MYTI Environmental Projects and Action Research Studies

Table II. Environmental Projects Carried Out by Master Teachers and their Students in the 2013-14 Academic Year[1]

Name	Discipline	Title of Project	School	Town
Carmen J. Velázquez Rivera	Math	Studying the Problem of Solid Waste in Fast Food Restaurants in Puerto Rico	Sor Isolina Ferré	Ponce
Lymarie Pérez Muler	Math		SU Eugenio María de Hostos	Cayey
Josiel Rosado Tirado	Math	*Zero Waste:* Reducing the amount of solid waste (plastic bottles) to protect the environment	Juan Quirindongo Morell	Vega Baja
Luis O. De Jesús Torres	Math		Francisco A. Garcia Boyrié	Guayama
Marixa Rodríguez Vega	Science		Especializada Brígida Álvarez Rodríguez	Vega Baja
Minnuette Rodríguez Harrison	Science	Environmental Disclosure to analyze the environmental impact (natural landscape) in our community (El Pedregal)	Julián Blanco	Guaynabo
Carmen M. Ruiz Méndez	Science	Hydrological Study in Quebrada Juan Méndez at Río Piedras	Central Especializada Artes Visuales	San Juan
Jadira Aponte Ramírez	Science	Potential Development of Agriculture in Urban Areas in the Municipality of Orocovis	Alberto Meléndez	Orocovis
Tomás Díaz Berrios	Math		José Rojas Cortés	Orocovis
Osvaldo Parés Rivera	Math	Reduction of Solid Waste: Studying the generation of solid waste and devising ways to reduce it	Eugenio María de Hostos	Mayaguez
Sylvia Hernández Acevedo	Math		Dr. Carlos González	Aguadilla
Lourdes R. Rivera González	Science	Development of Alternatives to Reduce the Amount of Solid Waste Generated by Students from Public Schools in Four Geographic Areas of Puerto Rico	Juan D. Stubbe	Caguas
Maria L. Ortiz Hernández	Science		Generoso E. Morales	San Lorenzo
Myrna Hernández Nieves	Science		Catalina Morales de Flores	Moca
Sandra Beltrán Morales	Science		Francisco Gaztambide Vega	Bayamón
Amabel T. Soto Guzmán	Math	Impact of Solid Waste to our Community: Volume and Surface Area it Occupies	Carmen L. Feliciano Carreras	Rio Grande
Marilyn Santiago Román	Math		Nueva Intermedia Piletas	Lares
Yamily Colón Negrón	Math		Jose Santos Alegría	Dorado

[1] Many teachers formed groups to design their projects but each one implemented them based on their students' ideas and context.

Table II.9 Action research studies on student learning resulting from participation on environmental projects

Name	Discipline/ Grade level	Title of project	Research design	Math or science topics studied
		Mathematics		
Carmen J. Velázquez Rivera Lymarie Pérez Muler	Math/7-9 Math/10-12	Studying the Problem of Solid Waste in Fast Food Restaurants in Puerto Rico	Pre-experimental: Pre/post	Data analysis & probability: central tendency & dispersion measures Statistics & probability: Frequency, central tendency, dispersion measures and its graphic representations
Luis O. De Jesús Torres Josiel Rosado Tirado	Math/7-9 Math/10-12	*Zero Waste:* Reducing the amount of solid waste (plastic bottles) to protect the environment	Pre-experimental: Pre/post	Data analysis & probability: central tendency measures & graphs Data analysis & probability: dispersion diagrams & linear association patterns (correlation & regression)
Amabel T. Soto Guzmán Marilyn Santiago Román Yamily Colón Negrón	Math/7-9 Math/7-9 Math/10-12	Impact of Solid Waste to our Community in Terms of Volume and the Surface Area it Occupies	Quasi-experimental: Pre/post with comparison group	Measurement: Perimeter, area, volume of two and three dimension geometric figures Geometry: Bi-dimensional models of tridimensional figures. Measurement: area & volume formulas Measurement: Volume of tri-dimensional figures.
Osvaldo Parés Rivera Sylvia Hernández Acevedo	Math/10-12 Math/10-12	Reduction of Solid Waste: Studying the generation of solid waste and devising ways to reduce it	Pre-experimental: Pre/post	Statistics & probability: Collection, organization, analysis (descriptive statistics), representation & interpretation of experimental data.
Tomás Díaz Berrios	Math/10-12	AgroSTEM: Potential Development of Agriculture in Urban Areas in the Municipality of Orocovis	Pre-experimental: Pre/post	Exponential functions: linear & exponential models; 'best fit' line
		Science		
Marixa Rodríguez Vega	Science/ 7-9	Transforming waste we will eat better	Pre-experimental: Pre/post	Conservation & change: states of matter, chemical & physical changes & properties
Maria L. Ortiz Hernández	Science/ 7-9	Educate, act, and live: Development of Alternatives to Reduce the Amount of Solid Waste Generated by Students from Public Schools in Four	Quasi-experimental: Pre/post with comparison group	Energy & interactions: carbon cycle & nitrogen cycle
Lourdes R. Rivera González	Science/ 7-9		Pre-experimental: Pre/post	Conservation & change: protecting the natural resources

Myrna Hernández Nieves	Science/ 10-12	Geographic Areas of Puerto Rico		Conservation & change: chemical and physical changes at the macro & micro levels
Sandra Beltrán Morales	Science/ 10-12			Energy: organic matter, biomass, bioenergy, renewable energy, energy recuperation, biogas
Carmen M. Ruiz Méndez	Science/ 10-12	Hydrological Study in Quebrada Juan Méndez at Río Piedras	Pre-experimental: Pre/post	Systems & models; Energy: water cycle, water quality, related physical & chemical parameters, water contamination by solid waste
Minnuette Rodríguez Harrison	Science/ 10-12	Environmental disclosure to analyze the impact on the natural landscape of the El Pedregal Community	Pre-experimental: Pre/post	Nature of science, technology & society: human actions in the environment, urbanism, environmental conservation Data analysis & probability: Graphic representations to scale
Jadira Aponte Ramírez	Science/ 10-12	Potential Development of Agriculture in Urban Areas in the Municipality of Orocovis	Quasi-experimental: Pre/post w comparison group	Systems and models: organic recycling, biogeochemical cycles, food chain.

Dissemination of projects' results

Teachers and students reported that they would disseminate results from their environmental projects in their schools and communities through various means. Names of teachers and the dissemination activities they reported are the following:

Mater Teacher	Dissemination activity
Carmen Velázquez	Letter to fast food establishments, the written press & TV stations about the results of study about amount of solid waste derived from fast foods
Lymarie Pérez	Orientations to fast food establishments to promote that they become eco-friendly
	Orientations in the school and community about results on study on amount of waste produced in fast food restaurants.
Luis de Jesús	Talks in school about student solutions to deal with solid waste problems
	Public campaign to promote recycling and minimizing use of bottled water
Josiel Rosado	Presentation in school library using brochures and posters about the problem caused by the consumption of bottled water & the benefits of drinking water from the water fountain
Amabel Soto	Proposal to school council presenting strategies to reduce and dispose solid waste including a plan to reorganize the space where trash is stored, providing space for recycling containers
	Digital public campaign presenting alternatives to minimize the impact of waste in schools and communities
Marylin Santiago	Theater play to disseminate and promote the classification and separation of solid waste in the school
Yamily Colón	Public campaign about the solid waste problem and ways to minimize it.
	Recycling activity carried out in the school on May 9. 2014.
Osvaldo Parés	Massive campaign to make student families & community of the need to reuse, recycle and reduce solid waste.

Mater Teacher	Dissemination activity
	Video, to be posted in social networks, amount good management of solid waste.
Sylvia Hernández	Massive campaign in radio, news reports & newspapers using various means like videos & brochures presenting ways to reuse, recycle and reduce solid waste.
Tomas Díaz	Videos depicting conventional and unconventional crops in urban zones and how they can contribute to reduce solid waste (e.g., producing & using compost, creating a wind mill using metal scraps)
	Presentation of student work and results in scientific fairs, research congress & school open house.
Marixa Rodríguez	School-community activities in which students presented posters, handed out book markers with conservation slogans, exhibited products made with reused materials, carried out workshops to make recycled paper, presented their vegetable garden and campaign to recycle cans and plastic bottles.
M. Ortiz, L. Rivera, M. Hdez., S. Beltán	Forum of students from various schools that focused on the issue of reducing the amount of solid waste generated in schools
María Ortiz	Presentation to school community about achievements attained in the environmental project
Lourdes Rivera	Information to different groups of the school community about student experiences and achievements attained in the environmental project, including different means such as talks, leaflets and posters
Sandra Beltrán	Demonstration using models describing the way energy ifs obtained from organic matter
Carmen Ruiz	Presentation of findings of the hydrological study to the school community
	Spot to create awareness about the importance of preserving the water resources
Minnuette Rodríguez	Environmental forum in which students take different roles and positions about the proposed development of an urban forest, with students from other schools as the audience
	Poster with photos and maps depicting how the studied secondary urban forest has developed through time in the past, and model portraying how students would like it to look in the future
Jadira Aponte	Workshop on hydroponic vegetable gardens for the community