

## **Arboretum Educators Part of Team to Train Teachers in the Galapagos Islands and in Dallas**

For most teachers, learning doesn't stop in the summer. In fact, the Dallas Arboretum Education Department hosts professional training for 500 teachers annually, and much of that training takes place in the summer months. This summer, two members of the Arboretum's education team also had the opportunity of a lifetime to expand their own knowledge, as well as to help educators in one of the world's most unique natural environments, the Galapagos Islands.

Allyson Marbut, Dallas Arboretum vice president of education, said, "The Arboretum's Education Department provides high quality, standards-aligned professional development for teachers with a focus on life and earth science, particularly in the Rory Meyers Children's Adventure Garden where we are a Certified Monarch Waystation, a National Wildlife Federation Certified Wildlife Habitat, and a Texas Parks & Wildlife Certified Texas Aquatic Science field site. The eight-acre garden's mission is to get children and adults excited about nature and science as they learn through engaging, hands-on activities, most of which are held outdoors."

The Arboretum has teachers who have a combined 120 years of experience. They teach more than 110,000 children who attend field trips, camps and other educational classes annually in the garden or offsite at schools.

Earlier this summer for the first time, Dallas Arboretum Education's Dustin Miller, director of education, and Marisol Rodriguez, bilingual specialist, were invited to help train 125 teachers in the Galapagos Islands in the sciences using the area's abundant natural environment as a learning lab, with a substantial focus on resource conservation. They joined five additional professors and graduate students from Southern Methodist University, Stanford University, North Carolina State University and Oregon State University. In coordination with other instructors, the team led a five-day workshop for 125 elementary, middle school and secondary science teachers from two of the Galapagos Islands.

In open air classrooms, surrounded by the natural environment, Galapagos teachers received in-depth professional development in content knowledge, how to teach lessons (pedagogy) and actual experiment time showing them how to perform the lessons. The teachers capped off the week by presenting a new lesson plan that they would be able to implement in their classroom upon returning to their schools. In total, they received 50 hours of professional development, largely funded through the Galapagos Conservancy, which partnered with the Ministry of Education of Ecuador.

Miller said, "Because of the distance from the mainland, Galapagos teachers do not often have access to professional development, so this public/private partnership provides high quality training for teachers that the government could not easily afford.

This partnership also serves as a model for how to train teachers in hard to reach places.”

Diego Román, Ph.D., assistant professor and Dara Rossi, Ph.D., clinical associate professor, both in the Department of Teaching and Learning at the Annette Caldwell Simmons School of Education and Human Development at Southern Methodist University, were part of the teaching team. They had originally met the Dallas Arboretum Education team when the professors first started serving as members of the Arboretum's Education and Research Committee. This committee advised on planning, developing, building and programming of the Rory Meyers Children's Adventure Garden, which opened in 2013, and continues to collaborate in support of Arboretum education efforts.

Dr. Rossi said, “SMU has been exploring ways to partner with the informal science community, and this was a great way to showcase the work the Dallas Arboretum does, such as science teacher training, workshops and professional development.” She added, “Traditional teacher-led education is prevalent in the Galapagos, so we work with them to create lessons that can be run by students and are also active and engaging.”

When it came to teaching scientific lessons, both Dallas Arboretum team members were at an advantage because they could teach in Spanish.

Dr. Román added, “Marisol's knowledge of early childhood and bilingual education and Dustin's science knowledge were an asset to training these teachers.”

The team taught lessons based on matter and energy content tied into conservation, an important aspect of the Galapagos Islands with a population of 20,000 people and more than two million visitors annually. Some examples:

**Lightbox:** Educators explored how different materials refract light, learned about solar light, and used this knowledge to create models using solar light.

**Forms of energy:** Teachers utilized energy stations (electrical/light, mechanical, sound, wind, chemical, solar and alternative energy small cars that are powered with saltwater) to explore and identify energy forms and sources in nature.

**Matter lesson:** Teachers made Oobleck, a non-Newtonian fluid, which acts like a liquid when being poured, but like a solid when a force is acting on it.

**Transfer of heat:** Teachers explored several heat transfer stations to understand conduction, convection and radiation, and the exercise culminated in the construction of updraft towers.

**Straw rockets:** Using straw rockets, teachers conducted scientific experiments by varying both the trajectory angle and the amount of energy used to launch these

rockets.

Zip line airplanes: Educators built and raced model airplanes, while exploring variables and comparing Galapagos bird appendages with early plane design.

Eggdrop: Teachers applied concepts of momentum, impulse, force and energy using an egg, a toilet paper roll, a pizza pan, a cup and a broom.

Dr. Román said, “Teachers in the Galapagos do not have access to as many materials as we do in the U.S., so we adopted lessons that could take advantage of their environment and best leverage the resources they have at hand. For example, we used many recycled items for our experiments.”

The team provided the teachers with lessons that are easily replicable, along with the materials and supplies they would need for their students to study that particular concept.

What did the team learn? Miller said, “Teachers everywhere have the same struggles. They may not have the content knowledge or the right supplies to teach, and they may lack the time to fully teach difficult-to-understand concepts. Their students aren’t interested in learning science only from a book, so we need to make the concepts engaging and practical.”

Dr. Rossi added, “Research shows that it takes hours to change teachers’ thinking and beliefs before they will adapt their practices and how they teach. As we’ve continued to work with these educators, we have already started to see significant changes in their practice and a renewed excitement for teaching.”

The Dallas Arboretum hopes to return to the Galapagos, or another country, to train even more teachers in the future, in addition to the ones they train locally.

**Photo link:**

[https://www.dropbox.com/sh/jff6fodo6c4w7ns/AADn7iBe\\_5bgqD6IEOMJpicpa?dl=0](https://www.dropbox.com/sh/jff6fodo6c4w7ns/AADn7iBe_5bgqD6IEOMJpicpa?dl=0)

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