also used a weather meter to chart temperature, wind speed, and pressure.
- Site Survey – students also studied the ecology of this salt marsh. They observed, identified, and recorded wildlife. They use field guides and the internet to identify organisms, and documented their findings through graphs and charts to compare data.
- Students conducted mini-shoreline cleanups every time we went out to the park.
- Students used GPS to find predetermined points.
- Class projects - These activities allowed students to investigate and visualize the effect of pollution on our waters. Students used an Enviroscape watershed model to simulate the effect of land pollution (point source and non-point source) on our waters. Making their own soda bottle terrariums, students experimented with the effects of fertilizer on a wetland environment. Students were also trained on how to use the Enviroscape. The students, themselves then demonstrated the Enviroscape to other students during our annual Water Festival.
- Trips - two trips were arranged to give students a first hand perspective of a portion of our watershed. Students witnessed the movement of water through a watershed from river to ocean.
  - Trailside Science and Environmental Center, Mountainside, NJ – to learn about early and current use of our land.
  - Ocean Institute at Sandy Hook, NJ – to study water and marine life.

Community Outreach: Students became “stewards” of our environment.

- Families and community leaders were invited to a “Family Water Festival” at our school during the spring of 2006 and 2007. Students demonstrated the use of the water test kit, and discussed their results. The Enviroscape watershed model was used to demonstrate how human activity affects our waters. Students gave tips to attendees about what we can do to protect our waterways. Participants visited each table, and completed an activity, a craft, or played a game related to water. Each table also had an educational display. Students were treated to complimentary snacks, and participated in door prize drawings.

**Student and Community Participation:** Students conducted regular and long term studies of our community waterways. By tracking the test results, publishing findings, researching, conducting cleanups, and teaching others, these students began to see themselves as an important link in the watershed restoration. They are starting to understand their role as “rightful owners” of our waters. With ownership comes responsibility. The students learned through these activities that they can and will make a difference. Through the hands-on field work, students established a “relationship” with their testing site. They gained an understanding of our impact, good and bad, on our environment. By inviting our school community to a Family Water Festival, students shared their knowledge and experiences with other students.

The Family Water Festival was also open to community leaders. At this event, students taught participants about the importance of our waters. Finally, this program aired on our local cable TV station, reaching the community beyond our school family.

**Budget:**

Field Trips:	2	\$861.00
Equipment:		
Chemical snap test kits	3	\$142.00
Enviroscape Watershed Model	1	\$795.00
GPS kit	1	\$459.00
Plankton net	1	\$75.00
Soil Analysis Kit	1	\$255.00
Weather meter	1	\$166.00
Turbidity tube	2	\$109.00
Spotting scope	1	\$126.00
Dissolved oxygen test	1	\$55.00
Waders	2	\$24.00
Salinity Refractometer	1	\$93.00
PH tester, electronic	1	\$99.00
Total Budget		\$3,259.00

**Evaluation:** This project was evaluated based on the ongoing performance of the students, as well as the products created as a result of this program. Problem-solving skills were constantly assessed when students completed lab and field investigations and reports. The success of this project was affected by student’s ability to conduct water quality tests safely, accurately, and consistently. Students received instructions, practiced using testing equipment, and were evaluated by demonstrating proper use before doing field work. This evaluation process continued throughout the project by reviewing and

practicing procedures prior to testing days and by working with and observing students during testing.

The creation of accurate graphs and reports (analyzing data) also served as an evaluation tool. The project was also evaluated based on student presentations and demonstrations at the Family Water Festival.

### **NJ Science Core Curriculum Standards met through this project:**

5.1: All students will develop problem-solving, decision-making and inquiry skills, reflected by formulating usable questions and hypotheses, planning experiments, conducting systematic observations, interpreting and analyzing data, drawing conclusions, and communicating results. (Implemented through field studies)

5.3: All students will integrate mathematics as a tool for problem-solving in science, and as a means of expressing and/or modeling scientific theories. (Implemented through charts and data analysis)

5.4: All students will understand the interrelationships between science and technology and develop a conceptual understanding of the nature and process of technology. (Implemented through use of computer, electronic meters and GPS)

5.5: All students will gain an understanding of the structure, characteristics, and basic needs of organisms and will investigate the diversity of life. (Implemented through site surveys)

5.6: All students will gain an understanding of the structure and behavior of matter. (Implemented through use of chemical test kit, and study of water molecule)

5.8: All students will gain an understanding of the structure, dynamics, and geophysical systems of the earth. (Implemented through study of rivers, erosion, tides, glacial formation of our area, etc.)

5.10: All students will develop an understanding of the environment as a system of interdependent components affected by human activity and natural phenomena. (Implemented through watershed study)

**Personal Biography:** I've been the 7<sup>th</sup> and 8<sup>th</sup> grade Science teacher at PS #14 for 10 years. My class has conducted water quality tests on the Newark Bay for Hackensack Riverkeeper's Water Quality Monitoring Program. We took Part in the Urban Fishing Program for three years. I've received two PSE&G/BISEC environmental science grant. These grants enabled my class to conduct monthly water quality tests of the Newark Bay, the Kill van Kull, and Rutkowski Park, and to conduct seasonal pond studies and salt marsh site surveys (macroinvertebrate, pollution, plant and wildlife surveys). I also received a NJ Project WET grant to conduct a Water Festival at our school for three consecutive years.

My eighth grade classes visit the Pocono Environmental Education Center for a three day residential eco-trip each fall. I recently helped PEEC staff to write a grant to institute a summer program for my students. Thanks to this Dodge Foundation Grant, we were able to bring 25 students to PEEC during the summers of 2006, and 2007, and the grant extends to the summer of 2008, as well.