ECO-ACADEMY 2010-2011

LEARNING PROGRAM GUIDE FOR PARENT EDUCATORS AND STUDENTS

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ECO-ACADEMY FOR PARENT EDUCATORS AND STUDENTS

The *ECO-ACADEMY* provides a hands-on curriculum to community youth and the general public in the fields of environmental sciences, biology, marine biology, zoology, ecology and endangered species and conservation. Our team is a highly trained group of individuals that is dedicated to preserve and interpret the invaluable resources found at Deering Estate at Cutler and Miami Metrozoo. Our Eco-brigade is prepared to interact in a fun and educational way with every group regardless of age, special interests or grade level. They will encourage student and parent educator participation during educational programs. They are trained in South Florida and the world's ecosystems. With some of the highest quality and most diverse natural resources remaining in Miami-Dade County, our *ECO-ACADEMY* also educates our community about preserving our biodiversity through environmental stewardship, environmental sustainability, and overall resource management.

ECO-ACADEMY'S sessions engage participants in an interactive, positive and balanced activity to help them understand and appreciate, as well as think critically about, the world around them. The Deering Estate and Miami Metrozoo staff provides participants with fossils, artifacts and tools, living exhibits, preserved specimens, photographs and simple laboratory experiments to help illustrate the key points of a specific topic. The program will accommodate up to 30 people and will be offered once a week for 30 week during the academic year for 2 hours each session. The fee is $35 per module (5 weeks). The cost of material is included in the fee. The *ECO-ACADEMY* will provide 3 Modules of 15 sessions at Deering Estate at Cutler and 3 Modules of 15 sessions at Miami Metrozoo.

MODULE SESSIONS

Core Module	Sessions	Date
Group DZ (Deering –Zoo)		
Natural Sciences	5 wk	August 30th – September 30th
South Florida Ecosystems	5 wk	October 4th – November 4th
Marine Biology	5 wk	November 8th – December 16th
Zoology	5 wk	January 10th – February 10th
Ecology	5 wk	February 14th – March 24th
Endangered Species and Conservation	5 wk	March 28th – April 28th
Group ZD (Zoo – Deering)		
Zoology	5 wk	August 31st – September 30th
Ecology	5 wk	October 4th – November 4th
Endangered Species and Conservation	5 wk	November 8th – December 16th
Natural Sciences	5 wk	January 10th – February 10th
South Florida Ecosystems	5 wk	February 14th – March 24th
Marine Biology	5 wk	March 28th – April 28th
Proposed: Graduation Ceremony May 6th, 2011		
Proposed: INFO SESSIONS May 10th, 2011 10-noon and May 17th, 2011 from 2:30-4:30pm		

NATURAL SCIENCES

In science, the term natural science refers to a naturalistic approach to the study of the universe, which is understood as obeying rules or laws of natural origin.

The term NATURAL SCIENCES is also used to distinguish those fields that use the scientific method to study nature from the social sciences, which use the scientific method to study human behavior and society; from the formal sciences, such as mathematics and logic, which use a different (a priori) methodology; and from the humanities.

Natural sciences form the basis for applied sciences. Together, the natural and applied sciences are distinguished from the social sciences on the one hand, and the humanities on the other. Though mathematics, statistics, and computer science are not considered natural sciences (mathematics traditionally considered among the liberal arts and statistics among the humanities, for instance), they provide many tools and frameworks used within the natural sciences.

Alongside this traditional usage, the phrase NATURAL SCIENCES is also sometimes used more narrowly to refer to natural history. In this sense "natural sciences" may refer to the biology and perhaps also the earth sciences, as distinguished from the physical sciences, including astronomy, physics, and chemistry.

Within the natural sciences, the term hard science is sometimes used to describe those subfields which some people view as relying on experimental, quantifiable data or the scientific method and focus on accuracy and objectivity. These usually include physics, chemistry and biology. By contrast, soft science is often used to describe the scientific fields that are more reliant on qualitative research, including the social sciences.

During this module Eco-Academy Participants will learn about:

NATURAL SCIENCES

Unit	Description
The Scientific Method	Students will be able to design their own experiment to make slime. Students will be able to use the scientific method to test their hypothesis and create a pie chart with their results.
Making Three Dimensional Plant and Animal Cells	The purpose of this activity is to provide students with a hands-on activity which will enhance their understanding of the 3-D characteristics of cells while reinforcing their knowledge of plant and animal cell structure.
Mystery Murder	Students will be able to understand the value of the scientific method in solving a crime.
Weather	Participants will build their own weather station creating their own weather instruments.
Animal Tracks	Students will learn how to identify animals through their tracks.

South Florida Ecosystems

The term ecosystem refers to the combined physical and biological components of an environment. An ecosystem is generally an area within the natural environment in which physical (abiotic) factors of the environment, such as rocks and soil, function together along with interdependent (biotic) organisms, such as plants and animals, within the same habitat to create a stable system. Ecosystem is a functional unit consisting of living things in a given area, non-living chemical and physical factors of their environment, linked together through nutrient cycle and energy flow.

Central to the ecosystem concept is the idea that living organisms interact with every other element in their local environment. Eugene Odum, a founder of ecology, stated: "Any unit that includes all of the organisms (the "community") in a given area interacting with the physical environment so that a flow of energy leads to clearly defined trophic structure, biotic diversity, and material cycles (i.e.: exchange of materials between living and nonliving parts) within the system is an ecosystem." The human ecosystem concept is then grounded in the deconstruction of the human/nature biotype and the premise that all species are ecologically integrated with each other, as well as with the abiotic constituents of their biology.

Eco-Academy Participants will discover and study the following South Florida Ecosystems:

SOUTH FLORIDA ECOSYSTEMS

Unit	Description
Tropical Hardwood Hammocks	During this session students will learn about Tropical Hardwood hammocks and the community associated with this habitat. They will learn how to identify the most common plants and animals found within this ecosystem.
Pine Rock Land	Participants will learn about the Pine Rock Lands found in South Florida, their flora and fauna and how to protect this endangered habitat.
Salt marshes	Students will know the differences between marshes and salt marshes, basic facts about the animals and plants found here and the roles that plays this habitat in the natural environment.
Sea Grasses	Participants will learn about the different types of sea grasses found in Florida, their parts and the community of animals that inhabit them.
Everglades	Students will visit this unique ecosystem and will discover the beauty of this wonderful place only found in South Florida.

MARINE BIOLOGY

Marine biology is the scientific study of organisms in the ocean or other marine or brackish bodies of water. Given that in biology many phyla, families and genera have some species that live in the sea and others that live on land, marine biology classifies species based on the environment rather than on taxonomy. Marine biology differs from marine ecology as marine ecology is focused on how organisms interact with each other and environment and biology is the study of the animal itself.

Marine life is a vast resource, providing food, medicine, and raw materials, in addition to helping to support recreation and tourism all over the world. At a fundamental level, marine life helps determine the very nature of our planet. Marine organisms contribute significantly to the oxygen cycle, and are involved in the regulation of the Earth's climate. Shorelines are in part shaped and protected by marine life, and some marine organisms even help create new land.

During Marine Biology module Students will learn about:

MARINE BIOLOGY

Unit	Description
Algae	Understand the wonderful world of algae and create your own algae collection.
Plankton	Students will learn about this microscopic world creating their own plankton net and collecting and identifying some of these organisms.
Sea Urchins	Students will understand the fascinating world of sea urchins through a dissection. They will collect the data and understand the importance of protecting these wonderful creatures.
Crustaceans	Participants will learn about these wonderful creatures and their anatomy and adaptations to the marine environment.
Basic Seining and Snorkeling	Participants will learn about the wonderful world of marine habitats learning the techniques of seine netting and snorkeling.

ZOOLOGY

Animals are a major group of mostly multicellular of the kingdom Animalia. Their body plan eventually becomes fixed as they develop, although some undergo a process of metamorphosis later on in their life. Most animals are motile, meaning they can move spontaneously and independently. Most animals are also heterotrophs, meaning they must ingest other organisms for sustenance.

Miami Metrozoo has over 80 exhibits and more than 1,000 animals, representing over 400 species, 48 of which are endangered species. The zoo has representatives from all vertebrates groups: mammals, birds, reptiles, amphibians and fish. Their newest exhibit Amazon and Beyond comprised of 27-acres and features over 100 astonishing species, with a total of over 600 new animals.

During the Zoology module participants will understand the difference of the major groups of animals and they will study in depth the wonderful world of birds and will be able to learn about:

ZOOLOGY

Unit	Description
Bird Anatomy	The purpose of this program is to familiarize students with the general anatomy of birds.
Bird Habitats	Participants will learn about different types of habitats which are essential for birds. Students will also understand how birds display adaptations to a particular habitat.
Family Life	The purpose of this program is to familiarize students with parenthood and cooperation among birds.
Birds in Culture	Participants will learn how birds have played an important role in ancient cultures and how birds are viewed today.
How Much Do you Know about Birds?	Students will participate in an innovate hands on activity, such as making an oven bird clay nest.

ECOLOGY

Ecology is the scientific study of the distributions, abundance and relations of organisms and their interactions with the environment. Ecology includes the study of plant and animal populations, plant and animal communities and ecosystems. Ecosystems describe the web or network of relations among organisms at different scales of organization. Since ecology refers to any form of biodiversity, ecologists research everything from tiny bacteria's role in nutrient recycling to the effects of tropical rain forest on the Earth's atmosphere.

The understanding of ecology is found in the broader details of study, including:

- life processes explaining adaptations
- distribution and abundance of organisms
- the movement of materials and energy through living communities
- the succession development of ecosystems, and
- the abundance and distribution of biodiversity in context of the environment.

During Ecology participants will learn about:

Unit	Description
Introduction to Animal Behavior	During this session students will learn about the history of animal behavior and the different kinds of behaviors exhibited throughout the animal world.
Survival Behavior	Participants will take an in depth look at basic survival skills in the animal kingdom and examine how certain behaviors help animals survive.
Seasonal Behavior	Students will take an in depth look at seasonal behaviors displayed in some of nature's most amazing animals. Participants will also understand the connection between environment and behavior.
Social Relationships	Participants will learn about animal communication as it relates to social behavior. They will also learn about the benefit and downside of living in groups.
What Have you Learned about Behavior?	Students will participate in an innovate hands on activity, such as *behavior observation*.

Endangered Species and Conservation

An endangered species is a population of an organism which is at risk of becoming extinct because it is either few in numbers, or threatened by changing environmental or predation parameters. An endangered species is usually a taxonomic species, but may be another evolutionary significant unit. The International Union for Conservation of Nature (IUCN) has calculated the percentage of endangered species as 40 percent of all organisms based on the sample of species that have been evaluated through 2006. Many nations have laws offering protection to conservation of species: for example, forbidding hunting, restricting land development or creating preserves. Only a few of the many species at risk of extinction actually make it to the lists and obtain legal protection. Many more species become extinct, or potentially will become extinct, without gaining public notice. During the Endangered Species and conservation module students will about the endangered animals found in the zoo, their habitats, behavior and the reasons that are causing their extinction. Students will understand in depth the world of:

Endangered Species and Conservation

Unit	Description
Journey through Asia	During this session students will learn about the plight of some of Asia's most threaten or endangered animals through case studies. This lesson includes a visit to the Zoo's Asian lobe. Students will receive a conservation passport that will be stamped after completing each visit to the Zoo's four continents.
Expedition Africa	Participants will learn about the *Heart of Darkness*-AFRICA- and the plight of gorillas and other threaten or endangered animals through case studies. This lesson will include a visit to the Zoo's African lobe. Don't forget your passport!
Voyage of the Americas	Students will travel through the Americas and learn about conservation initiatives of some of America's most endangered animals, such as the Golden Lion Tamarin and the Harpy Eagle. This lesson includes a visit to the Zoo's Amazon & Beyond. Passports, please!
The Australian Outback	*G'day, mate!* Participants will take a journey through the Australian Outback as they learn about Koalas, Tree Kangaroos, and other animals. Students will focus on conservation initiatives through case studies. This lesson includes a visit to the Zoo's Australian Outback. Passports, please!
Conservation Award	Students will participate in an innovate hands on activity, such as a scavenger hunt. Upon completion of all the conservation studies across four continents, students will receive their final passport stamp and a conservation award.

School Yard Science Program

The Deering Estate at Cutler is an assured destination for a wealth of experiential and recreation-based educational programs that are aligned with local and state standards of learning. The *Living Classroom* at the Deering Estate at Cutler serves as an environmental education center for all of Miami-Dade County, providing a hands-on curriculum to community youth and the general public in the field of ecology, geology, marine biology, environmental sciences, nature photography and archaeology. *All programs are correlated to the Sunshine State Standards and are FCAT compatible.*

SYS Eco-Academy (30 week program)

Our 30-week SYS Eco-Academy provides a hands-on interdisciplinary curriculum to community youth. The goal of this program is to complement formal education within an after-school program setting. Each curriculum unit is covered during a 5-week session. During this program, participants are engaged in interactive activities during a two-hour class offered once a week that help them understand the world around them, all while developing critical thinking skills.

This program will accommodate up to 30 students per instructor. Classes are offered once a week for 2-hours each session. Participants will come every Wednesday from 3:00-5:00pm for 30 weeks. The curriculum is offered for K-8th.

SYS Modules for 2010-2011 are:

Module	Classes				
Natural Sciences	The Scientific Method	Making Three Dimensional Plant and Animal Cells	Mystery Murder	Weather	Animal Tracks
South Florida Ecosystems	Tropical Hardwood Hammocks	Pine Rockland	Salt marshes	Sea grasses	Everglades
Marine Biology	Algae	Plankton	Sea Urchins	Crustaceans	Basic Seining and Snorkeling
Geology	Geologic Time	Fossils	Weathering and Erosion	Volcanoes	Earthquakes
Archaeology	Introduction to Florida Archaeology	By hour houses you will know us	Scientific Inquiry	Rock Archaeology	Cookie Excavation
Ecology	Biomes and Biogeography	Population Ecology: Distribution and Abundance	Population Ecology: Growth and Extinction	Symbiosis	Conservation Biology

Marine Science Conservation and Policies Program

Early in 2010, the Deering Estate at Cutler received a grant from the R. J. Dunlap Marine Conservation Program to design a curriculum and lesson plans for the Marine Conservation Science & Policy Service Learning Program so that teachers, students, and staff learn collaboratively in a hands-on environment that is convenient for all. Each of five, five week lesson plans, includes in depth study in Coastal and Ocean Habitats; Sharks and Rays; Ocean Connections; Marine Issues; and Management, Conservation, Research, and Action.
In partnership with the Deering Estate at Cutler (an historic flanking protected resources of the Biscayne Bay Aquatic Preserve and listed on the National Register of Historic Places), the R.J. The MCS&P Service Learning Program partnership provides a practical, hands-on marine science education and self-initiated research project opportunities for high school, undergraduate and graduate students in the marine science field. Fostering excitement, scientific understanding and stewardship of our native habitats, coastlines and bay resources, the proposed MCS&P Service Learning Program educates our community (particularly youth) about preserving our biodiversity through environmental stewardship, environmental sustainability, and overall resource management.

This program will be taught at Deering Estate at Cutler for 30 weeks during 2 hours sessions once a week. This program is designed for youth 13 yrs old and older. Parents are not required to participate but are welcome to do it as well. The cost of the program is $35 per module plus $12 annual registration fee. A minimum of 25 participants is required.

Modules:

Coastal and Ocean Habitats - Within the oceans, there exists many different types of habitats. These habitats all come with their unique challenges and are inhabited by a wide variety of organisms. In this module, students will learn about:

- Ocean Zones
- Mangroves,
- Seagrass
- Coral Reefs
- The Everglades, Florida Bay, and Biscayne Bay

Sharks and Rays – Sharks are intriguing organisms that are often considered to be dangerous, despite the important role they play in maintaining ecological balance in the marine environment. This module will focus on:

- Myths
- Classification (using dichotomous keys)
- Basic anatomy and adaptations

- Physiology (behavior, respiration, and reproduction)

Ocean Connections – Interactions in the ocean allow us to observe a specific population of organisms, identifying their behaviors and relationships, or investigate entire marine habitats to see how different living and nonliving factors contribute to the overall ecosystem. This module will focus on:

- Food Chain/Webs and Apex Predators
- Population Sampling
- Our watershed and the aquatic ecosystems
- Connectivity and Migrations
- Ocean Resources

Marine Issues - The health of the ocean and marine life is often taken for granted, because for much of history, we have considered the resources of the ocean to be inexhaustible. However, it is as vulnerable to harm by human activities as any other environmental realm. In this module, students will study:

- Fishing and Bycatch
- Coastal Development
- Pollution, Water Quality and Bioaccumulation
- Climate Change
- Invasive Species

Management, Conservation, Research, and Action - Careful conservation protection and management of our natural resources will help sustain our environment for future generations. This module will focus on:

- Fisheries and management strategies
- Principles of Conservation
- Practicing Environmental Stewardship
- Designing Field Studies and Research Projects

To request material in accessible format, information on access for persons with disabilities, or sign language interpreter services (7 days in advance), call 305-365-6706.