

FAIRCHILD
Discovery
PROGRAM

Annual Report 2010-2011



FAIRCHILD TROPICAL BOTANIC GARDEN
Exploring, Explaining and Conserving the World of Tropical Plants

Program Introduction and Goals

The Discovery Program at Fairchild Tropical Botanic Garden (FTBG) offers a selection of guided and self-guided multi-disciplinary field studies designed for students in grades 3-12 to enhance science and environmental education. By exploring science, art and technology, students take a trip to “botany and beyond”. The menu of activities includes using GPS units, maps and compasses to navigate the garden; identifying butterflies and their host plants; exploring the art exhibited in the Garden; and discovering the diversity of the plant kingdom. The program is grade-appropriate, and designed to meet Next Generation Sunshine State Standards and assist in the preparation of students for the Florida Comprehensive Assessment Test (FCAT).

Program Objectives:

- To help students develop observational and critical thinking skills
- To foster an appreciation for nature
- To raise awareness of contemporary, environmental issues

Program Content

The guided program curriculum includes two guided modules, each of which is offered on a separate day: “Biomimicry: Designed by Nature”, offered on Tuesdays, and “Symbiosis: Butterflies and Plants”, offered on Wednesdays. Both guided programs are comprised of three activity stations that students rotate through. Students are equipped with GPS units, compasses and maps to navigate through the Garden. Students collaborate with each other and work together to find the activity stations while learning team building and leadership skills.

Below is a detailed description of each of the two guided modules and their objectives:

1. *Symbiosis: Butterflies and Plants*

Students explore the butterfly life cycle, the difference between nectar and host plants and the symbiotic relationship of butterflies and plants. This program is comprised of three activity stations representing each life stage of the butterfly: the egg, the caterpillar and the butterfly.

Egg Station

Students identify the host plant of the *Atala* species (the coontie), hunt for actual *Atala* eggs, design their own eggs applying ecological principles and identify habitat components and their importance.

Caterpillar station

Students identify the *Atala* caterpillar on its host plant by going on a caterpillar scavenger hunt, describe the main functions of this life stage, record observations and

solve mathematical calculations to determine how much a caterpillar can eat in two weeks.

Butterfly Station

Finally, at the butterfly station, younger students act out the process of pollination and then look for butterflies in order to match them with their nectar or host plants. Older students act as “lepidopterists for a day” in order to observe and track butterflies visiting various nectar or host plants and they record their observations. At the end, they present what they discovered to the rest of the group.

2. *Biomimicry – Designed by Nature*

Students learn about this relatively new science that studies nature - its models, systems, processes and elements - to imitate or take creative inspiration to solve contemporary human problems. This module uses two ecosystems as case studies of how humans can learn from nature to solve contemporary human problems sustainably, while the last station uses examples of natural objects that have been used to create inventions.

Rainforest Station

Students define producers, consumers, and decomposers and describe the role of each in a rainforest ecosystem. The process of decomposition and the circular flow of energy in a food web provide an example of how humans can reduce, reuse, and recycle. This station ends with a relay race to test students’ knowledge about recycling and composting, while inviting students to rethink their waste and incorporate simple solutions to reduce their trash.

Desert Station

At the desert station, located around our arid plant plots, students are asked to describe plant adaptations in dry/arid environments and then brainstorm how these adaptations could inspire humans to better use, collect and conserve water.

Designed by Nature

Students identify natural objects that have been used as a model for inventions designed to protect the environment while providing humans a useful service. They then spend time observing their surroundings and brainstorming how the natural elements around them could serve as inspiration for solving contemporary, environmental problems.

Pre- and Post-Visit Materials

Prior to their visit, teachers are sent a comprehensive packet of pre- and post-visit activities designed to meet the Next Generation Sunshine State Standards. Each packet is program-specific. These activities prepare students for their exploration of the Garden and create a learning environment conducive for processing, integration and reflection of their learning experience at the Garden.

Program Materials, Supplies, and Innovative Approach

Visiting groups are divided into three smaller groups and equipped with three types of navigational tools: GPS units, maps, and compasses. Following a brief overview and orientation, groups are sent off to find their way to activity stations, which are marked as points in the GPS units. Incorporating the use of this technology into the flow of Discovery activities, students gain technological and navigational skills while having fun finding their way around the garden. This use of GPS appeals to young people and their interest in cutting-edge technology and electronic gadgets, while supplying live learning opportunities to develop important life skills. Students have the opportunity to develop and strengthen leadership, collaboration and team building skills as they navigate and guide their group to the different Discovery activity stations.

Urban Advantage

This year, Fairchild Tropical Botanic Garden, in collaboration with the Zoological Society of Florida and the Miami Science Museum, offered a component piece of the Urban Advantage Program. Miami is one of four cities nationwide participating in this program aimed at connecting middle school students with cultural and scientific institutions in their communities. Fairchild Tropical Botanic Garden partnered with two local middle schools: John F. Kennedy and Riviera . All seventh grade students in these schools were invited to come to the Garden for a fieldtrip. John F. Kennedy middle participated in five (5) field studies programs and Riviera Middle participated in four (4). A total of 413 students participated in a Discovery Program through this program, which accounted for 74% of all 7th grade students in these 2 schools. Through funding from the Florida State Department of Education, students' admission, transportation, program materials, and cost for substitute teachers were completely covered.

Self-Guided Programs

School groups also have the option of scheduling a self-guided visit in order to use the Garden as a living laboratory to supplement their own curriculum. This option is available to K-12 students on Mondays, Thursdays and Fridays during the school year. While Fairchild has offered the self-guided option for several years, this year we expanded the program by developing supplementary materials that groups can use during their self-guided visits. The following two program modules are now available as laminated booklets with guided instruction and activities:

Ethnobotany – Students investigate how plants have shaped cultures across continents and centuries as they explore the Garden. Using a map to locate plants of interest, student can learn about the multitude of ways that humans depend on plants, historically and currently, for food, fiber, shelter, medicine and recreation.

Plant Kingdom – In this module, students explore various plant groups, learning how and why plants are classified as they are. Teachers are able to reinforce botanical concepts learned from the textbook with living examples, as students observe a variety of plant forms, functions and adaptations.

Self-guided school groups also have the option of using the annual art exhibit each year to teach drawing, photography, art history, theory and more. Groups choosing this option are provided with booklets containing detailed information about the artist and each piece of artwork.

Attendance

Guided and self-guided programs had a maximum capacity of 60 students per day and were offered from October 2010 through May 2011. Students who participated in the Fairchild Discovery program reflected the ethnic and socio-economic diversity of Miami-Dade County.

- 2945 students and 328 teachers and chaperones participated in Discovery guided and self-guided programs.
- Groups from 47 different schools attended the program for a total of 71 visits.
- Of these visits, 53% chose the guided option, in which volunteer guides led hands-on activities at stations located throughout the garden.
- 64% of visiting schools receive Title 1 funding.

Volunteer Guide Training

Volunteer guides are an integral part of the Discovery program as they conduct the hands-on activities at each activity station.

- 20 volunteers dedicated a combined total of 1,302.5 hours during the school year. We had an **increase of 43% in the total of hours dedicated by Discovery volunteers compared to the previous school year 2009-2010**
- 10 new volunteers joined the program and were trained to teach at activity stations and/or to be walking guides

Education staff set high standards of performance and satisfaction for the volunteer guides, which required ongoing training, supervision and motivation.

To prepare Discovery Volunteers to conduct these activities, the Discovery Coordinator scheduled a two-week long training for new and returning guides. The training included step-by-step instructions for each activity station, talking points and supplemental materials for each of the modules that included background information and resources. The volunteers chose their preferred module (Biomimicry or Symbiosis). Throughout the year, volunteer guides were paired at each station, and reciprocal feedback was encouraged and sought at wrap up sessions in order to troubleshoot and quickly solve problems that arose. At the beginning of the school year, new volunteers were paired with returning guides to create a supportive learning environment. Additionally, this year volunteer walking guides were added to the program to help students learn how to use navigational tools in natural areas.

A professional development series was developed and facilitated in conjunction with the Explorer Program for both programs' volunteer guides in the spring to increase volunteer

knowledge about plants and education strategies. Topics for presentations, workshops, and fieldtrip locations were determined based on feedback received from volunteers in the program evaluations from the previous year. Lee Morgenstem, Inclusion Specialist at CCDH (formerly Community Committee for Developmental Handicaps), taught a workshop titled: Discovering Inclusion and Theresa Chormanski taught a workshop about Florida Native Plant Communities. Education Staff at the Garden organized two fieldtrips for the Field Studies volunteers: one to G.R.O.W. (Green Railway Organic Workshop) and a tour of the Fairchild Farm. Volunteers also had the opportunity to take classes offered by the Volunteers Department.

Program Evaluation

Design and Strategy

The Discovery Program evaluation was created to effectively measure the success of the program curriculum and approach. Evaluation instruments included:

- **Teacher/Chaperone Questionnaire:** Teachers and/or chaperones filled out the questionnaire as they were observing each of the activities in order to answer specific content-related questions. This questionnaire matches questions with program objectives for each activity station and module in order to gauge the effectiveness of the curriculum, and if the volunteer guides were addressing all required material. Additional questions sought feedback on the educational materials, the staff and volunteer guides, and the map and GPS tools provided to groups.
- **On-going Wrap-up Sessions:** The volunteer guides and the Discovery Coordinator held multiple wrap-up sessions to gather feedback, identify successes, offer suggestions for improvement, and to provide high-quality programming.
- **On-going observation and informal feedback** from teachers and volunteers.
- **Testimonial letters** from students and teachers.
- **End of the year wrap-up with volunteers:** In May 2011 we collected questionnaires and initiated focus group discussions among program volunteers at the end of the school year.
- **Pre and Post Evaluations:** All students participating in the Urban Advantage Program completed pre and post – evaluations of their fieldtrips.

Evaluation Results

The predominantly positive responses from teachers and chaperones found in the program evaluation reveal that the program is effective, engaging, and relevant to both students and teachers. For some students, their trip to the Garden was a once-in-a-lifetime exposure to the natural world, which they might not otherwise have a chance to experience.

Overall Feedback

A total of 35 teachers or chaperones completed surveys for the Symbiosis Discovery Program, and a total of 27 completed evaluations for the Biomimicry Program. An overwhelming majority found the activities “**interactive, engaging, and interesting**”.

- 98% stated that the program met its objectives
- 99% answered positively or affirmatively to questions related to the pre-visit materials, the guides’ performance, and interaction with staff
- 96% said they would “recommend this program to a similar group”

Feedback from Volunteer Guides

The Discovery Program Coordinator met with the program volunteers to conduct a focus group discussion and have them complete surveys to gather feedback to continue to improve the program.

- 100% of the volunteers who completed the survey believe in the mission of the Discovery program and the lessons taught
- 100% enjoy being a volunteer and that they feel they are making a difference by working as a Discovery volunteer

Moving Forward: Suggestions for Future Programming

Using the feedback from the volunteer guides and the participants, we will make adjustments to the curriculum including station modification, additional visual displays, and a more detailed script in the volunteer manual. Additionally, the staff is creating a new guided program on Biodiversity: Creating Healthy Ecosystems.

With the tremendous growth of this program, we have found that the number of groups of students with special needs has increased. To ensure the continued success of the program for all ability levels, we are working to develop appropriate levels of curriculum and a materials toolkit to assist in meeting the needs of all our audiences. We have partnered with CCDH to make our program more inclusive and staff is completing a certification program with them to be better equipped to effectively accommodate students with special needs. In addition, we plan to offer professional development opportunities for staff and volunteers in the coming school year to provide the tools necessary to educate all visitors.

Overview

Feedback from teachers, students, staff and volunteers indicates that the Discovery program is very successful at meeting and exceeding the expectations of our audience. Formative evaluations continue to be a priority as we value the input of all stakeholders. By using this information we are able to monitor the quality of the programs and presenters, adjust when needed and offer the most innovative, interactive environmental education programming.

Feedback from Teachers and Students

"Our fourth year coming and the program keeps getting better. Keep up the good work." **Glades Middle School**

"Very friendly and knowledgeable volunteers- especially enjoyed the rainforest explanation and recycling explanation!" **Island Christian**

"Thank you for having us your grounds were not only inviting but a very dynamic change from the very busy city." **Carlos J. Finley**

"Thank you for an excellent time in the lives of my students. The instructors were also excellent." **John F. Kennedy Middle School**

"Absolutely great volunteers" **Miami Lakes Educational**