Oceanographic Cultural Environmental Activity Notebook

TEACHER IN-SERVICE WORKSHOP
AND
CURRICULUM WRITING PROGRAM

"THE O.C.E.A.N. BOOK: A TEACHER'S RESOURCE GUIDE"

Dade-Broward-Palm Beach
Middle School Program
1 October 1993 - 30 September 1994

Funded by
The State of Florida
Florida Coastal Management Program
Department of Community Affairs
as a Subgrant Awarded by
N.O.A.A.
National Oceanic and Atmospheric Administration

Administered and Published by
Pine Jog Environmental Education Center
at Florida Atlantic University
A Self-Supporting Unit Within the College of Education

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Millions of Florida residents live in communities on or near the coast. The impact from population density on the extensive Florida coastline reflects escalating threats as development, recreation and waste disposal activities increase, often in conflict with long-term natural processes.

By educating teachers of grades 6-8, the O.C.E.A.N. curriculum can be incorporated into middle school instruction to create "Marine Literate Students". The objective of the O.C.E.A.N. Project was to equip classroom teachers to teach students how to become knowledgeable about the marine environment. Young people must develop an information base in order for them to make the ecologically and sociologically sound choices necessary to protect and maintain the world of water all around them.

It is our hope that this educational project has generated a curriculum guide which will meet the needs of teachers throughout South Florida. The teaching materials contained in this guide are both laboratory-oriented and field-based. Most of the activities and field experiences have been designed to lead student action-oriented involvement by students.

This Teacher's Guide is the result of a team effort of project staff and teachers from Dade, Broward, and Palm Beach Counties. The fifty-two teachers from the Tri-County area made significant contributions to the overall interdisciplinary character of this guide. Although an effort was made to standardize the overall format of the contents within the four modules, the integrity of individual contributions was maintained.

Congratulations to all the teachers and project personnel who contributed to this teaching resource. Many thanks for a job well done.

Joyce B. Taylor
R. Duncan Mathewson III

Kathryn Jones
Patricia Welch

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The O.C.E.A.N. Book:
A Teacher's Resource Guide

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THE O.C.E.A.N. BOOK
A TEACHERS RESOURCE GUIDE

COME ON IN - THE WATER'S GREAT

"IN CELEBRATION OF INNER SPACE" - Dr. Sylvia Earle

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PINE JOG ENVIRONMENTAL EDUCATION CENTER

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COME ON IN - THE WATER'S GREAT!

Have you ever had "one of those days" that was about as perfect as possible, a day when everything just clicked, and wonderful things happened to you without your trying to make them occur? Most of us have had a day like that every now and then. Well, yesterday was MY DAY!

Over the last fifteen years or so, I have taken many weekend inservice workshops for science teachers. I have done this on my personal time for various reasons: for points, to "fill up my bucket" or when I felt I was getting a little stale in the classroom. Best of all, I always meet new people and have some fun "playing science" with my peers. I usually acquire a few pearls of wisdom to take home for my investment of time and effort. Maybe I learn a new skill, obtain some knowledge or insight I did not have, acquire a science "toy" to take back to my kids or just find a reason to feel good about having decided to go into teaching some thirty years ago. I have traveled far and wide with and without my students on the never-ending quest for new experiences. Besides the love of my family, it is these experiences which make me feel rewarded, productive and important.

I am a kindred spirit with those people, famous or not, who hold the marine world in highest regard and find a "psychological home" in the spectacular world beneath the sea. My best friend often teases me when I get cranky by saying, "What's the matter with you? Do you need to get your flippers wet?" Some of my happiest hours of discovery have been spent peeking into the nooks and crannies of the coral reef and once, even a wonderful kelp garden in an icy bay off the coast of New Zealand. Two summers ago, I went half way around the world to the Great Barrier Reef with a group of thirty-one middle school science exchange students. Who says teachers do not have fun!

My latest escapade came in the form of a regional ecology conference in the Florida Keys held by the Florida Marine Science Educators Association, of FMSEA. Fortunately for me, this organization includes educators in its ranks. A group of about 40 of us gathered in Islamorada on a Friday afternoon. We were to begin our conference experience with a "research dive" on Alligator Reef. What made this reef trip different was that Dr. Sylvia Earle, the world renowned oceanographer, was joining our group and would address our conference as keynote speaker later that evening.

I have read about and shared with my science students what I knew of Dr. Earle and her achievements. In 1990, she was appointed as the first female chief scientist of National Oceanic and Atmospheric Administration. In 1979, she made an incredible journey to the ocean floor and walked about in an untethered diving suit at a depth of over 1200 feet. Her participation in the Tektite II underseas habitat research program back in the 70's gave me the desire to volunteer twice to take part in the underwater Marine Lab program at Marine Resources Development Foundation in Key Largo. In 1987, I stayed under for 24 hours and then a year or so later, for 48 hours in a tiny marine habitat 30 feet beneath the water. On the latter dive, I was part of a scientific research study conducted by the University of Pennsylvania to collect data on nitrogen saturation in sport divers.

Needless to say, Dr. Earle's presence was a thrill for those of us who were acquainted with her impressive career. Arriving at the boat dock early, I rented a wet suit and excitedly waited for Dr. Earle and the others to arrive. I wondered what she would look like and how she had been delivered to the floor of the ocean on her world famous deep ocean walk.

The day was partly cloudy and the water a bit choppy, not an ideal day for diving and especially not a great day for those in the group who were snorkeling. We were thrilled, however, when a golf cart deposited our famous guest at the boat dock. Dr. Earle good naturedly allowed the photographers to record her arrival while her huge brown eyes seemed to dance with excitement as if our rather modest dive trip to a 20 foot reef was an exciting new challenge. When asked to say a few words, she charmed us with, "Let's go diving!" It always amazes me how unpretentious truly great people can be. As we headed out to our ocean destination, the local press took turns interviewing her and taking pictures. Between these interruptions, Dr. Earle chatted with those of us fortunate enough to be sitting near her. I actually got the opportunity to ask her questions which my students had asked me, about her scientific experiences. She told me that she rode the nose of a submersible, much like a hood ornament, to the bottom of the ocean floor on her record breaking ocean walk. My students will love that story!

When we reached the dive location we divided into buddy pairs and Dr. Earle and I were the only ones without partners. I could not believe my incredible luck to be selected as Dr. Sylvia Earles's diving buddy! Life is truly wonderful!

Our dive was splendid. A professional photographers accompanied the two of us and snapped dozens of pictures of her. We took turns pulling shreds of plastic off fire coral and monofilament off seagrowths. The highlight of the dive for me was to find and show her a marvelous green moray eel under a coral ledge. At one point, the photographer made it known that he wanted to photograph us together as well. I was so excited I almost swallowed my regulator!

On shore the following day, I saw slides of the pictures he had taken of us. I will purchase some of them to incorporate into a marine environmental lesson for my students.

In her address to the FMSEA members later that evening, Dr. Earle encouraged us to "get into the water." She implored us to make our students and others aware of the magnificent world that lies at our shore. Dr. Earle told us that we must not allow others to look at the ocean as just blank blue places on a globe. We must "fill in the blanks!" Only then can we appreciate what we have to lose.

Her advice can be taken in many contexts. The reason for telling my story is to encourage teachers to "get their feet wet" when it comes to taking advantage of the extra opportunities that are available. Workshops, summer institutes, and trips run by organizations such as FMSEA are yours for the taking. You may be surprised at the adventure and excitement that is awaiting you if you dare to "take the plunge". So come on in ... THE WATER'S GREAT!

NATIONAL OCEANIC AND ATMOSPEHERIC ADMINISTRATION
NOAA
U.S. DEPARTMENT OF COMMERCE

FLORIDA'S FRAGILE PARADISE

FLORIDA MARINE SCIENCE EDUCATORS ASSOCIATION

"Ocean Education Week"
Dr. Earle making a presentation to O.C.E.A.N. teachers at the
FMSEA-SE Regional meeting in the Florida Keys - 4-5 February 1994
(Photo: Carol Leonard, FMSEA President 1993-1994)

"A Celebration of Inner Space"

When talking to students about the Ocean, I often like to ask them to imagine what it would be like to be approaching our planet for the first time as an alien from some distant galaxy. As the Earth has become known to us through all of human history, what has really set this planet apart from all others in our Solar System? And of course the answer is - the ocean.

The existence of water over two-thirds of the Earth's surface does not present the full picture. The most intriguing thing to me as a biologist is that the ocean contains the most life found anywhere on Earth. Ninety-five percent of the living space on Earth is aquatic space.

There is just no excuse for not getting out there. Everybody should rush right out to the ocean, put on a face mask and flippers and jump right in. If any of you have resisted so far, don't let any more time pass. Get with it. See what this planet is really about from the inside out while getting to meet fish on their own terms.

Understanding the ocean will deepen our knowledge of the interdependency of life on Earth. Most people don't see the connections between our daily lives and the lives of earthworms, beetles, and frogs, sharks and ancient ocean creatures that don't yet even have a name. If we can get one thing right, it would be to understand the connections and to prize them, not just to respect them, but to cherish and protect them.

We are all tied to the ocean in one way or another. This O.C.E.A.N. Teachers Resource Guide helps to make these important connections by getting students to realize that they are part of the same ecosystem that relates to the oceans of the world. I congratulate all the teachers and project personnel who worked so well together to produce this product of learning as a fitting celebration of Inner Space.

Dr. Sylvia A. Earle

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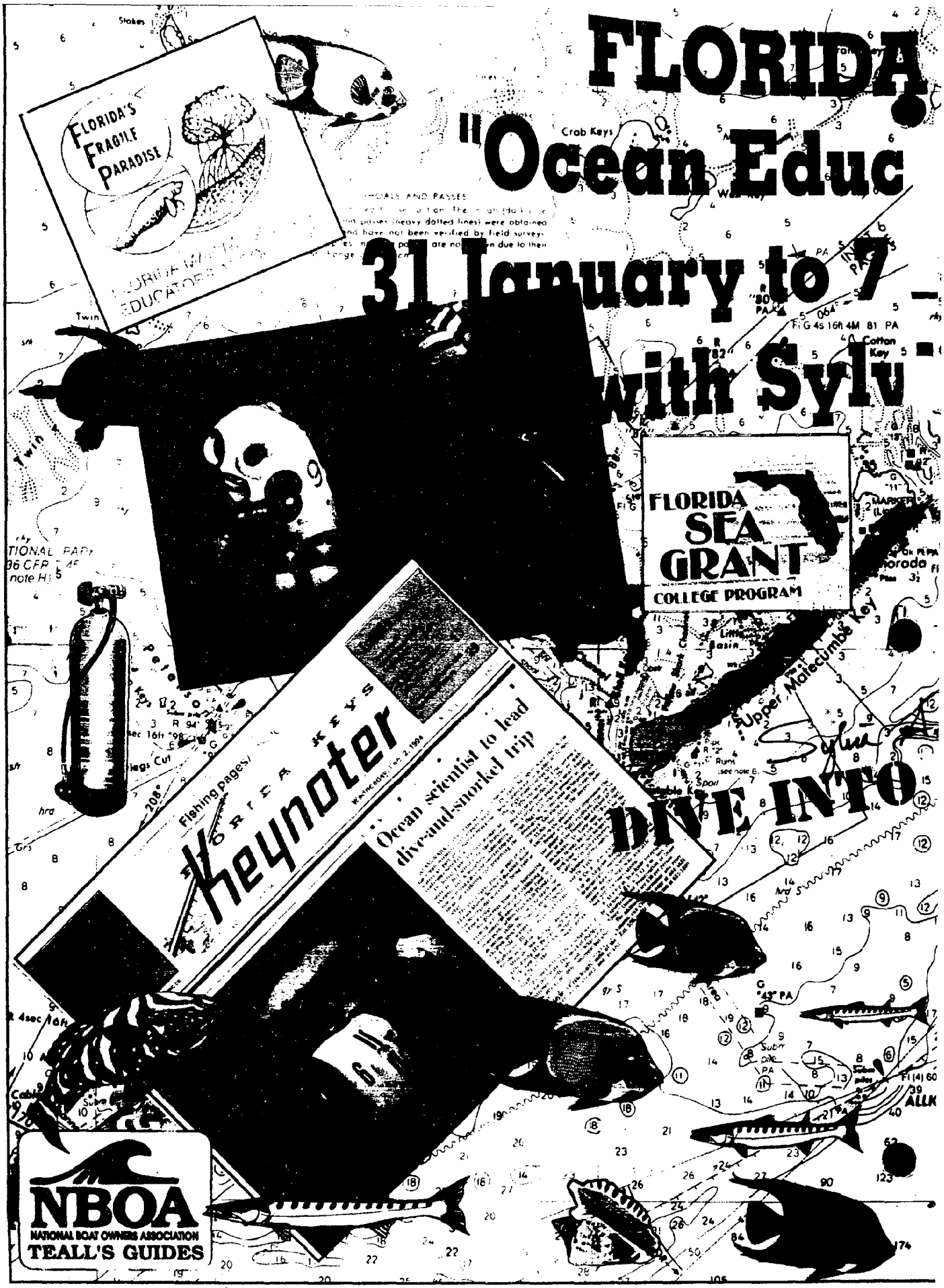
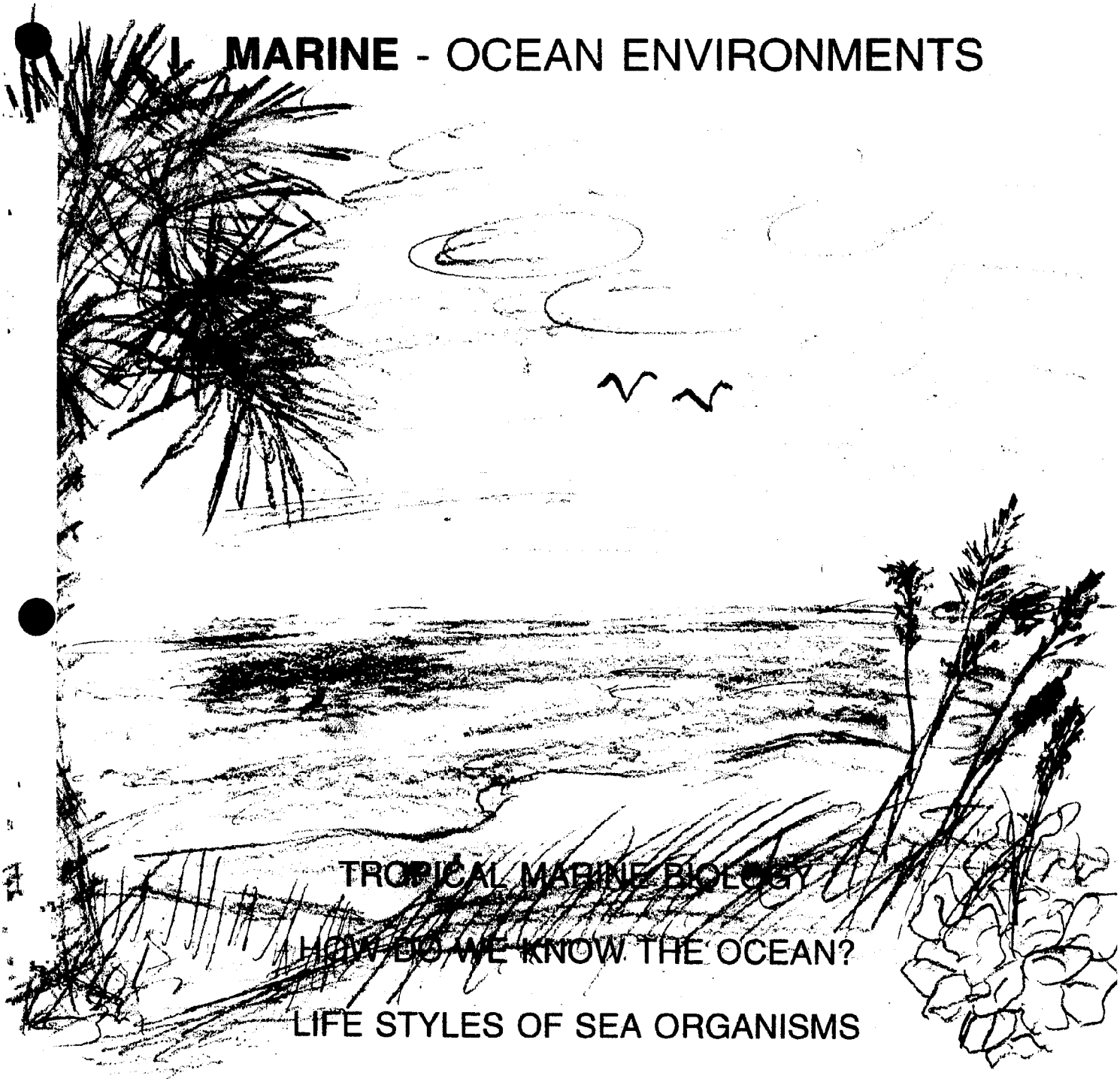

FLORIDA
"Ocean Educ
31 January to 7
with Sylv
DIVE INTO
FLORIDA'S FRAGILE PARADISE
FLORIDA SEA GRANT
COLLEGE PROGRAM
Fishing pages!
Keynoter
Ocean scientist to lead dive-and-snorkel trip
NBOA
NATIONAL BOAT OWNERS ASSOCIATION
TEALL'S GUIDES

NATIONAL CENTER FOR SHIPWRECK RESEARCH
CURRICULUM
Tropic Topics
Robert G. Walker
Superintendent
January 28, 1994
Teachers invited to FMSEA conference
Kids should spend their vacations in schools.
SYLVIA EARLE
Marine biologist
NOAA
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
U.S. DEPARTMENT OF COMMERCE
The Reporter
SERVING THE FLORIDA KEYS
INNER SPACE EXPLORER HOSTS BENEFIT
Banana Bay Resort
70/250

I. MARINE - OCEAN ENVIRONMENTS



TROPICAL MARINE BIOLOGY

HOW DO WE KNOW THE OCEAN?

LIFE STYLES OF SEA ORGANISMS

CAN YOU IDENTIFY FLORIDA'S SALTWATER FISH?

FRIEND OR FOE?

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1. TROPICAL MARINE BIOLOGY

OBJECTIVE: To familiarize students with various marine species and the ocean ecosystem in South Florida.

THE STUDENTS WILL:

1). Learn about the survival adaptions of different species on rocky and sandy shores at different tide levels.

2). Discover the workings of a coral reef.

3). Identify the different mangrove types.

4). Consider the importance of mangroves to the South Florida coastal ecosystems.

6). Describe the workings of a Florida coastal ecosystem.

COMPETENCIES: Dade County CBC: Grade 7, 7IV A. 7.400

SCHEDULE: 27 days

VOCABULARY:

mangroves	rocky shore	sandy beach shore	coral reef
artificial reef	tidal zones	seagrasses	shoal grass
turtle grass	wetlands	corals	sponges
shells	manatee-grass (red, white, black)		

MATERIALS:

CONSUMABLES
3 x 5 index cards
note book paper
fish food

NON-CONSUMABLES
movies, videos
over head projector
books, Peterson Guide series
Aquatic tank set-up
snorkeling gear
small plastic beach shovels
buckets
hand nets
cotton gloves
slates (U/W)
glass jars

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PREPARATION: Provide students with a background about different habitats within the coastal ecosystem in South Florida.

BACKGROUND: The nation's wetlands and coastal habitats are disappearing at an alarming rate. The United States has lost over 50% of its wetlands in the past century. California has lost more than 90% of its coastal wetlands. What better way to preserve our wetlands than to educate those that surround them. We can start by educating our young - our future.

TEACHING SUGGESTIONS:

1). Collect materials to be used at the sites prior to class.

2). Set-up field site activities for each area to be investigated.

3). Schedule appropriate site activities according to the tide table

4). Obtain proper supervision; schedule enough chaprones for all water activities

5). Review safety rules prior to each activity

6). Visit the site before scheduling trips

7). Instruct students on observation techniques

8). Prior to the field trip, divide the class into cooperative groups that will research one area and present their research findings to the class. These groups will also be the "work teams" for the field experience. (Where they will investigate all of the areas)

CONNECTIONS:

Math - Have students measure lengths of organisms found and create comparison charts to share with the class.

Language - Students are integrating language skills through their research, reports and sharing.

Social Studies - Along with their reports about the organisms of their area, have them also investigate human usage and history of the area.

Art - While on the field trip, have the students carry a sketch pad to draw the regions and organisms. Short videos are also useful.

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PROCEDURES:

I. Discussions

Cooperative groups are to lead discussions on different types of ecosystems:

sandy beach at low tide
sandy beach at high tide
rocky beach at low tide
rocky beach at high tide
coral reefs
mangroves
shipwreck

II. Field Trip:

A. Important Rules for All Participants:

***See Safety below**

*Students should carefully collect living and non-living specimens (note: all living specimens will be returned their natural environments as soon as possible after observation.)

*No duplication of specimens throughout the cooperative groups

*Proper lab procedures and safety are required

*Live specimen are to be placed in tanks immediately

B. Survey the site and record observations on the data sheets

C. Carefully collect and separate living from non-living specimens

D. Spread specimens out by zone, area located, and habitat

E. Repeat E,F,and G for each of the areas remembering to follow the rules for participants.

I. Compare class findings

J. Record notes of group findings

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SAFETY INFORMATION:

1). To participate, each student must be tested for swimming abilities and adequate skills must be displayed at that time.

2). The buddy system will be used at all times.

3). Proper clothing will be worn at all times.

4). Proper foot wear will be required

5). Water communication signals will be taught to everyone

6). When snorkeling at sites, a dive flag is required for each group of 6 students.

7). A First Aid kit will be available and complete for all activities.

ASSESSMENT:

1). Teacher observations on group and individual activities.

2). Vocabulary building activities

3). Exam, identification of species and content

4). Hands-on station exam

ENRICHMENT:

Summer Program: Trip to the Bahamas for comparison or similar Ecosystem

Trip to Bimini for comparison and contrast of areas.

Visit to Shark Lab - Dr. Sammual Gruber at Rosentiel Lab, University of Miami.

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FURTHER READING:

Environmental Education Resource Directory of Dade County

"Florida Coral Reef System", Deevon Quirolo and Marybelle Donnelly, pamphlet.

"Florida Keys National Marine Sanctuary", W. Harrigan, pamphlet

"Florida Mangroves", Florida Department of Natural Resources, pamphlet.

"Hard Bottom, a Biological Community", The Florida Keys Chapter, The Izaak Walton League of America.

"National Marine Sanctuary Program", NOAA, pamphlet

Peterson Guide to Coral Reefs to the Sea Shore and Shore Line.

Places to Go With Children in South Florida - p. 130

The G.R.E.E.N. Book, Environmental Resource Book for Monroe County

"The Other Edge of the Sea", Mote News, Dr. Ernie Estevez, p. 8-9

"The Underwater World of Florida Sea Grasses", Florida Department of Natural Resources, pamphlet

"Wetlands of the Florida Keys", The Florida Keys Chapter, The Izaak Walton League of America.

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Student Pages

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DATE: _____
CLASS: _____

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turtle grass	wetlands	corals	sponges
shells	manatee-grass (red, white, black)		

MATERIALS:

CONSUMABLES
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note book paper
fish food

NON-CONSUMABLES
movies, videos
over head projector
books, Peterson Guide series
Aquatic tank set-up
snorkeling gear
small plastic beach shovels
buckets
hand nets
cotton gloves
slates (U/W)
glass jars

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CLASS: _____

SAFETY INFORMATION:

1). To participate, each student must be tested for swimming abilities and adequate skills must be displayed at that time.

2). The buddy system will be used at all times.

3). Proper clothing will be worn at all times.

4). Proper foot wear will be required

5). Water communication signals will be taught to everyone

6). When snorkeling at sites, a dive flag is required for each group of 6 students.

7). A First Aid kit will be available and complete for all activities.

Additional Notes:

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Student Pages

NAME: _____
DATE: _____
CLASS: _____

Record your field findings below:
Area: Sandy Beach at Low Tide

Survey and Zone Observations:

_____
_____
_____
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_____

Organisms

Living **Non-living**

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Area: Sandy Beach at High Tide

Survey and Zone Observations:

_____
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Organisms

Living **Non-living**

_____
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Student Pages

NAME: _____
DATE: _____
CLASS: _____

Area: Rocky Beach at Low Tide

Survey and Zone Observations:

_____
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Organisms

Living | **Non-living**

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Area: Rocky Beach at High Tide

Survey and Zone Observations:

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Organisms

Living | **Non-living**

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Student Pages

NAME: _____
DATE: _____
CLASS: _____

Area: Coral Reefs

Survey and Zone Observations:

_____
_____
_____
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_____

Organisms

Living	**Non-living**

****

Area: Mangroves

Survey and Zone Observations:

_____
_____
_____
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_____
_____

Organisms

Living	**Non-living**

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Student Pages

NAME: _____
DATE: _____
CLASS: _____

Area: Shipwreck

Survey and Zone Observations:

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Organisms

Living | **Non-living**

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Describe the workings of the ecosystems you have visited. Are they interdependent? Explain. Are they important? (Use additional paper if needed.)

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NAME: _____
DATE: _____
CLASS: _____

FURTHER READING

Environmental Education Resource Directory of Dade County

"Florida Coral Reef System", Deevon Quirolo and Marybelle Donnelly, pamphlet.

"Florida Keys National Marine Sanctuary", W. Harrigan, pamphlet

"Florida Mangroves", Florida Department of Natural Resources, pamphlet.

"Hard Bottom, a Biological Community", The Florida Keys Chapter, The Izaak Walton League of America.

"National Marine Sanctuary Program", NOAA, pamphlet

Peterson Guide to Coral Reefs to the Sea Shore and Shore Line.

Places to Go With Children in South Florida - p. 130

The G.R.E.E.N. Book, Environmental Resource Book for Monroe County

"The Other Edge of the Sea", Mote News, Dr. Ernie Estevez, p. 8-9

"The Underwater World of Florida Sea Grasses", Florida Department of Natural Resources, pamphlet

"Wetlands of the Florida Keys", The Florida Keys Chapter, The Izaak Walton League of America.

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2. HOW DO WE KNOW THE OCEAN?

(Modified from Holt, Winston, Reinhart)

OBJECTIVE: To investigate the current methods of ocean mapping and to consider its effectiveness in establishing an accurate picture of the ocean floor.

THE STUDENTS WILL:

1). Students determine the contours of an ocean bottom.

2). Evaluate the accuracy of sonar as a tool for studying the ocean bottom.

COMPETENCIES: Dade CBC 6th, 7th or 8th Grade

SCHEDULE: One class period (55 minutes)

VOCABULARY:

sonar	reef	bathymetric	depth	rift
contour	isobath	topographic	Continental Shelf	

MATERIALS:

CONSUMABLE	**NON-CONSUMABLE (Per Group)**
pencil	1 piece of construction paper (18" x 24")
paper	assorted small objects
	empty soda box (or lid from copy paper box)
	paper clips
	metric rulers
	protractor (Teacher)
	masking tape (Teacher)

PREPARATION:

1). Turn the soda box upside down and draw a grid on it. (suggested 1" x 1")

2). Label grid numbers across the top; letters down the side.

3). Use a protractor to punch a hole at each cross mark.

4). Take a piece of construction paper (larger than the soda box).

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5). Take the assorted objects you have collected and tape them to the paper.

6). Cover the objects with the soda box.

7). Tape the paper to the sides of the soda box so the students can't peek.

8). Group students into investigative teams of four.

BACKGROUND: This classroom activity gives the students a glimpse of the problems we have interpreting data about an area we have never seen. We have used sonar to map the ocean bottoms and as a beginning its not bad but it leaves a lot to be learned.

TEACHING SUGGESTIONS:

1). Perform this activity before taking a field trip that uses SONAR to help them understand some of the difficulties encountered with undersea mapping.

2). An extension of SONAR is ultrasound. If possible, obtain a video or picture of a fetus to share other applications of this technique.

3). The field experience could be a trip on a boat that has a sonar unit. Students could see actual data and how it is assembled into a picture of the ocean below (probably by a computer). Check with the Coast Guard or auxiliary power squadron. Possible charter boat. Follow-up classroom activity would be to have students invent a better method for examining the ocean floor (ie: design and build a model of a mini-sub).

CONNECTIONS:

Math - Have the students solve distance problems with obtained or fictional data using the formula: Distance = (Speed of Sound) (1/2 Time for Echo Reception). They could even plot the data to create a profile the same way they did in the experiment.

Language / Social Studies - 1). Encourage students to research the development of submersibles and SONAR to share with the class either as a written or oral report.

2). Within the cooperative groups, have the students present their perspective on the importance of the future use of submersibles and SONAR.

Art - Have the students use their newly created profile to create a colorful and "living" environment

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NAME: _____
DATE: _____
CLASS: _____

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(Modified from Holt, Winston, Reinhart)

OBJECTIVE: To investigate the current methods of ocean mapping and to consider its effectiveness in establishing an accurate picture of the ocean floor.

THE STUDENTS WILL:

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COMPETENCIES: Dade CBC 6th, 7th or 8th Grade

SCHEDULE: One class period (55 minutes)

VOCABULARY:

sonar	reef	bathymetric	depth	rift
contour	isobath	topographic	Continental Shelf	

MATERIALS:

CONSUMABLE	**NON-CONSUMABLE (Per Group)**
pencil	paper clips
1 piece of construction paper (18" x 24")	metric rulers
paper	assorted small objects
	empty soda box (or lid from copy paper box)

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Student Pages

NAME: _____
DATE: _____
CLASS: _____

PROCEDURE:

1). With your group of four students, obtain a constructed model, a paper clip and a metric ruler.

2). Measure the depth of the box by putting the metric ruler along the side of the box. Record the length.

3). Write down each grid marking (ie: A,1; A,2; etc.)

4). Take the paper clip and put it into the hole at the grid mark (The easiest way is to measure the length of the paper clip is to slip the clip into the hole, measure how much is still sticking out the box and subtract.)

5). Record the depth at grid mark A,1.

6). Repeat this procedure for all grid marks

7). Graph each letter's depth.

8). Cut out profiles and tape to piece of notebook paper. Predict what the landscape under the box looks like.

9). Uncover landscape and compare.

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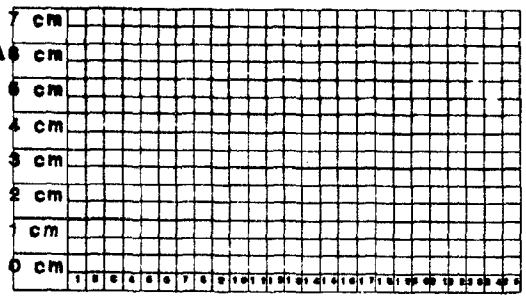
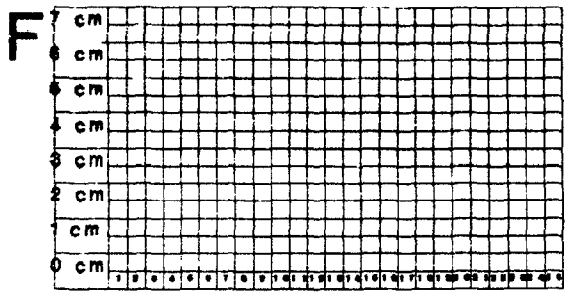
NAME: _____
DATE: _____
CLASS: _____

Use the grids below to draw and cut out cross sectional profiles of the unseen surface:

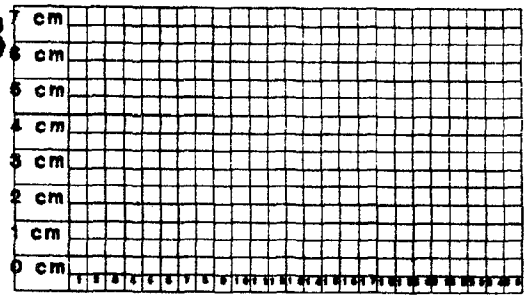
A



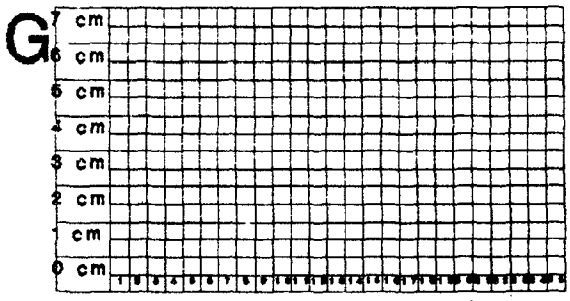
F



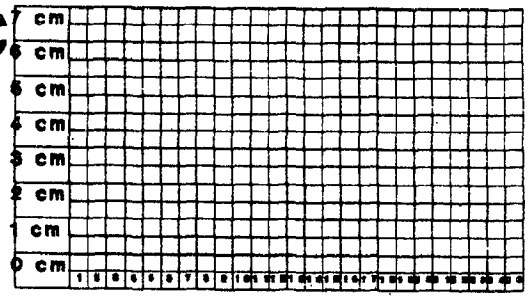
B



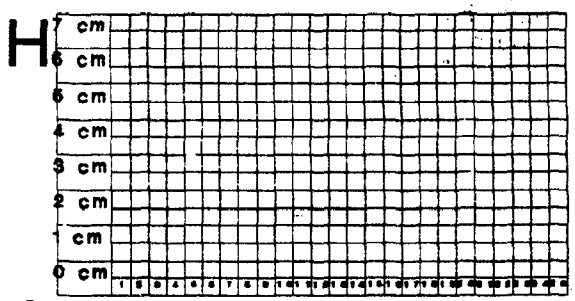
G



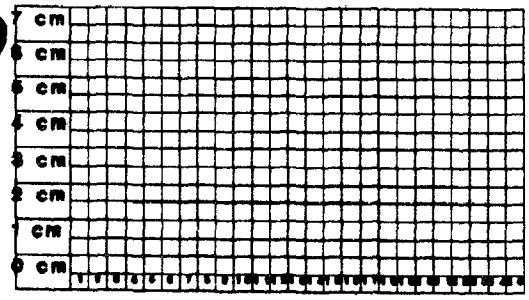
C



H



D



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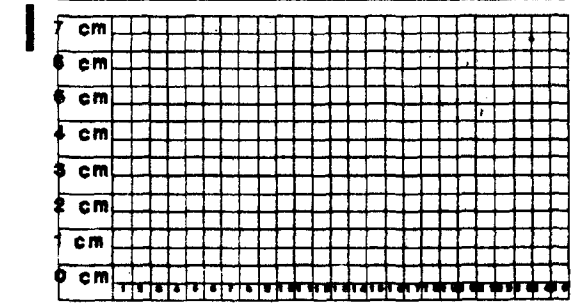

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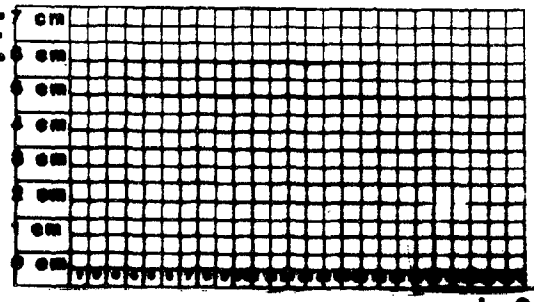
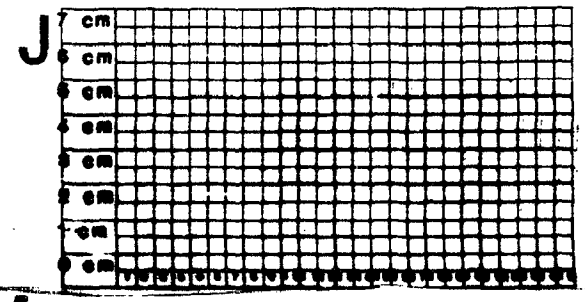


J



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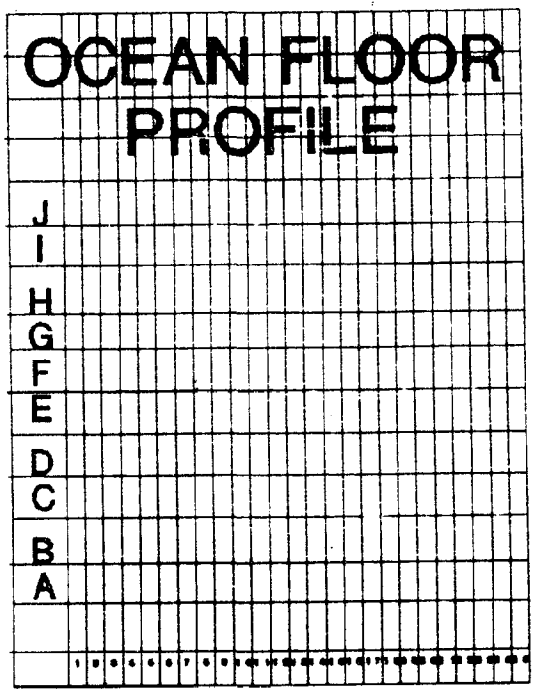
NAME: _____
DATE: _____
CLASS: _____

Tape your cross sectional profiles on the grid below:



Did your profile match the actual interior of the box? _____ If you were asked to map the ocean floor using this method, what would you do to improve the reliability of your map?

_____

_____

_____

_____

REINFORCEMENT: Study the different types of submersibles that have been built and used to study ocean depths.

FURTHER READING:

Beebe, William (1951), Half Mile Down Duel, Sloan & Pearce

Pieers, Anthony (1970) On the Bottom of the Sea, Dunlop

Cousteau, Jacques (1979) The Ocean World, Abrams

Jordan, Bernard L.(1970) Man and the Sea: Classic Accounts of Marine Explorations The Natural History Press.

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3. LIFESTYLES OF SEA ORGANISMS

HOW DOES A SPECIFIC HABITAT AFFECT ORGANISM STRUCTURE AND LIFESTYLE?

OBJECTIVE: To investigate how specific habitats affect organism structure and lifestyle

THE STUDENTS WILL:

1). List different habitats that exist within an ocean ecosystem.

2). Describe structures that would be common to each of the four lifestyles:
   1). benthic
   2). nektonic
   3). planktonic
   4). land and water

3). Create an original 3-dimensional sea organism specific to one of the four lifestyles.

4) Define the four basic lifestyles:
   a). Benthic Lifestyle: organisms that live on or attached to the ocean bottom.

   b). Nektonic Lifestyle: organisms that swim under their own power.

   c). Planktonic Lifestyle: floating plants or animals (they may or may not swim) which are swept about by the ocean currents.

   d). Land and Water Lifestyle: organisms that live on beaches or on land near the ocean. (They often feed in the ocean).

COMPETENCIES: 6th, 7th and 8th Grades

SCHEDULE: 3 Class Sessions

VOCABULARY:

lifestyle	habitat	behavior	benthic
nektonic	planktonic	niche	

MATERIALS:

CONSUMABLE		NON-CONSUMABLE
pipe cleaners	shells	ocean diagrams showing top, middle, bottom, and sea line
glue	straws	posters/pictures of sea life.
beads	buttons	
feathers	plastic soda bottles	
markers	construction paper	

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PREPARATION: Provide students with background about different habitats within an ocean ecosystem.

BACKGROUND: Lifestyle of an organism includes its habitat, behavior and energy requirements.

TEACHING SUGGESTIONS:

1). Prepare pictures of sea creatures

2) Organize cooperative learning groups if not already in place.

3). Be sure that students come up with concepts before you name them - discovery method not lecture.

PROCEDURES:

Day One

1). Show students videos, filmstrips, posters etc. of marine ecosystems.

2). Have groups list possible habitat niches of the ocean.

3). Have groups share lists

4). Allow the groups to lead a class discussion on different types of ocean creatures and where they might live in the ocean.

Concept Formation

1). Divide the board into four sections.

2). Pass out laminated pictures of different sea creatures representing all four lifestyles.

3). Have groups take pictures to appropriate board sections.

4). Facilitate class discussion of placement.

Day Two

1). Have students in groups list structures common to lifestyles.

2). Discuss the necessity of these structures to maintain a particular lifestyle.

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3). Assign a particular lifestyle to each group - instruct students to create a sea creature appropriate to the lifestyle.

Day Three

1). Complete sea creature

2). Present creatures to the class specifically explaining adaptions to lifestyle.

CONNECTIONS:

Math / Art : 1). While creating their creature, encourage the groups to use geometric shapes drawn with compass, ruler, and protractor to give it the desired shape.

2). The class the class might figure out food chain numbers (ie: How many minnows make a whale).

Language / Social Studies: 1). Draw an analogy between human lifestyles and the lifestyles of sea creatures.

2). Discuss where else similar sea creatures may live around the world.

3). Ask students from other areas of the U.S and other countries what types of other creatures they know.

ASSESSMENT: Cooperative learning assessment on presentation.

SPECIAL RESOURCE: Invite Gordon Gilbert or Steve Bass from the Gumbo Limbo Nature Center to visit the class as a guest speaker.

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PROCEDURES: Snorkel in cooperative learning groups locating assorted organisms that have been investigated in the previous assessment:

1). Cooperation

2). Describe organisms you saw

3). Compare and contrast real and student creations

4). Cooperative learning activity evaluation

REFERENCES:

Allen, Wendy Beard and Patty Owens McLaughlin, Sea Sampler, Aquatic Activities for the Field and Classroom, University of South Carolina, Sea Grant Publication SC-SG TR 85-1

Erickson, John, The Mysterious Oceans (1988) TAB Books Inc., Blue Ridge Summit, Pa Ch.13

Groves, Don. The Oceans (1989) John Wiley & Sons Inc..Washington, D.C.

Spence, Lundre and Vivian Barbee Cox, Coastal Capers: A Marine Education Primer UNG Sea Grant Publication, UNG SC 84-05

The Ocean Book: Aquarium and Seaside Activities and Ideas for All Ages. (1989) Center for Marine Conservation, Washington, D.C. John Wiley & Sons Inc.

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NAME: _____
DATE: _____
CLASS: _____

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   c). planktonic
   d). land and water

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   b). Nektonic Lifestyle

   c). Planktonic Lifestyle

   d). Land and Water Lifestyle

COMPETENCIES: 6th, 7th and 8th Grades

SCHEDULE: 3 - 4 Class Sessions

VOCABULARY:

lifestyle	habitat	behavior	benthic
nektonic	planktonic	niche	

MATERIALS:

CONSUMABLE

pipe cleaners	shells
glue	straws
beads	buttons
feathers	plastic soda bottles
markers	construction paper

NON-CONSUMABLE

ocean diagrams showing top, middle, bottom, and sea line
posters/pictures of sea life.

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Student Sheets

NAME: _____
DATE: _____
CLASS: _____

PROCEDURE

1). With your group, list different habitats that exist within an ocean ecosystem.

_____
_____

2). Describe structures that would be common to each of the four lifestyles:

a). benthic - _____
_____
_____
_____

b). nektonic - _____
_____
_____
_____

c). planktonic - _____
_____
_____
_____

d). land and water - _____
_____
_____
_____

3). Create an original 3-dimensional sea organism specific to one of the four lifestyles. Use your imagination and creativity!

4). Define the four basic lifestyles:

a). Benthic Lifestyle - _____
_____

b). Nektonic Lifestyle - _____
_____

c). Planktonic Lifestyle - _____
_____

d). Land and Water Lifestyle - _____
_____

5). Share your ideas and creatures with the other groups.

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AS A SUBGRANT AWARDED BY N.O.A.A. - NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

NAME: _____
DATE: _____
CLASS: _____

REFERENCES:

Allen, Wendy Beard and Patty Owens McLaughlin, Sea Sampler, Aquatic Activities for the Field and Classroom, University of South Carolina, Sea Grant Publication SC-SG TR 85-1

Erickson, John, The Mysterious Oceans (1988) TAB Books Inc., Blue Ridge Summit, Pa Ch.13

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The Ocean Book: Aquarium and Seaside Activities and Ideas for All Ages. (1989) Center for Marine Conservation, Washington, D.C. John Wiley & Sons Inc.

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4. Can you Identify Florida's Salt Water Fish?

OBJECTIVE: To recognize South Florida's common salt water fish.

THE STUDENTS WILL:

1). Identify Florida's salt water fish.

2). Identify and name all fish fins.

3). Recognize all fish which have streamlined bodies.

COMPETENCIES: 6th - 8th Grades

SCHEDULE: 5 Class Periods

Day One: Construct sculpting form
Day Two & Three: Cover form with several layers of "art paste" coated paper strips.
Day Four: Paint base coats (make sure forms are dry)
Day Five: Paint details/Share with class

VOCABULARY:

paper-mache	fin	fish	sculpting form	pectoral
pelvic	dorsal	caudal	anal	

MATERIALS:

CONSUMABLE
art paste (15)
tempera paint quarts
- white (6-8 qts.)
- black (1-2 qts.)
- brown (1-2 qts.)
- green (1-2 qts.)
- red (1-2 qts.)
- blue (1-2 qts.)
- yellow (1-2 qts.)

1/2" masking tape (3)
cardboard needed for
- frame of fish (use old science fair boards or boxes)

foam pans from meat or fruit etc. to fill art paste and dip paper strips into.

NONCONSUMABLE
size 4 paint brushes (3)
3/4" paint brushes (3)
two-gallon bucket to mix art paste
scissors

**Approximate cost of 150 students is $75.00 or 50 cents each. (If money needs to be collected)

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TEXT - "Fishing Lines Anglers Guide to Florida Marine Resources" available at Gumbo Limbo Nature Center of South Palm Beach County and Pine Jog Environmental Education Center in West Palm Beach

PREPARATION: Provide students with background about South Florida fish commonly caught in the ocean.

BACKGROUND: Fish are cold blooded vertebrates belonging to the Cordate phylum. Fish are adapted to life underwater and take oxygen from the water through structures called gills. Fish reproduce by external fertilization and are found in both fresh and salt water.

Fish are divided into three classes: the jawless fish, the cartilaginous fish, and the bony fish. Bony fish have a hard endoskeleton made of hard bones. Another important feature of bony fish is their swim bladder. The swim bladder is a sac filled with air which the fish can inflate or deflate. By letting air in and out of the bladder, a fish can remain at any level in the water.

Papier-mache is an art form made by coating strips of newspaper with "art paste" solution. Mold the wet strips of newspaper over sculpting forms made from cardboard, crumpled newspaper and masking tape. Continue putting strips on the form until there are five or six layers. Models may be painted after paper-mache forms are dry.

TEACHING SUGGESTIONS: Prepare all materials before the class and try your hand at paper-mache modelling before attempting it with your class.

CONNECTIONS:

1). This project requires the use of math, language, social studies and science skills.

2). Compare fish caught off the United States with similar and different species caught by other peoples around the world.

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NAME: _____
DATE: _____
CLASS: _____

4. Can you Identify Florida's Salt Water Fish?

OBJECTIVE: To recognize South Florida's common salt water fish.

THE STUDENTS WILL:

1). Identify Florida's salt water fish.

2). Identify and name all fish fins.

3). Recognize all fish which have streamlined bodies.

COMPETENCIES: 6th - 8th Grades

SCHEDULE: 5 Class Periods

Day One: Construct sculpting form
Day Two & Three: Cover form with several layers of "art paste" coated paper strips.
Day Four: Paint base coats (make sure forms are dry)
Day Five: Paint details/Share with class

VOCABULARY:

paper-mache	fin	fish	sculpting form	pectoral
pelvic	dorsal	caudal	anal	

MATERIALS:

CONSUMABLE
art paste (15)
tempera paint quarts
- white (6-8 qts.)
- black (1-2 qts.)
- brown (1-2 qts.)
- green (1-2 qts.)
- red (1-2 qts.)
- blue (1-2 qts.)
- yellow (1-2 qts.)

1/2" masking tape (3)
cardboard needed for
- frame of fish (use old science fair boards or boxes)

foam pans from meat or fruit etc. to fill art paste and dip paper strips into.

NONCONSUMABLE
size 4 paint brushes (3)
3/4" paint brushes (3)
two-gallon bucket to mix art paste
scissors

**Approximate cost of 150 students is $75.00 or 50 cents each. (If money needs to be collected)

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Student Pages

NAME: _____
DATE: _____
CLASS: _____

BACKGROUND: Fish are cold blooded vertebrates belonging to the Cordate phylum. Fish are adapted to life underwater and take oxygen from the water through structures called gills. Fish reproduce by external fertilization and are found in both fresh and salt water.

Fish are divided into three classes: the jawless fish, the cartilaginous fish, and the bony fish. Bony fish have a hard endoskeleton made of hard bones. Another important feature of bony fish is their swim bladder. The swim bladder is a sac filled with air which the fish can inflate or deflate. By letting air in and out of the bladder, a fish can remain at any level in the water.

Papier-mache is an art form made by coating strips of newspaper with "art paste" solution. Mold the wet strips of newspaper over sculpting forms made from cardboard, crumpled newspaper and masking tape. Continue putting strips on the form until there are five or six layers. Models may be painted after paper-mache forms are dry.

PROCEDURE:

Day One
Construction of the Sculpting Form

1). Cut cardboard into the outline of the fish you wish to construct. The shape should include the dorsal fin, caudal fin, anal fin as well as the body shape. (Use "Fishing Lines Anglers Guide to Florida Marine Resources" for a pictorial guide.)

2). Build up your fish to proper thickness by taping crumpled newspaper to both sides of the cardboard cut-out.

3). Cut out cardboard pelvic and pectoral fins. Securely tape fins to fish body.

Day Two and Three
Cover Sculpting Form with Paper-Mache Strips.

1). Make 1 gallon of art paste in the 2-gallon bucket.

2). Pour art paste solution into student foam pans.

3). Tear (not cut) newspaper into strips about 1" by 12".

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NAME: _____
DATE: _____
CLASS: _____

4). Dip newspaper strips into art paste solution. Remove excess by running strip through two fingers. (Do this over foam pan)

5). Carefully mold paper-mache strips over sculpting form covering all open areas with 2 to 3 layers of wet strips.

6). Place in a clean, dry place to dry overnight.

7). Wash all reusable materials.
* Extra art paste solution may be stored overnight in a covered container.

Day Four
Painting Base Coats

1). Mix base color(s) of your fish in clean foam pan(s). Use mostly while adding only small amounts of colored tempera.

2). Paint on base coats using 3/4" flat brush. Repeat.

3). Place model in a clean, dry place to dry overnight.

4). Wash all brushes and foam pans.

Day Five
Painting Fine Details

1). Mix detail colors in clean foam pans. Only small amounts will be needed.

2). Using small pointed brush, paint on fine details such as scales, fin spines, eyes, brighter colors, etc.

3). Place model in a clean, dry place to dry overnight.

4). Wash all reusable materials. Share with the class.

ASSESSMENT: Graded Models

ENRICHMENT: Visit 1). Juno Beach State Park; 2). Sea World; 3). Disney Epcot Center "Living Seas".

Follow-Up Classroom Activity: Graph, analyze and discuss all data obtained on field experience.

Enrichment Project: Use "Surf Fishing Data Tables" and fill them out when you go surf fishing. Periodically analyze data, continue on-going research.

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NAME: _____
DATE: _____
CLASS: _____

LOCATION: _____

SURF FISHING DATA TABLE

FISH #	TIME	SPECIES	BAIT	LENGTH	WEIGHT

WEATHER CONDITIONS

AIR TEMPERATURE: _____
WATER TEMPERATURE _____
SURF CONDITIONS: _____
WIND SPEED: _____
CLOUD COVER (CIRCLE ONE): CLEAR PARTLY CLOUDY CLOUDY RAINY

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5. Friend or Foe?

OBJECTIVE: To familiarize the student with marine organisms and group them according to their danger to people.

THE STUDENTS WILL:

1). Identify marine organisms

2). Discuss which organisms are dangerous to humans

COMPETENCIES: Dade County CBC: Grades 6-9

SCHEDULE: Two or three class periods; a 1/2 day field trip

VOCABULARY:

predator	benthic	gill slits	prey
camouflage	dorsal	venomous	spinicles
lateral line			

MATERIALS:

handouts showing drawings of various marine organisms.
reference books
videos and slides

PREPARATION: Provide students with background about marine organisms that are dangerous to humans.

BACKGROUND: References: Dictionary of Sharks; National Geographic Videos "The Sharks", "Coral Reef",; Teacher personal slides.

TEACHING SUGGESTIONS: Preview the videos before you show them and be sure you can identify and discuss the organisms on the pre-test and post-test.

PROCEDURE:

Day One

1). Divide students into groups of 3-4 people.

2). Put vocabulary words on board and briefly discuss each word.

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3). Have the groups do the ID sheet as pre-test and discuss answers.

4). Show & discuss video on sharks and other dangerous predatory fish identification.

Day Two

1). Have the students move back into their groups

2). Show a coral reef video.

3). Discuss dangerous and poisonous invertebrate marine animals and bottom dwelling fish, their identification and presentation, and treatment of injuries.

Day Three

Take the students on field trip to beach or aquarium for observation of live marine animals.

CONNECTIONS:

Math: Use information in Fishing Lines "Angler's Guide to Florida's Marine Resources to graph comparison charts of selected fish.

Language Arts: Read stories of encounters with marine organisms

Social Studies: 1). Research beliefs of various cultures about marine animals ie: South Pacific peoples Shark God
2). Discuss how different peoples of the world use sharks as a resource for food, medicine, etc.

Ecology / Economics: Report on commercial shark fishing endangering many species of sharks because of over hunting.

SAFETY INFORMATION: Before field trip make sure you have enough chaperons and if you are snorkeling that the chaperons are adequate swimmers. Be sure the students can also swim. Have a maximum of 1 adult for every 4-5 students for water work and insist that the groups stay together with the chaperon all the time.

For an aquarium visit 1 adult to 10 students is recommended.

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NAME: _____
DATE: _____
CLASS: _____

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THE STUDENTS WILL:

1). Identify marine organisms

2). Discuss which organisms are dangerous to humans

COMPETENCIES: Dade County CBC: Grades 6-9

SCHEDULE: Two or three class periods; a 1/2 day field trip

VOCABULARY:

predator	benthic	gill slits	prey
camouflage	dorsal	venomous	spinicles
lateral line			

MATERIALS:

handouts showing drawings of various marine organisms.
reference books
videos and slides

PROCEDURE:

1). Use the Fishing Lines: "Angler's Guide to Florida Marine Resources," and other reference books, videos, and slides to identify the on the following identification sheet.

2). With the information from the reference books, rank each of the fish on a scale of 1 to 5 as to danger with 5 as the most dangerous.

3). Are the fish on the identification sheet important? If so, how? _____
_____
_____
_____
_____
_____

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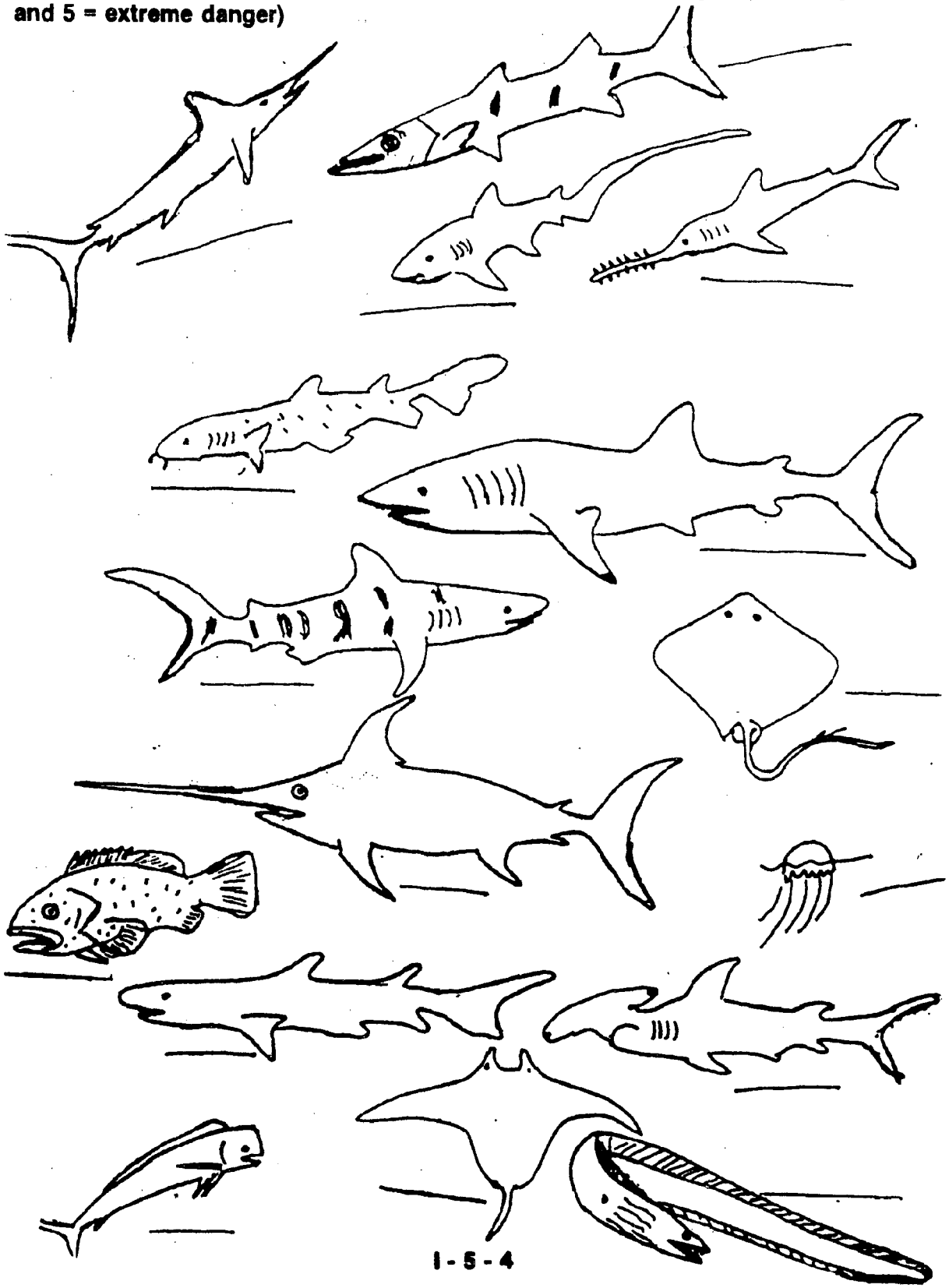
Student Pages

NAME: _____
DATE: _____
CLASS: _____

Name the organism and rank on a scale from 1 to 5 as to danger. (1 = dangerous and 5 = extreme danger)



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Student Pages

NAME: _____
DATE: _____
CLASS: _____

4). After snorkeling, or visiting the aquarium, describe your thoughts about one or all of the "dangerous" fish. _____

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

Draw or sketch what you saw:

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II. MANGROVE ESTUARINE ENVIRONMENTS

WHAT ROLE DO MANGROVES PLAY IN SOUTH FLORIDA'S ECOSYSTEM?

MANGROVE ECOLOGY

A Multicultural Perspective

MANGROVE METROPOLIS

A TASTE OF SALT

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6. What Role do Mangroves Play in South Florida's Ecosystem?

OBJECTIVE: To understand the role mangroves play in the South Florida ecosystems.

THE STUDENTS WILL:

1). Identify the three common species of mangrove trees be physical characteristics.

2). Observe that each species of mangrove is adapted to live in a specific salinity zone.

3). Locate the mangrove species which are predominant in zones formed by distance.

4). Identify organisms which compose the mangrove food pyramid and food web.

5). Understand the role mangroves play.

COMPETENCIES: Dade County CBC 6.400 7.400 8.400

SCHEDULE: 3-4 days

VOCABULARY:

freshwater	ecosystem	nursery	preamatophores
secrete	cycles	shoreline	elevation
extract	nutrients	rookeries	aerial root
exclude	salinity	prop-roots	propagation
absorption	attachment	propagules	elliptical
filter	swamp		

MATERIALS:

CONSUMABLE
3 types of mangrove leaves
Sample of decaying leaves and muck

NONCONSUMABLE
3 petri dishes/group
Slides and cover slips
Microscopes
Tweezers
Group copies of "Florida's Mangroves"
Turkey basters
Viewers

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PREPARATION:

1). Obtain a variety of books, films, videos, pamphlets, etc. on marine invertebrates and mangroves for class reference. Photograph mangrove communities and related organisms for slide presentation.

2). These activities are best performed at a mangrove site. If that is not possible, go to a local mangrove area to collect three types of mangrove leaves and a sample of decaying leaves and muck. Remember to consider class size when collecting . Check with local authorities about taking the samples before removing them from the site.

3). Have petri dishes, slides and cover slips, microscopes and/or viewers, tweezers, turkey basters on hand and divided into groups for easy student access.

4). Review water safety before the field experience.

5). Teach handling of marine organisms to prevent injury to the organism or student.

BACKGROUND: Three main species of trees are dominant in the mangrove forest along the South Florida shoreline. there include the red mangrove (Rhizophore mangle), the Black mangrove (Avicennia germinans), and white mangrove (Laguncularia racemosa). Through survival adaption, each species of mangrove tree lies in regions specific salinity range. Additionally, these trees are host to multitudes of organisms. The following activities are designed to help the students explore the mangrove swamps of South Florida.

TEACHER SUGGESTIONS:

ACTIVITY 1:

1). Divide the class into groups.

2). Give each team a sample of each mangrove leaf and a copy of "Florida's Mangroves" or other publication containing information about the three tree species and a graphic organizer.

3). After the activity, allow time for the students to share their results with others. You could use a transparency or the chalkboard in the format of the "Comparison of Mangroves" organizer to compile a class overview.

4). Note: These leaves can be dried (press between sheets of newspaper and place in a large book) for later use but may loose some of their color and will be more fragile unless they are mounted and laminated (glue on 100% rag paper and either cover with clear contact paper or use a heat laminating process).

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ACTIVITY 2:

1). Review food chains and pyramids.

2). Give the students the Dade County Environmental Story and ask them to turn to p. 15. (Or use another reference book with Mangrove information.)

3). Wrap up with class summary of the mangrove food pyramid. Again, the chalkboard or transparencies are helpful.

ACTIVITY 3:

1). Prepare your students for Mosquitoes and other insects that are commonly found in Mangrove areas.

2). Be sure to review water safety before reaching the shore and beginning this activity.

ACTIVITY 4:

1). This activity is best if performed on site. If that is not possible, collect the sample close to the same day you plan to do this activity since the organisms will not live indefinatly in containers. Also, remember that hot cars and closed containers are dangerous for living organisms.

2). If performed at the site, special care should be given to protect the microscope from mishaps. A good picnic table not far from the collection site would make a good working "Field Lab."

3). Remind the students that they will need to move their sample around to see all of the organisms present.

4). At the "Field Lab," extra resource guides placed among the microscopes will help the students to begin using characteristics to identify specific organisms. Additionally, this ready reference will help them view the adults along as learners also.

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CONNECTIONS:

Math - measuring distances of the mangrove trees, calculating average distance, and plotting graphs

Language - 1. Read the story The Wondrous World of the Mangroves Swamps by Katherine Orr.
2. Have the students write a descriptive paper or fictional story about the Mangrove site they visited.
3. Assign "Reporters" for the trip to document the trip with short articles, photos and, if possible, a short video covering the discoveries of their classmates or teams.

Social Studies - 1. Using data from the math zone measurements, develop a mangrove zonation map.
2. Research the affects of Hurricanes on Mangroves.
3. Research the interrelationships between town and city development and the survival of the Mangrove Swamp.
4. Help students form a "Coastal Clean-up" volunteer group to work in the Mangrove site visited by the team.

Art - Have the students create their own mangrove swamp art. (Drawings, Paintings, Photographs, Models, etc.)

FURTHER READING:

Dade County Environmental Story p. 15 (Teacher Resource)

The Wonderful World of the Mangrove Swamps of the Everglades and the Florida Keys by Katherine Orr (Student Book)

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NAME: _____
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CLASS: _____

6. What Role do Mangroves Play in South Florida's Ecosystem?

OBJECTIVE: To understand the role mangroves play in the South Florida ecosystems.

THE STUDENTS WILL:

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2). Observe that each species of mangrove is adapted to live in a specific salinity zone.

3). Locate the mangrove species which are predominant in zones formed by distance.

4). Identify organisms which compose the mangrove food pyramid and food web.

5). Understand the role mangroves play.

COMPETENCIES: Dade County CBC 6.400 7.400 8.400

SCHEDULE: 3-4 days

VOCABULARY:

freshwater	ecosystem	nursery	preamatophores
secrete	cycles	shoreline	elevation
extract	nutrients	rookeries	aerial root
exclude	salinity	prop-roots	propagation
absorption	attachment	propagules	elliptical
filter	swamp		

MATERIALS:

CONSUMABLE
3 types of mangrove leaves
Sample of decaying leaves and muck

NONCONSUMABLE
3 petri dishes/group
Slides and cover slips
Microscopes
Tweezers
Group copies of "Florida's Mangroves"
Turkey basters
Viewers

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NAME: _____
DATE: _____
CLASS: _____

ACTIVITY 1

COMPARISON OF MANGROVES

MATERIALS:

Samples of three types of mangrove leaves
"Florida's Mangroves"

PROCEDURE

1. Read the information in "Florida's Mangroves."
2. Study the leaves.
3. Complete the graphic organizer below.
4. Share information from groups and discuss differences.

HOW DIFFERENT?

RED MANGROVE	WHITE MANGROVE	BLACK MANGROVE	HOW ARE THEY DIFFERENT WITH REGARD TO
			LEAF/SEED CHARACTERISTICS
			TREE LOCATIONS (variations of salinity)
			TREE NAME/ CHARACTERISTICS (roots, trunk...)
			SALT EXTRACTOR OR EXCLUDER

HOW ALIKE?

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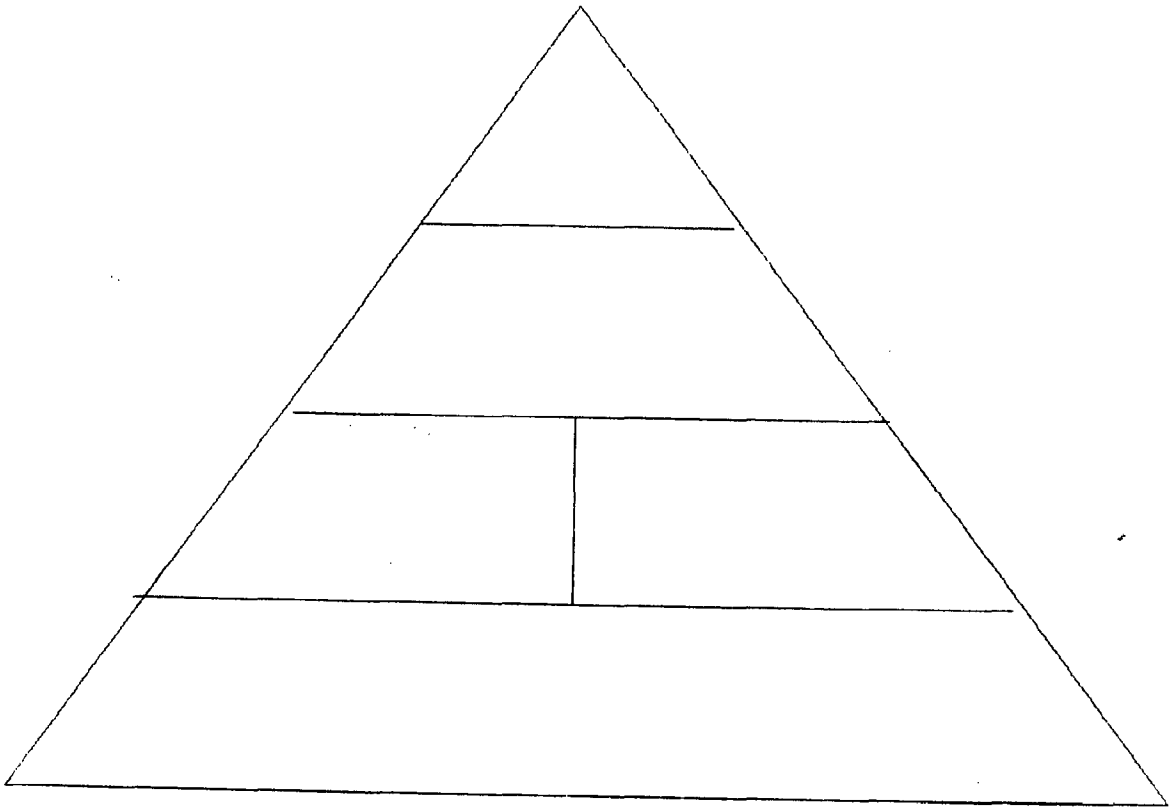
NAME: _____
DATE: _____
CLASS: _____

ACTIVITY 2

THE MANGROVE FOOD PYRAMID

1. Using the Dade County Environmental Story p.15 or another reference book, identify the components of the food web and food pyramid.

2. Construct a food pyramid or food chain using the organisms commonly found in Mangrove Swamps on the pyramid below. (Drawings with labels are helpful.)



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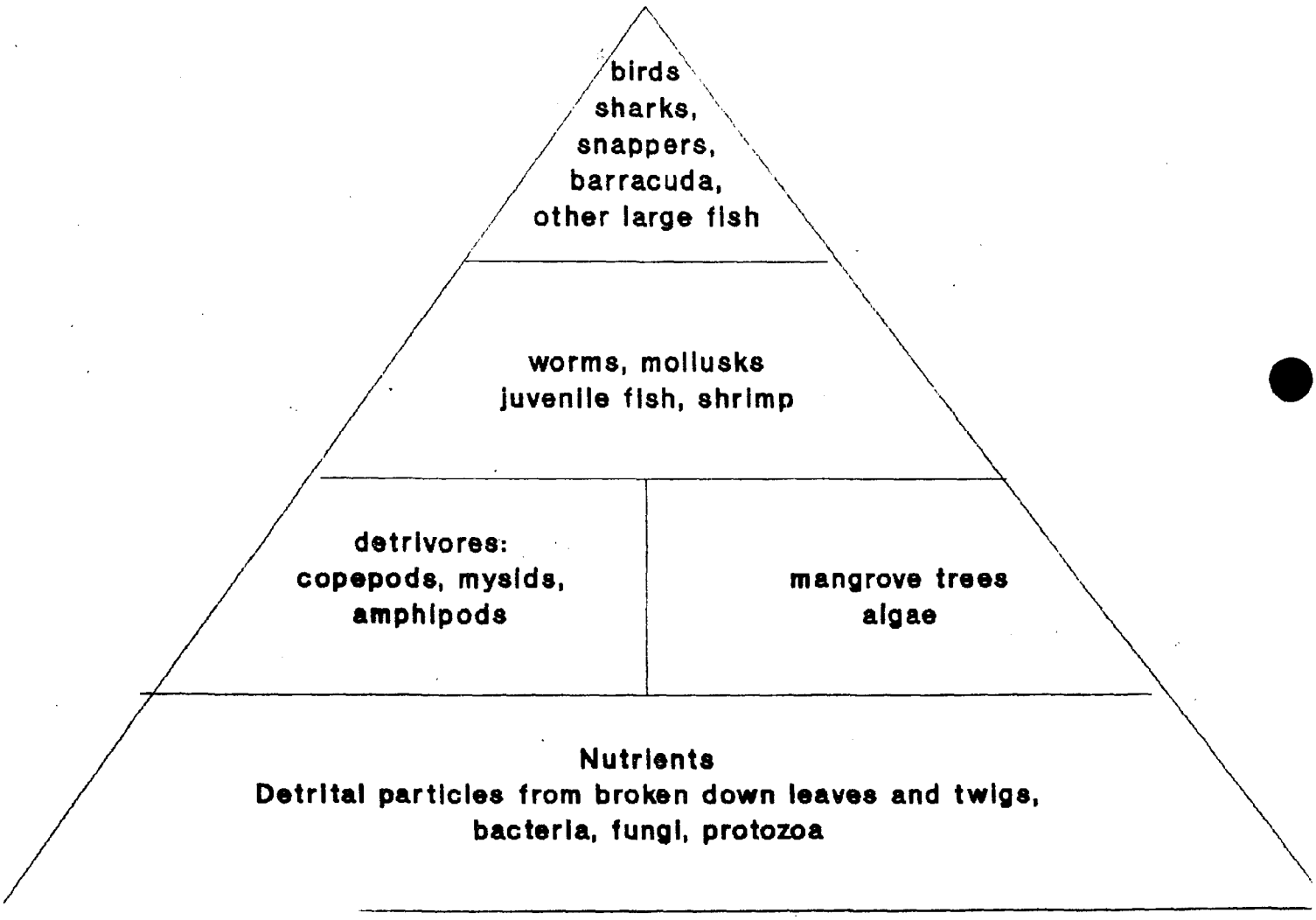

Student Sheets

NAME: _____
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ACTIVITY 3

A TRIP TO THE MANGROVE FOREST
- Graphing the Shoreline

MATERIALS

Data Table
Pencil
Graph Paper
Tape Measure or Meter Stick

PROCEDURE

1. Identify the difference between the three species of mangrove trees.
2. Locate 3 samples of each type.
3. Measure the distance between the trees and the shoreline and record the data on the table below.
4. Calculate the average distance of each species from the water.
5. Construct a graph that represents your findings and write some general conclusions about the mangrove species and their relative distance from shore.

DATA

Species 1

Tree A	Tree B	Tree C	
_____	_____	_____	AVERAGE DISTANCE = _____

Species 2

Tree D	Tree E	Tree F	
_____	_____	_____	AVERAGE DISTANCE = _____

Species 3

Tree G	Tree H	Tree I	
_____	_____	_____	AVERAGE DISTANCE = _____

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CLASS: _____

GRAPH

GENERAL CONCLUSIONS

_____
_____
_____
_____
_____
_____

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ACTIVITY 4

A TRIP TO THE MANGROVE FOREST -
What Organisms are Found in the
Mangrove Forest?

MATERIALS:

Detritus sample
Turkey Baster (for picking up water samples)
Slides and coverslips
Petri dish
Microscope,stereoscope, or viewer

PROCEDURE:

1. Using the turkey baster, put a sample of the detritus on a petri dish or viewer and observe.

2. Illustrate organisms in the circle below.

3. Using the tweezers, place a tiny sample of detritus on a slide and cover with a cover slip.

4. Observe under low, medium, and high power. (You may need to move the sample around to see any or all of the organisms. Illustrate the organisms you observe in the circles provided.

5. Using resource book and your own knowledge, try to name and label some of the organisms you observed.

6. Consider 3 of the organisms and come up with an answer for the following questions:

Does the organism have camouflage? Describe it.	A: _____
	B: _____
	C: _____
How do they get their food?	A: _____
	B: _____
	C: _____
Do they travel? How?	A: _____
	B: _____
	C: _____

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OBSERVATION DIAGRAMS

Low power

Medium Power

High Power

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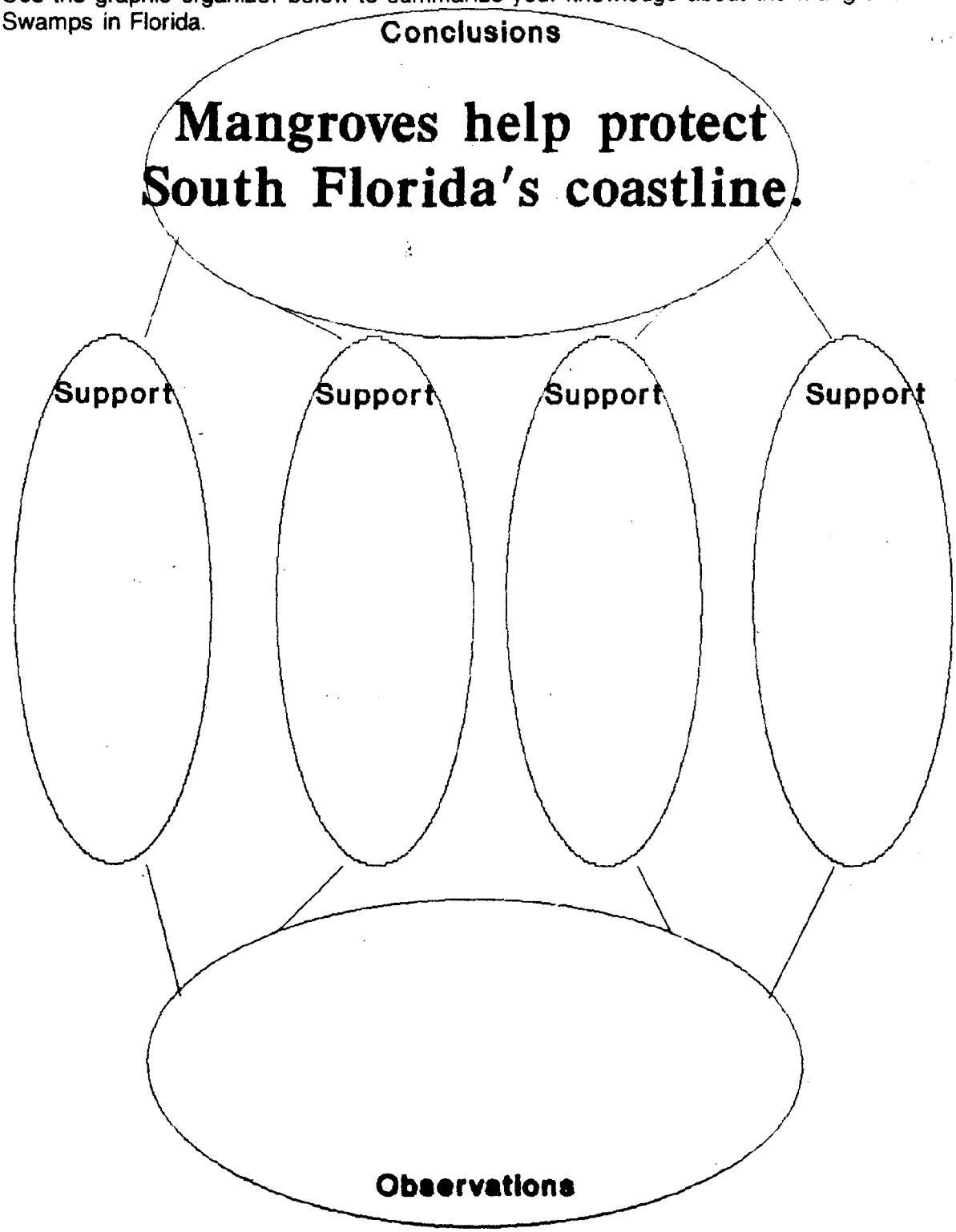
ASSUMPTIONS AND CONCLUSIONS

Use the graphic organizer below to summarize your knowledge about the Mangrove Swamps in Florida.



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CLEAN-UP:

Before leaving the Mangrove site, make sure that all samples are returned to their collection site.

FURTHER READING:

Dade County Environmental Story p. 15 (Teacher Resource)

The Wonderful World of the Mangrove Swamps of the Everglades and the Florida Keys by Katherine Orr (Student Book)

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7. Mangrove Ecology - A Multicultural Perspective

OBJECTIVE: To understand the interrelationships between the Mangrove ecosystem and the human inhabitants of South Florida.

THE STUDENTS WILL:

1). Use research techniques to investigate the history and sociology of the human ties to the Mangrove communities of South Florida.

2). Present their findings to the class through multimedia.

3). Understand the role mangroves play.

4). Discuss and recommend future directions to create a Ecological/Social balance in South Florida.

COMPETENCIES: Dade County CBC 6.400 7.400 8.400

SCHEDULE: 1-2 weeks

TEACHING SUGGESTIONS:

A). Have the students research and prepare Team (4-person) presentations on mangrove ecology and the importance of preserving mangrove communities using posterboards with graphics, transparencies or other media. Have the students include the following:

1). Discussion of Native Americans and their relationship with coastal mangrove ecology.

2). Caribbean connection - Importance and prevalence of mangrove communities throughout region in coastal habitats.

3). Issues of the fisheries, land development and South Florida population density.

B). Invite, or have students invite, guest speakers from the regions or industries that their presentation was based on.

C). Have the student teams recommend suggestions for creating a balance between the environmental needs and the social/industrial needs of South Florida.

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COMPETENCIES: Dade County CBC 6.400 7.400 8.400

SCHEDULE: 1-2 weeks

PROCEDURE

A). Research and prepare a Team (4-person) presentation on mangrove ecology and the importance of preserving mangrove communities using posterboards with graphics, transparencies or other media. Make sure that you include the following:

1). Discussion of Native Americans and their relationship with coastal mangrove ecology.

2). Caribbean connection - Importance and prevalence of mangrove communities throughout region in coastal habitats.

3). Issues of the fisheries, land development and South Florida population density.

B). Invite a guest speaker from the regions or industries that your presentation was based on. (Schedule the time/date with your teacher.)

C). Recommend, within your group or class, suggestions for creating a balance between the environmental needs and the social/industrial needs of South Florida.

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8. Mangrove Metropolis

OBJECTIVE: To learn about the importance of mangroves in our environment.

THE STUDENTS WILL:

1). observe the relationship of mangroves to the surrounding environment.

2). write a story that they will illustrate or act out that shows interactions of life on a mangrove "island".

3). Discover that "no man is an island"; nothing can exist alone; all living things are interrelated.

COMPETENCIES: 4 through 12

VOCABULARY:

banded tulip
black mangrove
fiddler crabs
great blue heron
great egret
mangrove crab
mollusk
needle fish
orb-weaving spiders
oysters
rhizophores
red mangrove
roseate spoonbill
tannin
tropics
sea squirts
sub-tropics

MATERIALS:

CONSUMABLE

art supplies
video tape (optional)
scavenger lists
white washed cotton fabric for testing tannin

NON-CONSUMABLE

video camera (optional)
clip board with pencil attached with a string
identification and reference books
binoculars
microscopic viewer

PREPARATION:

1). Read as much information as you can about the ecology of South Florida before beginning these activities. Mangrove Island by Marjory Bartlett Sanger is a great help. Tell the students that they are going to become an expert on whatever little bits of nature that they want to introduce into their stories. Even their families will be astonished about their knowledge.

2). Assign cooperative groups for both the classroom activities and for the field trip.

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BACKGROUND:

Mangroves build islands. At least, the red mangroves do. Scientists believe they first originated in West Africa but were beat out by more aggressive land plants. Fortunately, evolution equipped them to handle salt and designed seeds which can travel long distances. They float vertically upright with the root ends down. Passing over a sand bar, they will attach and grow. Mangroves require a great deal of rain in order to survive. Since all tropic regions have a rainy season, mangroves have developed leathery leaves designed to store moisture.

They belong to a group of plants called halophytes. This means "salt-plants." At the base of each leaf is an opening which permits the elimination of salt crystals. They can survive even when the salinity is very high. Most even seem to prefer it. some believe they might even receive nourishment from the salt.

The red mangrove or Rhizophora mangle is not the only mangrove found in Florida. There is also the white and black mangrove. Although totally unrelated, these two are also capable of surviving in a salty environment. Avicennia nitida, the black mangrove, belongs to the same family as teak. The wood of the black mangrove is not valuable but it does bear flowers that smell like honey and attract swarms of bees. Orb-weaving spiders spin their nets here to trap the bees. the white mangrove always grows more inland behind the black. Laguncularia racemosa does not bear live seeds or send up breathing roots.

These activities are designed to investigate the interrelationships of the organisms that live within the "Mangrove Metropolis."

CONNECTIONS: These activities are also designed to help the students see ties between all disciplines. Encourage your students to use all of their skills to learn more and create their best work.

ENRICHMENT: Your students may also enjoy collecting tracks and identifying them. If there is no appropriate place, create one by having sand hauled in beside a drainage area. Place a tablespoon of peanut butter on a plastic lid and bury the edges under the sand (to keep the lid from blowing away). Check for tracks the next morning. Have the students draw the tracks, try to identify it and then make a plaster cast. (Bird tracks do not easily make a good imprint.) When the cast is dry, remove from the sand and brush it off. This is great fun for the student and can be done easily.

FURTHER READING:

Anderson, Robert (1985) Guide to Florida Seashore Life, Erwin Lampert

Rezendes, Paul (1992) Tracking the Art of Seeing, Camden House Publishing,Inc., Charlotte, Vermont

Ricciuti, Edward R. (1982) The Peacemakers Guide, Doubleday & Company, Inc. Garden City, New York.

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3). Discover that "no man is an island"; nothing can exist alone; all living things are interrelated.

COMPETENCIES: 4 through 12

VOCABULARY:

banded tulip
black mangrove
fiddler crabs
great blue heron
great egret
mangrove crab
mollusk
needle fish
orb-weaving spiders
oysters
rhizophores
red mangrove
roseate spoonbill
tannin
tropics
sea squirts
sub-tropics

MATERIALS:

CONSUMABLE

art supplies
video tape (optional)
scavenger lists
white washed cotton fabric for testing tannin

NON-CONSUMABLE

video camera (optional)
clip board with pencil attached with a string
identification and reference books
binoculars
microscopic viewer

BACKGROUND:

Mangroves build islands. At least, the red mangroves do. Scientists believe they first originated in West Africa but were beat out by more aggressive land plants. Fortunately, evolution equipped them to handle salt and designed seeds which can travel long distances. They float vertically upright with the root ends down. Passing over a sand bar, they will attach and grow. Mangroves require a great deal of rain in order to survive. Since all tropic regions have a rainy season, mangroves have developed leathery leaves designed to store moisture.

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These activities are designed to investigate the interrelationships of the organisms that live within the "Mangrove Metropolis."

ACTIVITY 1

You will be going on a field trip to gather data. Before you go, read or listen to the story about how mangrove came to Florida - "Mangrove Metropolis." Our ancestors made up many stories to explain the nature around them. You will get a chance to continue the story after you have collected data and done research. At that time, your story can be illustrated or acted out to create a video for the class.

ACTIVITY 2

When you visit a mangrove swamp, carry a sketch pad and take notes about all that you see. Use the viewers and binoculars to see everything you can. You might even dip a piece of white cloth in the "muck" or detritus at the base of the mangroves to take a look at the effect of the tannins in the water.

ACTIVITY 3

Back in the classroom, extend your knowledge by choosing one organism you observed on the field trip to become an "expert on". Research the organism in the classroom and media center resources. Remember to include information on other areas beyond South Florida. When your research is complete, tie the information you found with "Mangrove Metropolis" or another story. Illustrate or act out your creation to help others understand how all living things are interconnected.

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DATE: _____
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Mangrove Metropolis

Long ago and far away, a very old tree stood on the shore of a sparking sea. His enemies had pushed him to the very water's edge. The tree planned secretly for years to save his children, to give them a place to grow free. The old father's roots dug deep in the sand. Small sea creatures whispered to him, telling their secrets, thanking him for protecting them in his branches. Year after year, the old tree planned. At last he was ready. He made boats for his children and sent them off from the shore with quiet whispers of love. The children in the bobbing cocoons whispered back. "We love you, too. We'll find homes, Father." The last little boat pleaded, "Father, let me stay with you." But, the bent old tree pushed his son gently into the outward tide. The young seedling cried until the waves gently cradled him to sleep.

For many months he traveled, only waking for short periods of time. All around him were the blue of sky and the blue of sea beneath his feet. Occasionally a sea creature could come close, wondering at the bobbing boat.

"Where are you going?" they would question.

"To find a land of my own," he would say.

"We understand," they always replied.

The seedling awakened one stormy night. All was black around him except when a flash of lightening pierced the dark sea. "Father, I'm scared," cried the seedling. No one answered. Father was too far away. The seedling huddled in his dark cocoon and rode the swelling waves. "I'm scared," he whispered to the waves.

Another voice answered back,"I'm scared, too."

"Who are you," asked the seedling.

"A friend," replied the voice.

The seedling felt himself entwined in seaweed. The voice even closer said, "Don't worry. We'll ride the storm together."

Throughout the cold dark night, the seedling and his friend talked quietly of sunny days and far off places. Finally, just before dawn, he slept.

Morning came. The sun warmed the little boat. Gentle lapping waters swirled around him but the boat no longer moved. The sun sparkled and the little seedling realized his roots were firmly attached in the sand. "I'm home," he sighed, "I'm home!"

"Well if you're home, then I must be home too," laughed a voice in his ear.

The seedling now saw the stranger from the long night before. A golden spider lay gleaming upon the debris caught around him.

"You mean you'll stay?" he said.

"Of course," said the spider, "But now I must rest."

The little seedling grew, spreading branches, and having children of his own. To each he told the story of the Father tree before he pushed them gently into the tide whispering words of love. The spider stayed. The seedling welcomed the black mangrove to shelter at his back. For this, the black mangrove, produced for him honey scented flowers. Here the spider and her children stayed spinning webs and catching all the bees that ventured in. They were joined by friends.....

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Student Sheets

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Notes:

FURTHER READING:

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9. A Taste of Salt

OBJECTIVE: To determine the effect of salinity on the growth of native dune plants.

THE STUDENTS WILL:

1). Research ocean salinity

2). Conduct salinity experiment

3). Illustrate observed growth changes.

COMPETENCIES: Dade CBC: Grades 6, 7 & 8

SCHEDULE: Initial start-up of one class period (50 minutes); Observe growth time: 9 weeks; To observe: 1 class period to discuss results and support reasons for outcome.

VOCABULARY:

salinity	reef	sea oats	salinity tester

MATERIALS:

CONSUMABLE	**NONCONSUMABLE**
grass seed	2 beakers
box salt	7 pots (cardboard root pots, usually free)
water	sand
	triple balance beam
salinity tester (purchase through commercial vendor ie: Carolina Biological)	

PREPARATION: Provide students with background about the salinity of ocean water (by research or by testing actual water from the ocean).

BACKGROUND: Sea Oats and related grasses have made special adaptions to living in a salt rich coastal environment.

TEACHING SUGGESTIONS: Since it is illegal to collect sea oats, the in-class experiment will use grass which is a relative of the sea oats. Other native plants can also be used if purchased from a nursery. (Some common dune plants are: Sea Grape, Rail Road Vine, Inkberry, Seacoast Marsh Elder, Golden Creeper and Bay Cedar)

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PROCEDURE:

1). Plant grass seeds in the seven pots filled with sand. Number the pots.

2). Prepare 120 ml of salt water which has the same salinity as the ocean water. Pour 20 ml of this solution into pot #1.

3). Divide the remaining water into 2 beakers.

4). Place the salinity tester in one beaker and set the other beaker aside.

5). Add water to the beaker until the salinity is 50% less than the original. Pour 20 ml of this solution into pot #2.

6). Place the salinity tester back into the beaker and add water until the salinity is 50% less than pot #2. Pour 20 ml of this solution into pot #3.

7). Continue diluting and watering each successive pot until all are prepared.

8). Observe.

9). Water as needed with saline water. (Remember to always water each pot with water that has the same salinity as the water you put in the first time.)

10). Record, graph and illustrate the growth of the grass.

11). Field Experiment: Check salinity of water in areas where there are sea oats and where there aren't any.

CONNECTIONS:

Math: Expect the students to use their math skills by:

1). producing solutions that are the same salinity as the ocean water,
2). performing the dilutions themselves,
3). creating their own growth graphs

Language Arts: Have the students research and report on changes in the protection of dunes areas.

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Fine Arts: Observational diagrams will help the students remember the changes that occurred over the growth period.

Social Studies/Economics: Debate the issue of home and business beach front construction on top of the dunes as compared to construction with boardwalks behind the dunes.

FURTHER READING:

Workman, Richard W. (1980) Growing Native: Native Plants for Landscape Use in Coastal South Florida, Sanibel-Captiva Conservation Foundation, Inc.

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NAME: _____
DATE: _____
CLASS: _____

9. A Taste of Salt

OBJECTIVE: To determine the effect of salinity on the growth of native dune plants.

THE STUDENTS WILL:

1). Research ocean salinity

2). Conduct salinity experiment

3). Illustrate observed growth changes.

COMPETENCIES: Dade CBC: Grades 6, 7 & 8

SCHEDULE: Initial start-up of one class period (50 minutes); Observe growth time: 9 weeks; To observe: 1 class period to discuss results and support reasons for outcome.

VOCABULARY:

salinity reef sea oats salinity tester

MATERIALS:

CONSUMABLE	NONCONSUMABLE
grass seed	2 beakers
box salt	7 pots (cardboard root pots, usually free)
water	sand
	triple balance beam
salinity tester (purchase through commercial vendor ie: Carolina Biological)	

PREPARATION: Provide students with background about the salinity of ocean water (by research or by testing actual water from the ocean).

BACKGROUND: Sea Oats and related grasses have made special adaptions to living in a salt rich coastal environment. Since it is illegal to collect sea oats, the in-class experiment will use grass which is a relative of the sea oats. Other native plants can also be used if purchased from a nursery. (Some common dune plants are: Sea Grape, Rail Road Vine, Inkberry, Seacoast Marsh Elder, Golden Creeper and Bay Cedar)

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NAME: _____
DATE: _____
CLASS: _____

PROCEDURE:

1). Plant grass seeds in the seven pots filled with sand. Number the pots.

2). Prepare 120 ml of salt water which has the same salinity as the ocean water. Pour 20 ml of this solution into pot #1.

3). Divide the remaining water into 2 beakers.

4). Place the salinity tester in one beaker and set the other beaker aside.

5). Add water to the beaker until the salinity is 50% less than the original. Pour 20 ml of this solution into pot #2.

6). Place the salinity tester back into the beaker and add water until the salinity is 50% less than pot #2. Pour 20 ml of this solution into pot #3.

7). Continue diluting and watering each successive pot until all are prepared.

8). Observe.

9). Water as needed with saline water. (Remember to always water each pot with water that has the same salinity as the water you put in the first time.)

10). Record, graph and illustrate the growth of the grass.

11). Field Experiment: Check salinity of water in areas where there are sea oats and where there aren't any.

FURTHER READING:

Workman, Richard W. (1980) Growing Native: Native Plants for Landscape Use in Coastal South Florida, Sanibel-Captiva Conservation Foundation, Inc.

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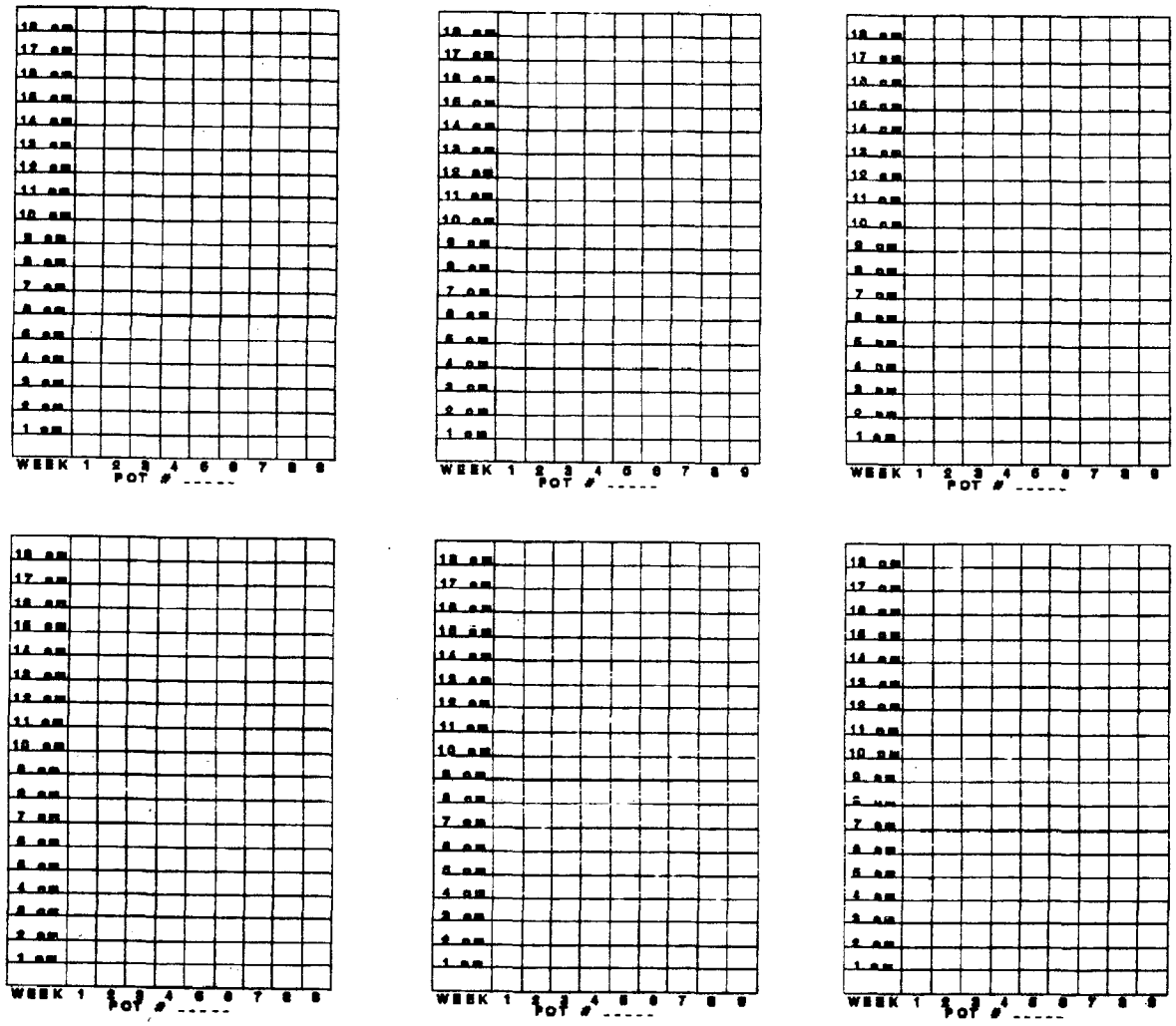
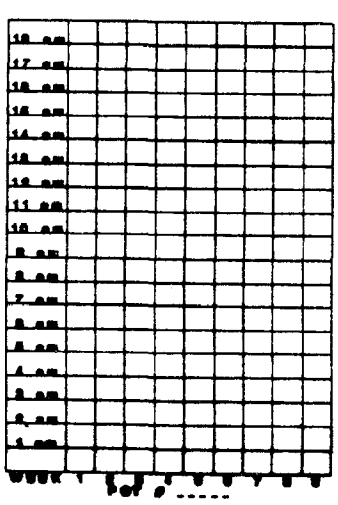
NAME: _____
DATE: _____
CLASS: _____

Use the chart below to construct a growth graph for each pot and draw a sketch of all the pots each week.





WEEK 1 WEEK 4 WEEK 7

WEEK 2 WEEK 5 WEEK 8

WEEK 3 WEEK 6 WEEK 9

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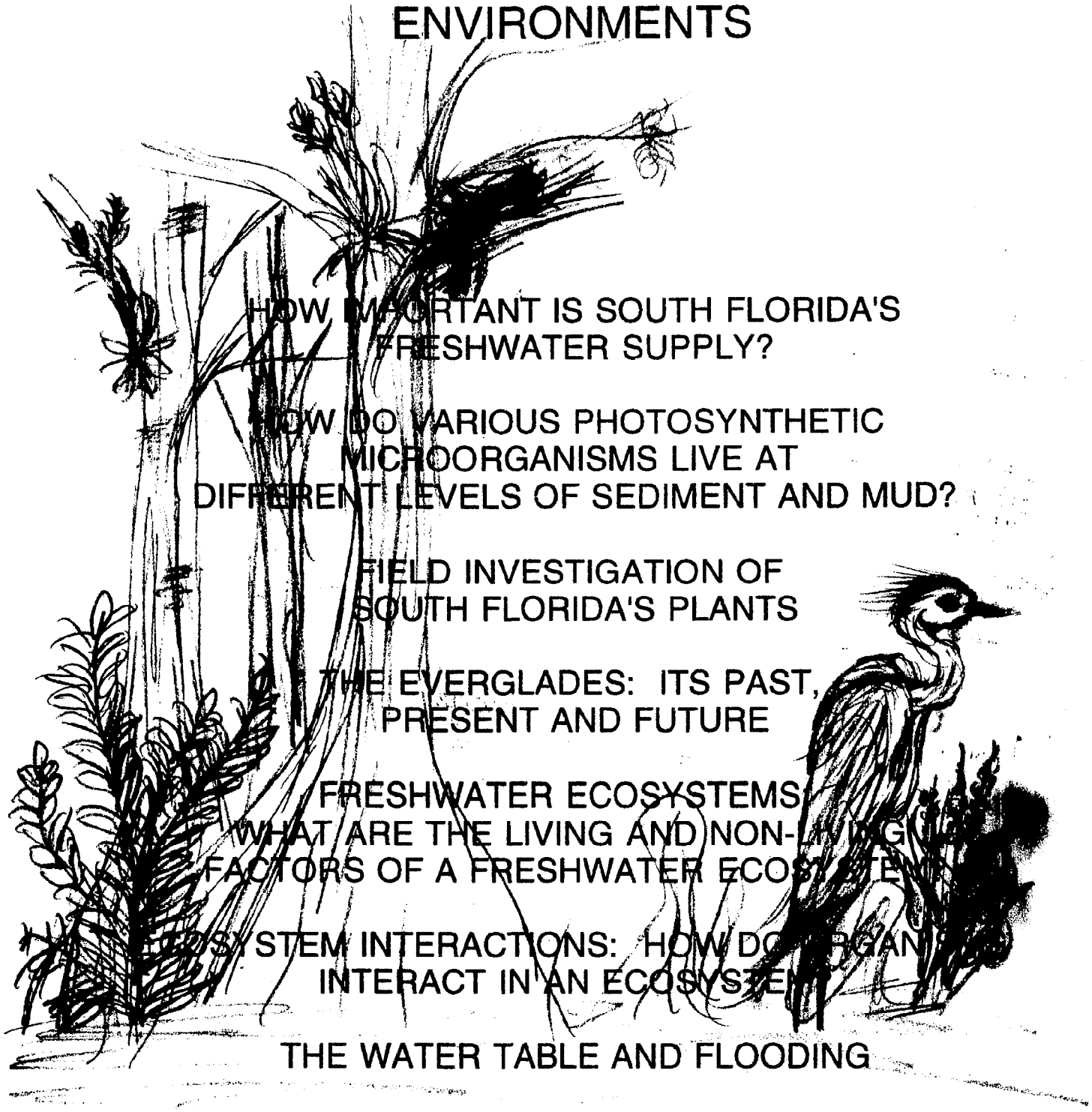
III. AQUATIC WETLAND ENVIRONMENTS



HOW IMPORTANT IS SOUTH FLORIDA'S FRESHWATER SUPPLY?

HOW DO VARIOUS PHOTOSYNTHETIC MICROORGANISMS LIVE AT DIFFERENT LEVELS OF SEDIMENT AND MUD?

FIELD INVESTIGATION OF SOUTH FLORIDA'S PLANTS

THE EVERGLADES: ITS PAST, PRESENT AND FUTURE

FRESHWATER ECOSYSTEMS: WHAT ARE THE LIVING AND NON-LIVING FACTORS OF A FRESHWATER ECOSYSTEM?

ECOSYSTEM INTERACTIONS: HOW DO ORGANISMS INTERACT IN AN ECOSYSTEM?

THE WATER TABLE AND FLOODING

FLORIDA'S GREATEST WETLANDS: THE EVERGLADES

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10. How Important is South Florida's Fresh Water Supply?

OBJECTIVE: To investigate the water cycle of South Florida as the basis of a healthy environment.

THE STUDENTS WILL:

1). Investigate the importance of water to our daily lives and environment.

2). Identify the biotic (living) and non-living(abiotic) factors in a freshwater ecosystem.

3). Explain the interactions between biotic and abiotic factors in a freshwater ecosystem.

4). Identify the niche and habitat of the living components of the ecosystem.

5). Compare the impact of several environmental disasters to the potential impact of a similar accident in South Florida.

6). Apply the consequences of improper water usage to an action plan to reduce their own water consumption and prevent contamination of freshwater ecosystems.

COMPETENCIES: Dade CBC

SCHEDULE: It could be developed into a two-week multidisciplinary module.

VOCABULARY:

Abiotic
Aquifer
Biotic
Condensation
Consequence
Consumer
Contaminated
Cycle
Decomposer
Ecology
Ecosystem
Endangered
Environment
Estuary
Evaporation
Foodchain
Foodweb
Habitat
Impact
Niche
Percolation
Phytoplankton
Pollution
Precipitation
Producer
Reservoir
Seepage
Transpiration
Universal pH paper
Vapor
Wetland
Wildlife

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MATERIALS:

CONSUMABLES	**NONCONSUMABLE**
Electrical Tape	2 equal size small glass jars
Ice	Graduated Cylinder or measuring cup
Colored Pencils	Plastic Bucket (white if possible)
Water	Net for dipping
Motor Oil	Pond Life field guides
Baby diaper lining	Microscope
	Slides and coverslips
	Dropper
	Thermometer
	Shallow aluminum pan
	Small ruler

PREPARATION:

1. Visit the school Media Center and secure copies of reference materials that relate to the life found in freshwater, historical information on the importance of the water flow in South Florida, and articles on recent environmental disasters that have impacted regional biomes (oil spills, chemical spills, urban development, etc.)

2. Have students begin collecting, reading and sharing newspaper and magazine articles on water and how it affects their lives.

3. If you plan to visit a site away from school to perform the field activities, contact the site(s) **early**. Many such resources become booked early in the school year.

4. Review water safety and care of handling living things before the field experience.

BACKGROUND: Since water is a very important and fragile component of South Florida's ecosystem, we need to teach our children about our aquatic environment, in terms of its quality and preservation; thus, enabling them to make informed choices about their activities and impact on an ecosystem.

TEACHER SUGGESTIONS:

ACTIVITY 1

1. About 2 weeks before beginning the unit, ask students to bring in current events related to South Florida's water (weather reports included - this could lead into weather, Hurricane tracking, etc.). Methods for sharing current events are numerous.

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The purpose for sharing with each other about their articles is to get them to think about where water comes from, how it is used, and how precious it is before the actual water activities begin.

2. Before assigning Activity 1, begin a chart of all of the ways water is used in the articles and brainstorm ways students might use water at home.

3. Emphasize that they don't have to measure every cup of water they put into a bathtub or sink but they can take a measurement of the rate of water flow and time themselves for a given activity.

4. Posting a class average of water use will help the students compare their use with others.

ACTIVITY 2

1. This activity is designed to help students understand the nature of the water cycle. A variety of additional water cycle activities can be found in An Activity Guide for Teachers: Everglades National Park.

2. In terms of sharing and discovery, make sure that the groups working on this are small (2-3 people).

ACTIVITY 3

1. Scheduling freshwater biome sites for this activity should begin early in the school year. Make sure that you have all of the proper paperwork together well in advance .

2. Forewarn parents that the students might get wet and dirty while on the trip. Extra chaperons are also helpful.

3. Review water safety and organism handling before arriving at the site.

4. Group materials such as thermometers, pH paper and hand lenses assembled into "kits" for each group to be responsible for helps avoid confusion when at the site.

5. Make bulletin board space available for sketches of the ecosystem and organisms.

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ACTIVITY 4

1. The lining of Ultra baby diapers are made of a "Super Soaker" similar to the absorptive materials used to clean up oil spills with. The students should observe its properties before being informed that this material could be used for this purpose.

2. At the end of the lab, the lining material should not be washed down the drain. Neither should the oil.

ACTIVITY 5

1. Distribute the "I promise..." sheets and ask the students to consider the knowledge they've gained and to write one promise that they can keep to save our freshwater ecosystems.

2. Display of the student's drawings and promises helps promote "positive peer pressure" help the students encourage one another. Use these to create a beautiful and meaningful bulletin board. (Or, have them cut out the drops and glue them to blue paper and hang them from the ceiling.)

3. Teacher participation also may facilitate and encourage the students to continue their promise.

CONNECTIONS

Math - 1. Converting temperature measurements
2. Calculating average temperature
3. Graphing the spread of oil across still water

Language - 1. Read historical information about the South Florida water supply and manmade changes in the flow of water that comes into the area.
2. Research and discussion about disasters such as the Valdez.
3. Written response to "I promise..."

Social Studies - 1. Discuss, describe, and write about changes that have taken place as a result of the mix of different people and culture (eg. social, political, environmental and economic changes) in this region and how it might affect the aqatic environment.
2. Create an environment of "Positive Peer Pressure" with the "I promise ..." bulletin board. Allow students (friends and parents) outside the class to add their promises too. This could even extend into a school effort, even possibly a regional effort!

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Science - 1. Observation
2. Collection and identification of organisms.
3. Data Collection and analysis.

Art/Music - 1. Creation of "Life I found..." pictures and "I promise..." bulletin board
2. On the field trip, students may want to carry cameras. If they are interested, consider the inclusion of their photos on the bulletin board, in a school newspaper, or in a yearbook.
3. South Florida has so many cultures, consider playing a variety of prescreened selections while the students are researching, writing, drawing, or participating in classroom lab activities. Students may have some discussion of the origin of the style of music particularly if it has origins in their ethnic background. Sounds of nature tapes may also add additional interests.

ADDITIONAL INFORMATION/CROSS REFERENCES

An Activity Guide for Teachers: Everglades National Park is an invaluable resource that contains a number of extensions and activities related to South Florida's water resources and ecosystems. It is available through Everglades National Park, P.O. Box 279 Homestead, Florida

Miami Herald: issue dates March 25-27, 1989 (Exxon Valdez oil spill)

National Geographic Special Edition: Water the Power, Promise, and Turmoil of North America's Freshwater November 1993

"South Florida Water: Paying the Price" National Geographic July 1990.

"The Exxon Valdez Disaster" Nova Video Tapes

Pond Life: A Guide to Common Plants and Animals of North American Ponds and Lakes, Reid, G. 1987 Golden Press. New York, 160 p.

The Dade County Environmental Story and
The Nature of Dade County: A Hometown Handbook are available through
Environmental Information Service of Friends of the Everglades
3744 Stewart Avenue, Miami, Florida 33133 (305) 888-1230

The Voyage of the MIMI: Ecosystem with Island Survivors , 1985, Sunburst Communications, Inc. 76p.

Water Information Phone Numbers (source: National Geographic Society):
American Ground Water Trust: 1-800-423-7748
U.S. Environmental Protection Agency: 202-260-2090
U.S. Department of Agriculture Soil Conservation Service: 1-800-THE-SOIL

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Student Sheets

NAME: _____
DATE: _____
PERIOD: _____

10. How Important is South Florida's Fresh Water Supply?

OBJECTIVE: To investigate the water cycle of South Florida as the basis of a healthy environment.

THE STUDENTS WILL:

1). Investigate the importance of water to our daily lives and environment.

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5). Compare the impact of several environmental disasters to the potential impact of a similar accident in South Florida.

6). Apply the consequences of improper water usage to an action plan to reduce their own water consumption and prevent contamination of freshwater ecosystems.

COMPETENCIES: Dade CBC

SCHEDULE: It could be developed into a two-week multidisciplinary module.

VOCABULARY:

Abiotic	Endangered	Pollution
Aquifer	Environment	Precipitation
Biotic	Estuary	Producer
Condensation	Evaporation	Reservoir
Consequence	Foodchain	Seepage
Consumer	Foodweb	Transpiration
Contaminated	Habitat	Universal pH paper
Cycle	Impact	Vapor
Decomposer	Niche	Wetland
Ecology	Percolation	Wildlife
Ecosystem	Phytoplankton	

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Student Sheets

NAME: _____
DATE: _____
PERIOD: _____

ACTIVITY 1 - WATER USE

BACKGROUND INFORMATION

Human beings require a minimum of 2.4 liters (about 2/3 gallon) of water per day to sustain life. However, the average American uses about 100 times more water than this everyday at home. People drink or use for cooking only a tiny portion of the water entering their homes, less that 4 liters (less than a gallon) per person per day. The rest of the water is used for washing, cleaning, and removing waste.

In this activity, your class is going to compare the amount of water they use for two activities: brushing their teeth and bathing.

MATERIALS

Large bucket
Measuring cup
Watch with a second hand
Pen or pencil

PROCEDURE

1. At home, place a large container under the faucet in your bathtub. While timing, turn the water on and allow it to run until the container is filled. Record the time below.

2. Measure the amount of water in the large container. Record the volume below.

3. Repeat steps 1 and 2 two more times.

4. Calculate the rate of water flow for the bath tub for each trial. (Divide volume by time.) Average the three. (Add the flow rate for the three trials and divide by 3.) This is the average water flow rate.

5. Repeat steps 1-4 with the sink.

6. When you take your bath, shower, or brush your teeth, time yourself, record it in the table below, and then calculate the amount of water you used. (Multiply the average flow rate by the time the water ran.)

7. Share your results with the rest of the class and answer the questions.

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Student Sheets

NAME: _____
DATE: _____
PERIOD: _____

DATA

	Bathtub Trial 1	Trial 2	Trial 3	Sink Trial 1	Trial 2	Trial 3
Volume	____	____	____	____	____	____
Time	____	____	____	____	____	____
Flow rate	____	____	____	____	____	____

Bathtub
Average flow rate = _____

Length of bath or shower = _____

Water used in 1 bath = _____

Sink
Average flow rate = _____

Time running water = _____

Water used in brushing teeth = _____

QUESTIONS AND CONCLUSIONS

1. After comparing with your classmates, what can you conclude about the water you use to take a bath and to brush your teeth?

_____
_____
_____
_____

2. What are some other ways we can conserve our household and school freshwater supplies?

_____
_____
_____
_____

3. Where does the water we use come from?

_____

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Student Sheets

NAME: _____
DATE: _____
PERIOD: _____

ACTIVITY 2

THE WATER CYCLE

BACKGROUND INFORMATION

The word "cycle" means a complete circle, or to end up where you started. The drinking water from your kitchen faucet and the ocean water in which you swim are part o the "Water Cycle". the water cycle occurs in three basic steps: precipitation, evaporation and condensation.

Water can take the form of rain, snow, or ice. When precipitation occurs, or water falls to the ground, some of it will run into lakes, wetlands, or other reservoirs. A reservoir is a place where water is stored. A wetland is an area where the soil is soaked most of the time.

Percolation, or water sinking into the earth, occurs until it reaches a natural underground storage area called an aquifer. Some of the rain water will also run into the ocean, where this fresh water mixes with the ocean's saltwater and an estuary is formed.

The second step of the water cycle is evaporation, which is a change in water from a liquid to a vapor (moist gas). When plants give off vapors, the process is called transpiration. Water vapor travels into the atmosphere through evaporation and transpiration.

As the atmosphere becomes saturated with water, condensation and then precipitation occurs. (Condensation is when vapor turns into liquid.)- and our cycle continues...and continues...and continues.

In this activity, you'll make your own water cycle!

MATERIALS

Two equal-sized baby food jars, no covers
Electrical Tape
Ice
Graduated cylinder or small measuring cup
4 milliliters of water

PROCEDURE

1. Create a condensation chamber by placing four milliliters of water in one jar.

2. Invert the other jar and tape both jars together mouth to mouth.

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NAME: _____
DATE: _____
PERIOD: _____

3. Place the chamber in a warm sunny location. Describe the changes you se
   What forms on the sides of the jars? _____

   How does it get there?

   _____

   _____

4. Place an ice cube on top of the chamber and describe the changes you see.

   What effect does the ice cube have on the chamber?

_____

_____

CONCLUSIONS

How is this experiment like the water cycle?

_____

_____

When does the water cycle stop? (or does it?)Explain.

_____

_____

_____

_____

Draw the water cycle below and label the steps.

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Student Sheets

NAME: _____
DATE: _____
PERIOD: _____

ACTIVITY 3 - A VISIT TO A FRESHWATER ECOSYSTEM

MATERIALS

Colored Pencils
Thermometer
Universal pH paper
Hand lens
Net for dipping
Large white bucket
Pond Life Field Guide
Small Plastic container with a lid
Medicine Dropper
Slides
Cover slips
Microscope
Water sample

PROCEDURE

1. Draw a sketch of the freshwater area on the "Water Drop" page.

2. Measure the temperature of the water _____

How might temperature effect life in this area?

_____

_____

_____

_____

3. Using a small strip of universal pH paper, touch the water with the strip and then compare the color that forms with the appropriate pH. _____
(7 is neutral, numbers below 7 are acidic and numbers above 7 are basic)

How might pH effect life in this area?

_____

_____

_____

_____

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NAME: _____
DATE: _____
PERIOD: _____

4. Gently dip the net in the pond. Carefully place any organisms in the bucket. Try to identify them (use the field guide if needed) and share your findings with your classmates. List or describe the special organisms you find. **Return all organisms to the water**:

_____
_____
_____
_____

5. Collect a water sample to look at under the microscope when back in the class. To do this, make sure that you collect it from below the surface.

6. Back in the classroom, place a drop of the collected water on a slide and cover with a coverslip. Look for any organisms. Draw them and try to name them on the "Life I Found..." sheet.

CONCLUSIONS

Even though the water in the ecosystem you visited is not being used for human consumption, how might areas like this be important to life in South Florida both now and in the past?

_____
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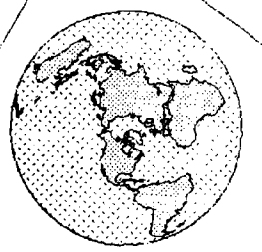
Student Sheets

NAME: _____
DATE: _____
PERIOD: _____

WATER DROP



A VIEW OF _____

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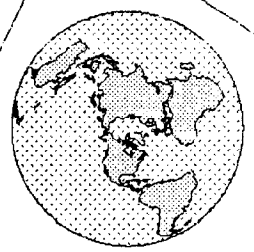
NAME: _____
DATE: _____
PERIOD: _____

LIFE I FOUND



LIFE I FOUND IN A DROP OF FRESHWATER THAT CAME FROM _____

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Student Sheets

NAME: _____
DATE: _____
PERIOD: _____

ACTIVITY 4 - OIL SPILL AND CLEAN UP

MATERIALS

Shallow pan
Water
Medicine dropper
Small amount of oil
Ruler
Baby diaper lining (about the size of three cotton balls)

PROCEDURE

1. Pour water into shallow pan (cover bottom)

2. Get a small amount of oil in a dropper. Drop 1 drop on the surface of the water.

3. Measure the diameter of the drop and record below.

4. Add another drop, measure its diameter, and record below. Continue until 10 drops have been added.

What happens as the drops are added?

_____
_____
_____

5. Lay the baby diaper lining on top of the oil drop. Leave it for about 30 seconds and then remove it. What happened?

_____
_____
_____
_____

6. Place the baby diaper material in the trash and pour the rest of the water down the drain.

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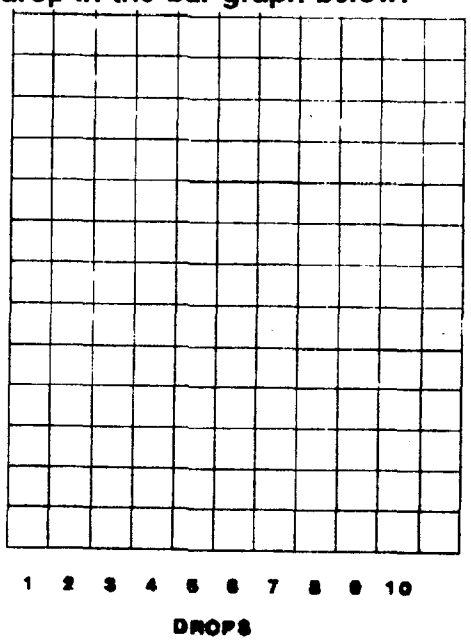
Student Sheets

NAME: _____
DATE: _____
PERIOD: _____

DATA

Trial	# of Drops	Diameter of Drop
A	1	_____
B	2	_____
C	3	_____
D	4	_____
E	5	_____
F	6	_____
G	7	_____
H	8	_____
I	9	_____
J	10	_____

Graph the spread of the drop in the bar graph below:



CONCLUSIONS

1. Why is it so important to stop an oil spill as soon as possible, if one occurs?

_____

2. Other than "Super Soakers," what are some other ways to clean up oil spills?

_____
_____
_____

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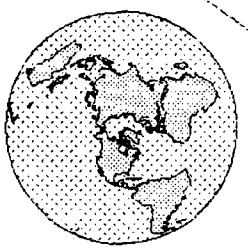
Student Sheets

NAME: _____
DATE: _____
PERIOD: _____

ACTIVITY 5 - Consider the knowledge you've gained and write one promise that you can keep to help save our freshwater ecosystems.



I PROMISE TO SAVE OUR FRESHWATER ECOSYSTEMS BY...

_____
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11. How Do Various Photosynthetic Microorganisms Live at Different Levels of Sediment and Mud?

OBJECTIVE: To explore microscopic life in bottom sediment.

THE STUDENTS WILL:

1). Collect mud and sediments from various South Florida sources.

2). Create a raised core sample and supply the conditions necessary to grow and display microbial organisms living in different layers and regions.

3). Investigate the seen and unseen living organisms found in sediments and mud.

4). Determine the important roles living organisms found in mud and sediments play in the natural world.

5). Keep a scientific log of observations over a period of time.

6). Research and compare theories about the origination and maintenance of the microbial world.

7). Investigate the effects of restoration of the sheet flow in the Everglades on the microscopic environment.

COMPETENCIES: Grades 4 through 12

SCHEDULE: Variable. It could be developed into a two week multidisciplinary module.

VOCABULARY:

aerobic zone
anaerobic zone
bacteria
cyanobacteria
fungi
hydrogen sulfide gas
microaerophillic zone
oxygen gradient
photosynthesis
sulfur gradient
translucent
wavelength (visible light)
Winogradsky column

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MATERIALS:

CONSUMABLE	NONCONSUMABLE
Transparent container (soft-drink bottle) at least 15 cm tall	Slides and cover slips
Large bucket of soil, mud or sand	Pipet or long medicine dropper
Water - from the region where the soil was collected (sea water if it is a marine environment)	Hand lens
Quick food source - hard boiled egg yolks, an entire raw egg, or cheese and powdered calcium sulphate	Microscope
Carbon source - shredded newspaper, calcium carbonate (lime), chalk dust, or plaster of Paris	Small rulers
Brown paper to surround the container between observations	Colored pencils
Plastic wrap to cover the top	

PREPARATION:

1. Ask students to collect and bring in the following:
   a. their own soft drink bottle
   b. a sample of soil, mud, or sand
   c. a water sample from the region around the soil sample site
   d. a description of the collection region

   (Collect several samples for yourself - or anyone who might not have theirs.)

2. Have a variety of resource books on microorganisms available for the students to use for reference. A class trip to the library for resource investigations may be helpful. If possible, obtain and have students read copies of "Life in a Teaspoon of Soil" by Shirley Foster Fields, Science Scope, volume 16, No. 5, February 1993.

3. Before beginning Activity 1, prepare the classroom for working with messy materials or plan to work outside. Students will want to wash their hands when their columns are complete.

BACKGROUND:

Have you ever stopped to wonder what soil is and where it comes from? Soil isn't "dirt cheap." It's precious and vital to life on earth. Without soil, most plants could not grow on the land. Without plants, no animals would survive.

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Soil covers most of the earth's land surface. It ranges in thickness from a few millimeters to a few meters. Many times soil has layers: topsoil, subsoil, and parent rock. Topsoil is a mixture of small grains of rock and the decayed matter of plants and animals. It is formed slowly as the remains of plant and animal life decay. The decayed matter combines with small rock particles for form dark soil called humus. Humus supplies the essential chemicals that plans need to grow. Because it is spongy, humus stores water. It can hold 600 times its own weight in water. Humus also contains air spaces which allow air and water to reach plant roots.

Vital to the formation of soil is the role played by decomposers. These organisms, the bacteria and fungi in soil, break down dead plants and animals into simple chemicals substances which become the nutrients needed by growing plants. It is the kind of bacterial that live at different leaves that we will focus our attention on as we investigate how the various photosynthetic microorganisms live in soil and sediment. The microbial organisms that live at different levels in soil and sediments live there because conditions vary at different levels. Each level is unique and supports a different kind of microbial population.

TEACHER SUGGESTIONS:

ACTIVITY 1:

1. Make sure that there is ample space for storage of the columns after they are prepared so that the students can make observations on a daily basis as they enter the classroom.

2. Before creating the columns, divide the class into teams that can work together to produce a group of columns (one for each student).

3. Ask the students to **READ** the background information and procedure before assembling their columns.

ACTIVITY 2:

1. To create journals, copy master cover in heavy stock paper and master inside pages front to back. Staple in the middle and fold.

2. Column/Journal observations can be done each day with a minimum amount of effort by each student. Have students do their column observations as they enter the class and journal writing immediately after class begins. (A time limit might be helpful.)

3. Student journals kept with the column or in a file in the classroom will help eliminate "lost papers" and disorganized information.

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ACTIVITY 3:

1. Perform this activity once upon completion of the column and once after the columns have had a chance to "mature."

2. Have droppers, slides, hand lenses, microscopes and reference books at lab stations before class.

*Adapted from"Microbial City" found in The Microcosmos Curriculum Guide to Exploring Microbial Space, by Dr. Douglas Zook, Boston University School of Education, Boston MA, published by Kendall/Hunt Publishing company, 1992.

CONNECTIONS

Math - Measuring band width and creating a growth graph

Language - 1. Journal Entries
2. Have the students write a fictional narrative about "life in the living soil."
3. After a media center research trip, ask the students to write either a scientific research paper, theological or opinion based about the theories of how microbial life originated and how it has maintained itself over time.
4. Have a debate on how restoration of the sheet flow in the Everglades would affect the microscopic environment.

Science - Utilized science skills: collection of soil and water samples, preparation of a raised core sample, scientific log and measurements, preparation of slides and proper microscope usage, and literature review.

Social Studies - Have students plot collection sites on a city/county map. Discuss growing conditions of the areas. Ask them to consider and discuss why or why not these sites were chosen for housing, farming, fishing,etc.

Art - Create a "Living Soil Portrait" Bulletin Board to display the students work

CLEAN-UP

At the end of the observation period, allow the students to take the columns home with their work for continued observations or to be returned to the source.

FURTHER READING

Sagan, Dorion and Lynn Margulis (1988) Garden of Microbial Delights: A Practical Guide to the Subvisible World, Harcourt, Brace, Jovanovich, Inc.

Hurd, Dean et.al (1992) General Science: Voyage of Adventure,, Prentice Hall: Englewood Cliffs, New Jersey

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VOCABULARY:

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anaerobic zone
bacteria
cyanobacteria
fungi
hydrogen sulfide gas
microaerophillic zone
oxygen gradient
photosynthesis
sulfur gradient
translucent
wavelength (visible light)
Winogradsky column

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Student Sheets

NAME: _____
DATE: _____
PERIOD: _____

MATERIALS:

CONSUMABLE

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Large bucket of soil, mud or sand
Water - from the region where the soil was collected (sea water if it is a marine environment)
Quick food source - hard boiled egg yolks, an entire raw egg, or cheese and powdered calcium sulphate
Carbon source - shredded newspaper, calcium carbonate (lime), chalk dust, or plaster of Paris
Brown paper to surround the container between observations
Plastic wrap to cover the top

NONCONSUMABLE

Slides and cover slips
Pipet or long medicine dropper
Hand lens
Microscope
Small rulers
Colored pencils

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Student Sheets

NAME: _____
DATE: _____
PERIOD: _____

ACTIVITY 1

CREATING A "LIVING SOIL" ENVIRONMENT*

PROCEDURE:

To grow microorganisms in a raised soil profile, we must provide all the conditions necessary for them to survive. These conditions include soil or sediment, water, a quick food source, sulfur, carbon, and light. Colonies of bacteria grow best in a warm environment. Soil for our purposes may come from a variety of sources: birdbaths, local ponds, streams, bogs or marshes. Our task will be to grow and observe columns of these essential microorganisms in plastic soda bottles, observing the colorful layers of development over a period of several weeks ... or even months.

1. Make sure you have read the "Living Soil" background information.
2. Cut the top off the plastic bottle just above where it curves in at the neck.
3. Working in a well ventilated area, mix the soil with enough water to make it "creamy." Pick out the rocks and sticks, so it is a smooth mixture.
4. Mix in the carbon and sulfur source.
5. Fill the column, tapping it on the table frequently to get rid of air bubbles. (The cut off top portion can be used as a funnel.) Fill to within 4-5 cm of the top.
6. Allow the column to settle for 24 hours.
7. Add or remove water with an eyedropper to leave about 1 cm of water on the top.
8. Cover the top of the column with clear plastic wrap and the sides with the brown paper.
9. Write your name and date on the bottle and place the bottle in a well-lit place. (Ideally, 40-60 watt bulb illuminating the top and sides either continuously or on a 12 hour timer. One light for 5-10 columns should provide enough light.
10. Do not allow your column to dry out. It takes 3-6 weeks to become established with different colored layers of bacteria.
11. Consider your column and your classmates columns and answer the questions.
12. Begin observations by drawing your column and writing your observations on the journal sheets.

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Student Sheets

NAME: _____
DATE: _____
PERIOD: _____

1. What factors might vary with the level of the column?

_____
_____
_____
_____
_____

2. Many of the bacteria that will grow in the column perform photosynthesis. How might the needed light get to the lower levels?

_____
_____
_____
_____
_____
_____
_____

3. What important part do living organisms found in mud and sediments play in the natural world?

_____
_____
_____
_____
_____
_____

ACTIVITY 2

OBSERVING THE GROWTH
OF A "LIVING SOIL" COLUMN

MATERIALS

Raised soil column created in Activity I
Copies of "Living Soil Journal" pages
Small Ruler
Colored Pencils

PROCEDURE

1. At the beginning of each class, unwrap the brown paper from the column, observe, and describe any changes in "Living Soil Journal."

2. Draw and color the column on the "Living Soil Portrait" once at the beginning and once every week afterward.

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NAME: _____
DATE: _____
PERIOD: _____

3. Measure the width of any bands that may form and record them beside their corresponding band on the "Portrait"

4. At the end of 6 weeks, plot a graph of the growth of each color band.

5. At the end of the 6 weeks, in your journal, write some general conclusions about the growth of your column.

6. Compare your results with others.

ACTIVITY 3

LOOKING INTO THE MICROBIAL
WORLD OF LIVING SOIL

PROCEDURE

1. Use a hand lens to observe the top of the soil column and the colored bands if any appear.

2. Describe your observations in the journal begun in Activity 2.

3. Using the pipet, draw a sample of liquid from within the soil sample.

4. Place a drop on the slide, cover it with the cover slip and observe with the microscope.

5. Draw any organisms you observe below and try to identify them using the reference materials.

6. Repeat this activity immediately after constructing the column and after 6 weeks.

7. In your journal, describe the changes you observed from the creation of the "living soil" column.

CLEAN-UP
At the end of the observation period, take the column home with their work for continued observations or return it to the source.

FURTHER READING
Sagan, Dorion and Lynn Margulis (1988) Garden of Microbial Delights: A Practical Guide to the Subvisible World, Harcourt, Brace, Jovanovich, Inc.

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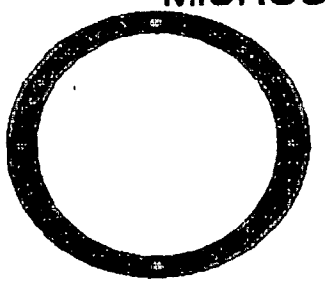
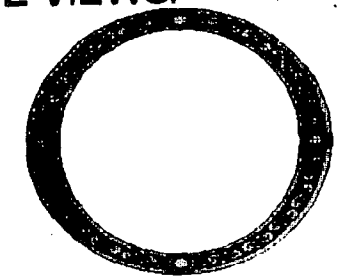
CONCLUSIONS:

MICROSCOPE VIEWS:





Living Soil

An Observational Journal

Name: _____

Date: _____

Class: _____

OBSERVATION NOTES:

DATE:_____

DATE: _____

DATE: _____

DATE: _____

DATE: _____

DATE: _____

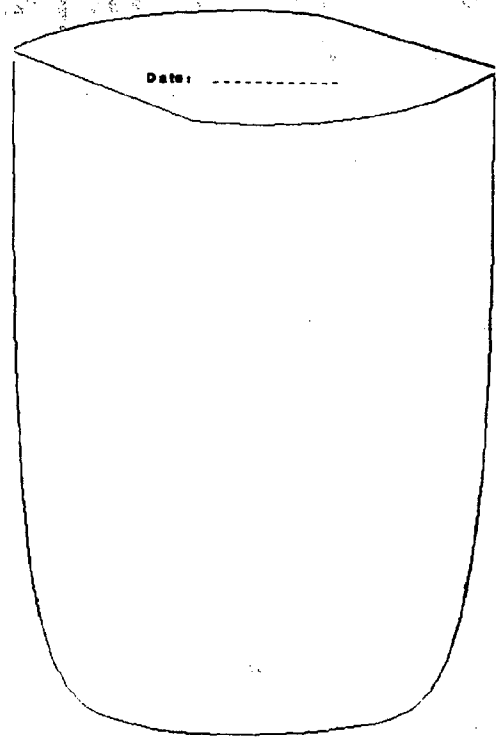
DATE: _____

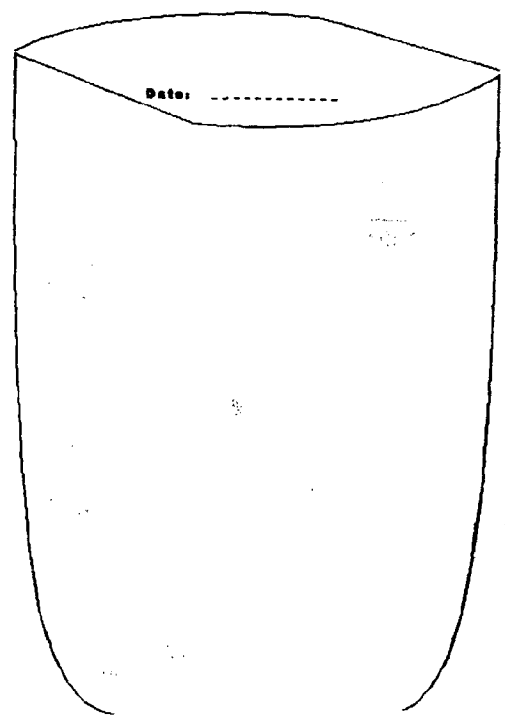
DATE: _____

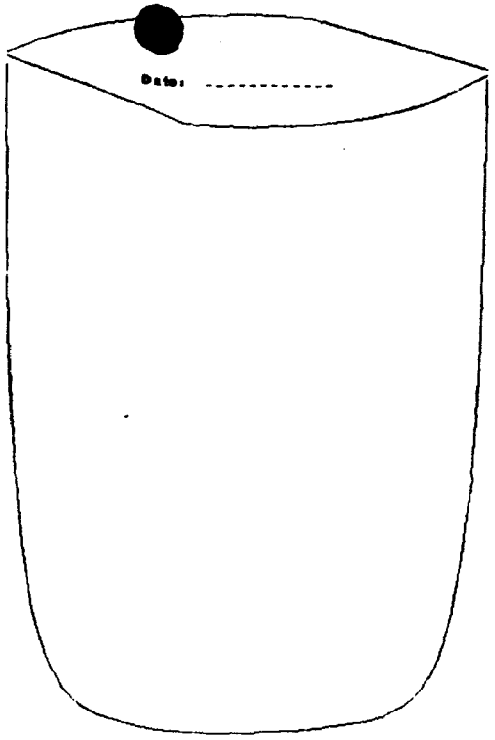
DATE: _____

DATE: _____

Record bead widths below







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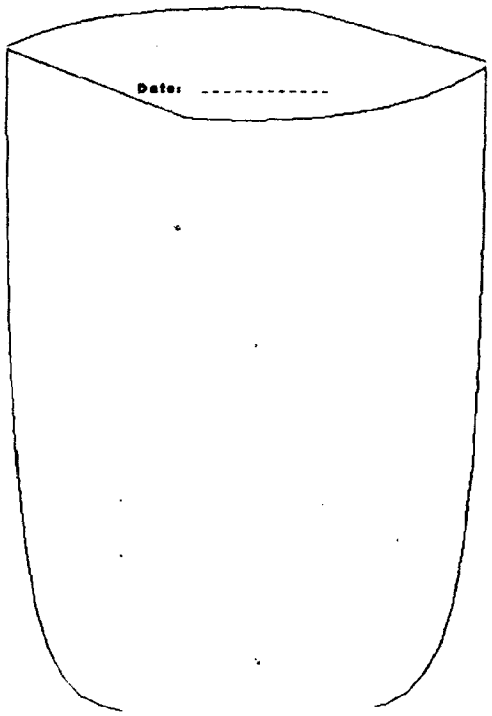

OBSERVATION NOTES:

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OBSERVATION NOTES:

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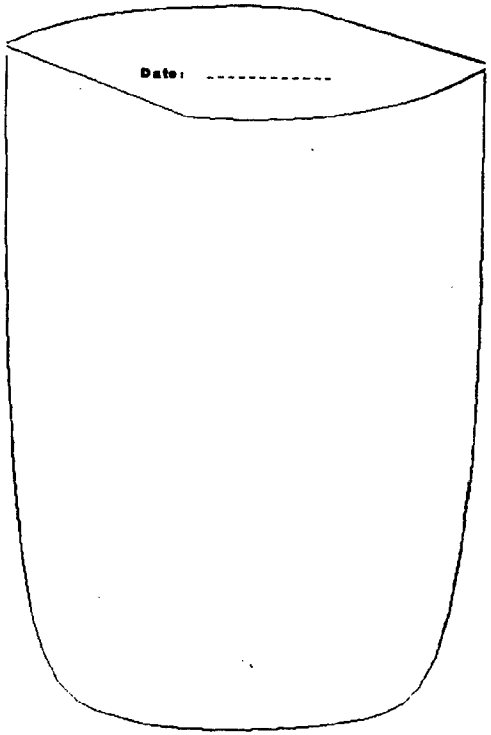
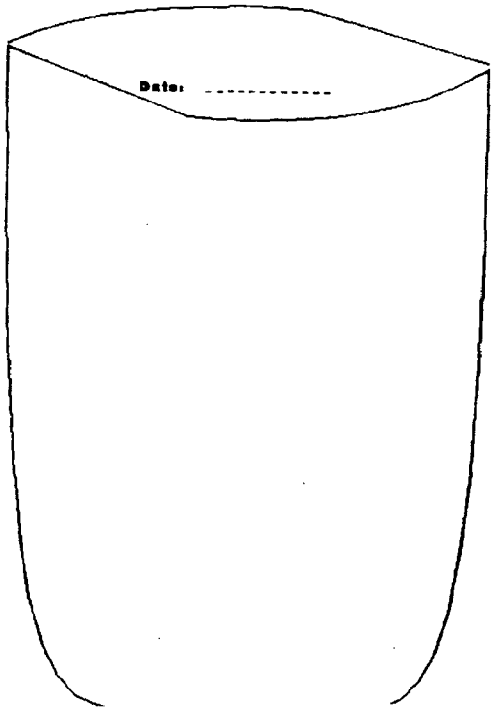
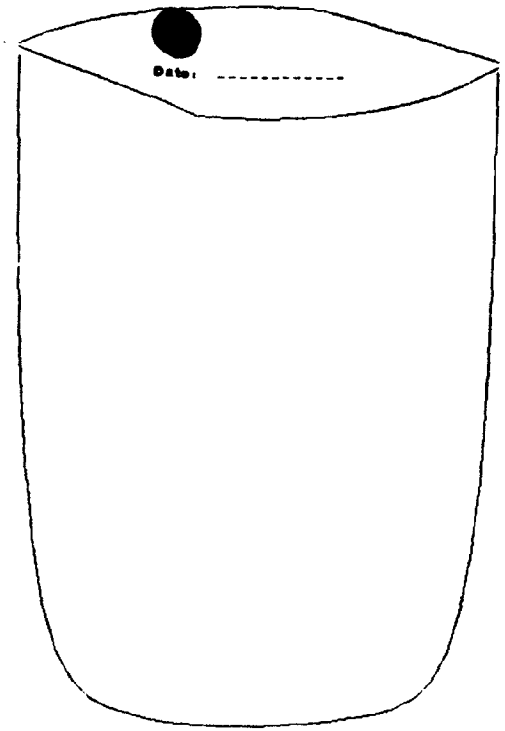
Record head widths below







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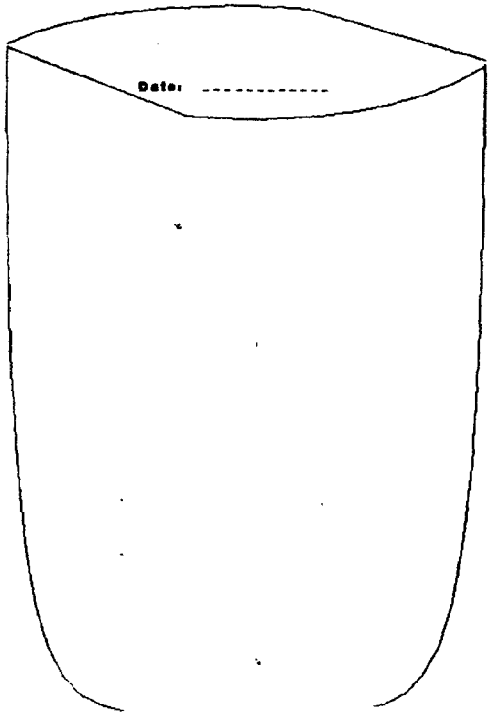

OBSERVATION NOTES:

DATE:_____

DATE: _____

DATE: _____

DATE: _____

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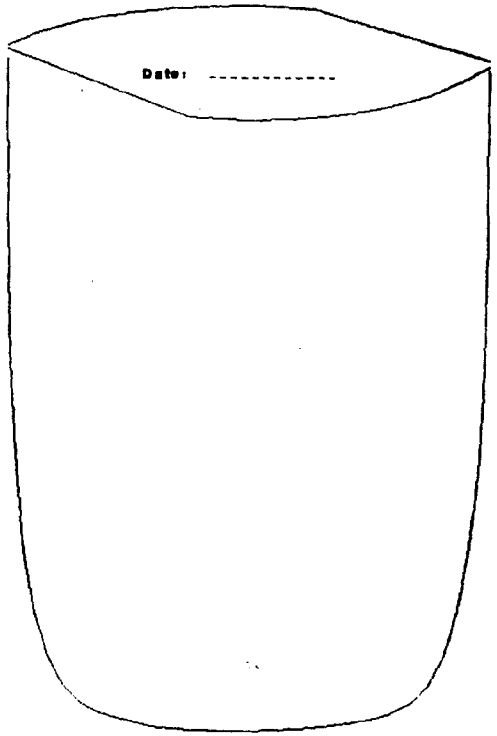

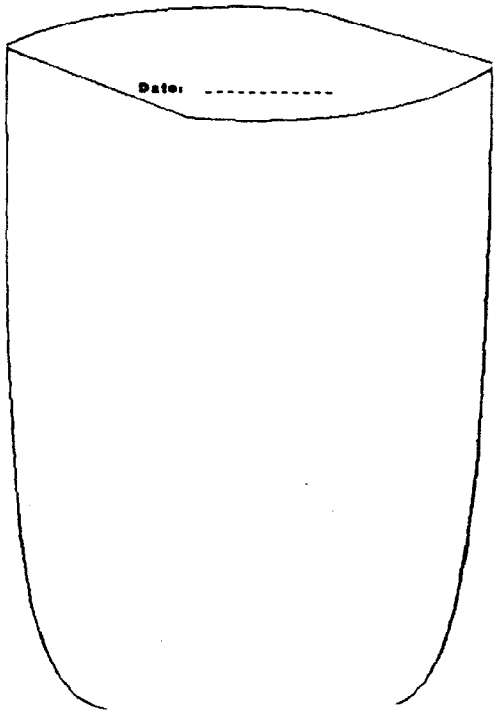

12. Field Investigation of South Florida's Plants

OBJECTIVE: To determine the population and stratification of native and non-native flora in a given ecosystem and to remove unwanted species in a highly motivated science activity.

THE STUDENTS WILL:

1). develop an awareness of South Florida plants

2). conduct a field study

3). participate in the eradication of non-native flora without resorting to chemical means to do so

COMPETENCIES: 6th, 7th, 8th Dade CBC: Grades 6 - 7: I - 5,6,7,8: AIV: 1,4: A
Grade 8 II: 1,2: A

SCHEDULE: 3 class periods: 1-day Field Trip

VOCABULARY:

exotic indigenous native

MATERIALS:

200 linear feet nylon fishing line (use a brightly colored 9-pound line for easy visibility)
25 pieces of 16 inch long wooden spikes
25 inch long wide headed tacks or nails
1 measuring tape
16 pairs gardening gloves
16 shovels for removing small plants

PREPARATION: Provide students with a background about the plants of South Florida.

BACKGROUND: South Florida is facing a major environmental threat caused by the "sometimes innocent" introduction of non-native flora and fauna into this environment. The result of such intrusions at such an alarming rate, are causing a succession of these foreign species over the natives which if unchecked, may cause major environmental damage.

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AS A SUBGRANT AWARDED BY N.O.A.A. - NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

TEACHER SUGGESTIONS:

1). Choose a site from which to conduct the activity. Parks are ideal. Plan your field trip well in advance. Choosing a site that has non-native invasive plant species that need to be removed will make the activity much more interesting for your students.

2). Borrow videos from the media center on the topic.

3). Select reference books from our library on Florida's plants.

4). Discuss plants of Florida and the need to preserve them.

5). Assign names of plants as a vocabulary definitions word list.

6). Take care of paper work associated with the field trip - discuss/ emphasize safety procedures.

7). Assign students to work in pairs. Give them their lab activity at the site.

8). Have about six students prepare the grids after you have chosen the site. Other students can be preparing their data table while the grids are being prepared.

9). Data tables can be completed at the site. Graphs and analysis questions can be done back in school.

10). Grades for the lab can be determined by the teacher.

PROCEDURES:

1). Measure off an area 16 x 16 feet square of your proposed site under investigation.

2). Drive in stakes at 4 foot intervals then inside the square in order to have 16 - 4x4 foot squares.

3). Hammer your tacks about 1/2 inch into the top of each stake.

4). At one end of the large square, tie your nylon line to the tack then the anchor on each stake following the diagram below:

(Note: Less line will be needed if this procedure is followed. Ultimately, you will have cordoned off sixteen 4 x 4 foot squares. This would be ideal for a class of 32 students. A larger class would necessitate a larger area being used.)

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NAME: _____
DATE: _____
PERIOD: _____

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THE STUDENTS WILL:

1). develop an awareness of South Florida plants

2). conduct a field study

3). participate in the eradication of non-native flora without resorting to chemical means to do so

COMPETENCIES: 6th, 7th, 8th Dade CBC: Grades 6 - 7: I - 5,6,7,8: AIV: 1,4: A
Grade 8 II: 1,2: A

SCHEDULE: 3 class periods: 1-day Field Trip

VOCABULARY:

exotic indigenous native

MATERIALS:

For the Class:
200 linear feet nylon fishing line (use a brightly colored 9-pound line for easy visibility)
25 pieces of 16 inch long wooden spikes
25 inch long wide headed tacks or nails
1 measuring tape
Field guides with native and non-native species identification

For each person in the group:
gardening gloves
shovel for removing small plants
goggles

PROCEDURE:

1). Help the class section off the transect area following the teacher's instructions.

2). Go to the assigned area in the field of study.

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5). Have students work in pairs, 1 pair per square and carry field guides to the site.

6). On completing their data collection, students should, under supervision, uproot and dispose of unwanted plant species.

MULTICULTURAL COMPONENT: Research and discuss plants and herbs used by Native Americans for medicinal purposes.

SAFETY INFORMATION: Observe the normal precautions during the field trip.

ADDITIONAL INFORMATION: Younger/ smaller plants will generally be ahead of older/ larger plants. The direction of new growth can be caused by wind direction, or the direction the birds and other seed/ fruit eaters travel.

Non-native plants are brought to Florida by visitors and Floridians returning from other countries as well as by owners of plant nurseries. Removal is needed because these plants bring new pests, replace native species but do not prevent soil erosion as native species do; succeed natives and create a loss of habitat for native animals; clog the canals and rivers; and incur the use of taxpayers' money to eradicate them.

ENRICHMENT: Invite speakers from the Audubon Society or the Native Plant Society in your county.

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Student Sheets

NAME: _____
DATE: _____
PERIOD: _____

3). Using reference guides, identify type and number of plants in the area. Record data as native and non-native species in the data table.

4). Remove non-native species as directed by the teacher to a safe disposal area.

5). Calculate the total and percentages of native and non-native plants in your grid. Then for all grids in your class. Enter these figures in your data table.

6). As a class, draw bar graphs showing the percentages all of the grids.

Conclusions and Observations

1). What was the percentage of non-native plants in you grid? _____

2). Using East, West, North, South as points of direction, where was your grid located? _____

3). Which grid had the most non-native plants? _____
The least? _____

4). On the basis of answers in 3 and 4, which direction would you assume the non-native plants were heading in new growth as they populated the area? Why do you think so?

_____
_____
_____
_____

5). Give two reasons non-native plants grow in Florida.

_____
_____
_____
_____
_____
_____

6). Give three reasons for removing or eradicating non-native species of plants from the Florida ecosystem.

_____
_____
_____
_____
_____
_____

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NAME: _____
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DATA

NAME OF PLANT	SCIENTIFIC NAME	NATIVE SPECIES	NON-NATIVE SPECIES	QTY

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13. The Everglades: It's Past, Present and Future

OBJECTIVES:

1). To determine how has man's altering of the natural water flow of the rivers, lakes and estuaries in the state of Florida affected the eco-system of the Everglades

2). To analyze the motivation for the canalization of the Kissimmee River and what effects are being seen today.

3). To consider all the factors which caused and still cause destruction to the Everglades and how society can bring about an end to this destruction.

THE STUDENTS WILL:

1). work in cooperative learning groups to explore and research historical information on the canalization of the Kissimmee River, the creation of canals and waterways as agricultural draining systems and the resultant effect on the Everglades.

2). research specific chapters in Marjorie Stoneman Douglas' s book "The Everglades: River of Grass" (Chapters 1, 13-15) leading to a discussion, understanding and possible solutions to the essential questions given.

3). create two maps of the Kissimmee waterway. These will be completed on overheads in the form of a base and overlay maps. (These maps, involving map skills completed in the 6th grade curriculum will be a spring board for in-class discussion.)

4). generate classroom roundtable discussions using the CORT thinking skills. PMI plus interesting inventory and CAF (consider all factors).

5). view the Everglades "first hand" with a culminating field trip.

COMPETENCIES: 7th and 8th Grade advanced or gifted 6th Grade students

* Map Skills
* Research Skills
* CORT Thinking Skills

SCHEDULE: 1-2 Weeks of Multidisciplinary activities.

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VOCABULARY:

algae	algae bloom	aquifer	eutrophication
canals	coastal wetland	conservationists	aquifer depletion
dredge	environmentalists	Kissimmee River	Lake Okeechobee
meandering	commercial	inorganic	fertilizer
environmental		degradation	

MATERIALS:

overheads
overhead pens
tape
rulers
maps of Kissimmee River and canals

PREPARATION: Provide students with a background about the Everglades and the Kissimmee waterway. Through the following:

1). In-class reading of Everglades: River of Grass.

2). Research from articles in Sun Sentinel found on CD-ROM articles by Robert McClure.

3). Newspaper articles on Marjorie Stoneman Douglas.

4). South Florida Water Management District Map.

BACKGROUND READING:

The Everglades: River of Grass by Marjorie Stoneman Douglas, Mockingbird Books Inc. Marietta, GA - 1974, Chapters 1, 13-15

Sun Sentinel CD-ROM articles by Robert McClure, staff writer, "Everglades Clean-Up". INDEX TERMS: Everglades restoration, conservation, Florida wetlands, Everglades and the sugar industry.

Kids Workbook for Social Action by Barbara Lewis

Glimpses of South Florida History by Stuart Miller, historical columnist for the New/Sun Sentinel.

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ASSESSMENT: Assessment of a unit such as this can be done in a variety of ways. Outcomes can be measured through a scoring procedure such as:

1). Presentation (30 points)
   a. Students have evolved answers to the essential question
   b. Students have researched and addressed key points
2). Objective (20 points)
3). Cooperation among members (10 points)
4). Preparation/ Time Management (20 points)
5) Visual / Props / Maps / Overlays (10 points)
6). Follow-up letter writing / Petitions (10 points)

The assessment categories may be changed to fit the personal needs of the class.

VOLUNTEER PROGRAMS:

Bay Watch (Water Sampling): Contact - Fran Decker at Florida keys National Marine Sanctuary in Marathon - 743-2437

Broward's Earth Keeper Program: Contact - Kay Gervasi at the Department of Natural Resource Protection - 519-1257

FURTHER READING:

Lewis, Barbara (1991)The Kids Guide to Social Action Free Spirit Publishing Minneapolis, MN

McIver, Stuart (1988) Glimpses of South Florida HistoryFlorida Flair Books Miami, Fl

Miller, Jr., G. Tyler (1988) Environmental Science: Sustaining the Earth Wadsworth Publishing Belmont, CA

Morris, Allen (1991) The Florida Handbook 1991-1992 Peninsular Press, Tallahassee, FL

Postel, Sandra Water for Agriculture: Facing the Limits World Watch Institute Washington, D.C.

Important Telephone Numbers:

South Florida Water Management District407-686-8800
Kids Book for Social Action 612-338-2068
Everglades Holiday Park 305-434-8111
Fax: 305-434-4252

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PROCEDURES:

1). Start students off researching the wetland environment of South Florida.

2). With class help, create a base map depicting the natural flow of the Kissimmee River. This overlay should depict canals and all artificial waterway structures

3). Trace the man-made changes to the Kissimmee River and Lake Okeechobee on an overhead - (a) before and (B) after.

4). As a class, develop a time-line depicting when these changes occurred.

5). Discuss the political and economic reasons for these changes using critical thinking skills.

6). Discuss causes, motivations and consequences for these changes keeping in mind the following factors:
* Economic (sugar growers - What are their roles?)
* Political (Washington, D.C. lobbyists and laws)
* Social (Migrant workers)
* Environmental (Florida Bay, Everglades, fires, salt intrusion)

7). Research in newspapers - about laws applying to the Everglades.

8). Compile biographical sketches on famous activists such as Marjorie Stoneman Douglas

9). Write letters and petitions to political representatives. See Background Reading Kids Workbook for Social Action by B. Lewis.

10). Take a trip to the Everglades to get a first-hand view of what the River of Grass looks like. Learn from air boat captains some more of the past history.

9). Take water samples at the Everglades and test for impurities and excess nutrients.

ENRICHMENT: Contact the International Oceanographic Foundation, 3979 Rickenbacker Causeway, Virginia Key, Miami, Fl 33149. As part of the University of Miami, IOF will help answer questions about career possibilities in oceanography and marine science.

Arrange to have a guest speaker from South Florida Water Management District. (1-800-432-2045).

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NAME: _____
DATE: _____
PERIOD: _____

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OBJECTIVES:

1). To determine how has man's altering of the natural water flow of the rivers, lakes and estuaries in the state of Florida affected the eco-system of the Everglades

2). To analyze the motivation for the canalization of the Kissimmee River and what effects are being seen today.

3). To consider all the factors which caused and still cause destruction to the Everglades and how society can bring about an end to this destruction.

THE STUDENTS WILL:

1). work in cooperative learning groups to explore and research historical information on the canalization of the Kissimmee River, the creation of canals and waterways as agricultural draining systems and the resultant effect on the Everglades.

2). research specific chapters in Marjorie Stoneman Douglas' s book "The Everglades: River of Grass" (Chapters 1, 13-15) leading to a discussion, understanding and possible solutions to the essential questions given.

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4). generate classroom roundtable discussions using the CORT thinking skills. PMI plus interesting inventory and CAF (consider all factors).

5). view the Everglades "first hand" with a culminating field trip.

COMPETENCIES: 7th and 8th Grade advanced or gifted 6th Grade students
* Map Skills
* Research Skills
* CORT Thinking Skills

SCHEDULE: 1-2 Weeks of Multidisciplinary activities.

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Student Sheets

NAME: _____
DATE: _____
PERIOD: _____

VOCABULARY:

algae	algae bloom	aquifer	eutrophication
canals	coastal wetland	conservationists	aquifer depletion
dredge	environmentalists	Kissimmee River	Lake Okeechobee
meandering	commercial	inorganic	fertilizer
environmental		degradation	

MATERIALS:

overheads
overhead pens
tape
rulers
maps of Kissimmee River and canals

BACKGROUND READING:

The Everglades: River of Grass by Marjorie Stoneman Douglas, Mockingbird Books Inc. Marietta, GA - 1974, Chapters 1, 13-15

Sun Sentinel CD-ROM articles by Robert McClure, staff writer, "Everglades Clean-Up". INDEX TERMS: Everglades restoration, conservation, Florida wetlands, Everglades and the sugar industry.

Kids Workbook for Social Action by Barbara Lewis

Glimpses of South Florida History by Stuart Miller, historical columnist for the New/Sun Sentinel.

PROCEDURE: Within the class cooperative groups, read and research background materials about the Everglades and the Kissimmee River:

1). Read, in class, Everglades: River of Grass.

2). Research articles from the Sun Sentinel found on CD-ROM by Robert McClure.

3). Locate and read newspaper articles on Marjorie Stoneman Douglas.

4). Look at the South Florida Water Management District Map of the Kissimmee River restoration project.

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NAME: _____
DATE: _____
PERIOD: _____

5). With your class, create a base map depicting the natural flow of the Kissimmee River. This overlay should depict canals and all artificial waterway structures

3). Trace the man-made changes to the Kissimmee River and Lake Okeechobee on an overhead - (a) before and (B) after.

4). As a class, develop a time-line depicting when these changes occurred.

5). Discuss the political and economic reasons for these changes using critical thinking skills.

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* Environmental (Florida Bay, Everglades, fires, salt intrusion)

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8). Compile biographical sketches on famous activists such as Marjorie Stoneman Douglas

9). Write letters and petitions to political representatives. See Background Reading Kids Workbook for Social Action by B. Lewis.

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9). Take water samples at the Everglades and test for impurities and excess nutrients.

ENRICHMENT: Contact the International Oceanographic Foundation, 3979 Rickenbacker Causeway, Virginia Key, Miami, Fl 33149. As part of the University of Miami, IOF will help answer questions about career possibilities in oceanography and marine science.

Arrange to have a guest speaker from South Florida Water Management District. (1-800-432-2045).

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NAME: _____
DATE: _____
PERIOD: _____

ASSESSMENT:

1). Presentation (30 points)
   a. Students have evolved answers to the essential question
   b. Students have researched and addressed key points
2). Objective (20 points)
3). Cooperation among members (10 points)
4). Preparation/ Time Management (20 points)
5) Visual / Props / Maps / Overlays (10 points)
6). Follow-up letter writing / Petitions (10 points)

VOLUNTEER PROGRAMS:

Bay Watch (Water Sampling): Contact - Fran Decker at Florida keys National Marine Sanctuary in Marathon - 743-2437

Broward's Earth Keeper Program: Contact - Kay Gervasi at the Department of Natural Resource Protection - 519-1257

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Student Sheets

NAME: _____
GROUP #: _____
DATE: _____
PERIOD: _____

GROUP EVALUATION

TOPIC/OBJECTIVE: _____

Members and Grade Level:

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

Evaluator: _____

GROUP EVALUATION

1. PRESENTATION (30 POINTS) _____
2. OBJECTIVE - EXPLAINED AND MET (20 POINTS) _____
3. COOPERATION AMONG MEMBERS (10 POINTS) _____
4. PREPARATION/TIME MANAGEMENT (20 POINTS) _____
5. VISUAL/PROPS (10 POINTS) _____
6. FOLLOW-UP LETTER WRITING/PETITION (10 POINTS) _____

TOTAL POINTS _____

GROUP AVERAGE _____
(GRADE)

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14. Freshwater Ecosystems: What are the Living and Non-Living Factors of a Freshwater Ecosystem?

OBJECTIVE: To determine the differences between biotic and abiotic parts of freshwater environments.

THE STUDENTS WILL:

1). Identify the biotic (living) and abiotic (non-living) factors in an ecosystem.

2). Explain the interactions between biotic and abiotic factors.

3). Identify the niche and habitat of the living components of an ecosystem.

COMPETENCIES: Dade County CBC: 7th but can be adapted to 6th and 8th.
Component IV Objectives 2,3,4
Competency A.

SCHEDULE: Three class periods

VOCABULARY:

ecosystem	biotic	abiotic	niche
habitat	consumer	producer	decomposer
food chain	food web	zooplankton	phytoplankton

MATERIALS:

textbook
notebook
field guide
pen
pencil

Field Trip:
proper attire
wide mouth plastic containers with lids
pond field guide
thermometer
secchi disk
plankton net etc.

Laboratory:
microscope
slide and cover slip
medicine dropper
pond water sample
pond life field guide etc.
water test kits: pH, Oxygen and carbon dioxide

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PREPARATION: Provide students with a background about what lives in a freshwater habitat.

BACKGROUND: Ecosystems are communities of living things and their surroundings. Studying ecosystems is one way scientists study nature. All the parts of an ecosystem are connected to one another. This means that if something happens in one area of an ecosystem, other parts are affected.

A single ecosystem may have hundreds of different parts. These parts can be divided into two large groups: Living and non-living. Living things are call Biotic, from the Greek word bios, meaning life. Non-living things are called Abiotic, (putting an a in front of a word often adds the meaning not. Abiotic means not living.) The role that a living organism plays in its environment is called niche and the area where it lives is called habitat.

Florida is known for its warm climate, nice beaches and abundant water sources. When Ponce de Leon landed in Florida in 1513, he was searching for riches and water that would make them young again. Since water is a very important and fragile component of South Florida ecosystem, we need to teach our children about our aquatic environment in terms of its quality and preservation.

TEACHING SUGGESTIONS: It is important that students have a clear idea about how living and non-living things are related to each other in a freshwater ecosystem. They should also fully understand field activity procedures and objectives before going on any trips.

PROCEDURE:

Day One

Introduce ecosystem concepts and field trip procedures.

1). Discuss the key vocabulary words.
2). Complete the Word Search and Crossword Puzzle

Day Two

Field Trip to Miami Springs Elementary Biome

1). Make a list of plants and animals found at biome
2). Describe and draw the aquatic vegetation.
3). Describe the water color.

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4). Determine the transparency, surface and bottom temperature
5). Determine the substrate type
6). Collect a water sample for use in class tomorrow
7). Gather historical information about the biome

Day Three

Laboratory Activity

1). Use a microscope and field guide to identify phytoplankton and zooplankton
2). Conduct a water chemistry analysis: ph, CO_2, O_2
3) Draw the pond food chain and food web
4). Write field trip and laboratory report

ENRICHMENT ACTIVITY:

Library research: Investigate the effect of temperature fluctuation and water transparency on species survival in pond water.

MULTICULTURAL COMPONENT: Compare how the Seminoles and Miccosukees live in the Everglades with the traditional life styles of the Sioux and other native American Indians of the western plains.

FURTHER READING:

Dade County Environmental Story

Reid, G.(1987) Pond Life: A Guide to Common Plants and Animals of North American Ponds and Lakes. Golden Press, New York

The Voyage of the MIMI: Ecosystem with island Survivors (1985) Sunburst Communications Inc. Publishers

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Student Sheets

NAME: _____
DATE: _____
PERIOD: _____

14. Freshwater Ecosystems: What are the Living and Non-Living Factors of a Freshwater Ecosystem?

OBJECTIVE: To determine the differences between biotic and abiotic parts of freshwater environments.

THE STUDENTS WILL:

1). Identify the biotic (living) and abiotic (non-living) factors in an ecosystem.

2). Explain the interactions between biotic and abiotic factors.

3). Identify the niche and habitat of the living components of an ecosystem.

COMPETENCIES: Dade County CBC: 7th but can be adapted to 6th and 8th.
Component IV Objectives 2,3,4
Competency A.

SCHEDULE: Three class periods

VOCABULARY:

ecosystem	biotic	abiotic	niche
habitat	consumer	producer	decomposer
food chain	food web	zooplankton	phytoplankton

MATERIALS:

textbook
notebook
field guide
pen
pencil

Field Trip:
proper attire
wide mouth plastic containers with lids
pond field guide
thermometer
secchi disk
plankton net etc.

Laboratory:
microscope
slide and cover slip
medicine dropper
pond water sample
pond life field guide etc.
water test kits: pH, Oxygen and carbondioxide

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NAME: _____
DATE: _____
PERIOD: _____

BACKGROUND: Ecosystems are communities of living things and their surroundings. Studying ecosystems is one way scientists study nature. All the parts of an ecosystem are connected to one another. This means that if something happens in one area of an ecosystem, other parts are affected.

A single ecosystem may have hundreds of different parts. These parts can be divided into two large groups: Living and non-living. Living things are call Biotic, from the Greek word bios, meaning life. Non-living things are called Abiotic, (putting an a in front of a word often adds the meaning not. Abiotic means not living.) The role that a living organism plays in its environment is called niche and the area where it lives is called habitat.

Florida is known for its warm climate, nice beaches and abundant water sources. When Ponce de Leon landed in Florida in 1513, he was searching for riches and water that would make them young again. Since water is a very important and fragile component of South Florida ecosystem, we need to teach our children about our aquatic environment in terms of its quality and preservation.

PROCEDURE:

Day One
1). Discuss the key vocabulary words.
2). Complete the Word Search and Crossword Puzzle

Day Two
Field Trip to Miami Springs Elementary Biome - **Use the information pages**

Day Three
Laboratory Activity - **Use the information pages**

ENRICHMENT ACTIVITY:

Library research: Investigate the effect of temperature fluctuation and water transparency on species survival in pond water.

MULTICULTURAL COMPONENT: Compare how the Seminoles and Miccosukees live in the Everglades with the traditional life styles of the Sioux and other native American Indians of the western plains.

FURTHER READING:

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NAME: _____
DATE: _____
PERIOD: _____

In the puzzle below, there are words related to equatic ecology. These words are hidden horizontally, vertically and diagonally. Circle these words and then define them.

AQUATIC ECOLOGY

LOOK FOR:

BIOTIC
DECOMPOSER
FOODCHAIN
HABITAT
PHYTOPLANKTON
ZOOPLANKTON

ABIOTIC
CONSUMER
ECOSYSTEM
FOODWEB
NICHE
PRODUCER

Q	Y	R	S	L	H	F	X	O	H	O	D	N	V	M	E	R	V	L	V	M	C	J	W	D	S	Y	Z	F	P	D	B
E	M	S	U	Y	Z	J	X	A	Q	S	A	Z	X	O	P	R	X	G	L	W	O	D	Q	F	B	O	O	V	I	Q	B
R	O	J	O	C	X	J	I	V	K	P	P	Y	M	O	Z	Y	R	N	B	G	P	S	E	N	J	N	F	A	X	K	D
Q	Q	W	O	O	P	Y	X	R	L	I	T	O	D	X	C	K	A	S	R	U	U	H	G	C	O	R	I	T	V	T	R
R	J	H	W	F	O	G	X	J	D	X	A	N	R	S	C	X	N	W	K	O	A	D	U	W	B	Y	I	Q	G	J	F
M	B	F	N	A	K	N	H	A	C	J	L	J	F	W	V	K	Y	Q	Y	I	W	Y	I	C	V	B	X	Z	X	Z	M
E	T	H	J	Z	G	I	R	S	C	F	U	V	X	F	W	K	P	Z	B	X	Y	Q	E	I	R	L	D	R	O	J	T
M	D	E	R	Q	M	J	L	K	S	O	W	B	Z	X	D	S	E	P	L	X	A	Y	U	E	R	M	U	U	Q	N	S
A	X	R	V	A	F	B	O	O	E	Z	Z	H	R	O	X	Z	N	K	J	H	A	G	S	W	J	D	U	J	L	D	H
E	Z	B	H	F	J	L	K	L	X	T	C	N	D	Y	O	D	B	T	B	P	I	O	U	E	Q	Z	W	D	X	O	M
I	M	J	T	J	S	H	B	U	I	A	I	S	V	W	F	P	Z	H	J	O	P	I	N	N	P	B	S	B	C	L	D
Q	X	H	Q	L	C	Q	Q	W	E	C	F	H	Q	W	C	U	L	R	C	M	G	P	A	Y	L	J	X	R	W	F	Y
B	E	A	K	E	R	V	S	L	D	I	C	F	C	H	O	R	N	A	O	I	A	Y	C	U	S	Q	L	M	R	S	T
Y	Z	B	K	L	M	S	V	J	I	U	A	H	Q	H	B	K	Q	C	N	K	Z	N	M	T	X	R	I	H	T	K	P
I	S	I	V	D	J	G	D	B	P	V	E	M	V	A	Z	L	E	V	I	K	J	I	H	Y	D	D	S	W	P	I	X
E	M	T	Q	L	N	Z	P	W	Y	C	U	F	C	L	A	D	W	P	Q	K	T	I	Z	C	P	Y	J	N	T	G	H
A	K	A	W	I	Z	I	V	L	Q	S	U	M	T	Q	R	F	J	E	Z	P	W	O	I	S	E	X	M	V	K	M	Y
Y	C	T	F	U	G	I	U	R	T	X	K	Y	X	K	F	M	I	I	X	I	H	T	N	A	V	L	C	F	H	N	F
X	B	O	J	D	D	V	L	K	U	S	Y	T	U	A	F	O	B	O	G	P	O	L	G	K	U	A	Q	K	C	Q	C
O	P	K	K	H	A	I	M	I	P	R	S	B	P	H	F	W	O	Y	T	I	F	G	O	P	C	I	T	C	E	L	Z
F	Q	I	H	T	Q	X	W	Y	Y	N	G	Q	K	X	M	L	T	D	B	R	R	P	I	N	J	X	V	H	V	Q	R
N	M	V	W	L	U	A	Q	K	O	H	T	U	I	S	O	N	Q	A	W	E	P	Q	R	Y	X	S	H	S	Z	M	M
C	O	P	H	Y	T	O	P	L	A	N	K	T	O	N	M	X	B	W	C	E	R	V	G	D	O	Y	P	R	G	S	J
Z	N	J	I	Q	X	Z	J	I	E	H	M	P	L	V	F	J	W	U	E	J	B	Q	U	S	T	N	E	R	O	A	E
B	C	W	X	P	B	Z	F	Y	T	V	W	E	U	S	M	I	D	V	K	G	D	H	H	F	G	Q	E	M	B	I	A
F	O	O	D	C	H	A	I	N	T	S	M	J	L	T	T	O	X	E	C	O	S	Y	S	T	E	M	Y	T	F	R	T
W	O	C	I	G	I	B	A	B	U	Q	E	I	P	L	R	V	S	N	B	C	L	Y	U	E	U	R	V	T	B	S	I
R	X	W	O	X	Y	C	I	K	E	H	R	C	E	P	Z	E	N	J	S	E	K	X	H	S	S	O	X	Z	I	P	M
Z	F	D	Z	Q	R	Z	I	O	C	P	N	C	L	G	W	D	N	T	X	N	S	N	N	D	L	E	Z	D	X	J	B
O	L	R	B	I	Z	A	F	I	T	L	A	F	U	M	F	Q	M	W	M	A	J	O	S	W	M	C	F	M	S	H	C
V	Y	J	H	O	G	F	N	C	Z	I	H	G	U	E	R	M	F	Y	P	E	C	D	M	M	U	W	G	X	Q	Y	G
N	X	G	P	T	V	H	N	D	A	R	C	Y	B	V	K	Q	X	L	Q	N	A	Y	M	C	C	U	J	E	P	A	Y

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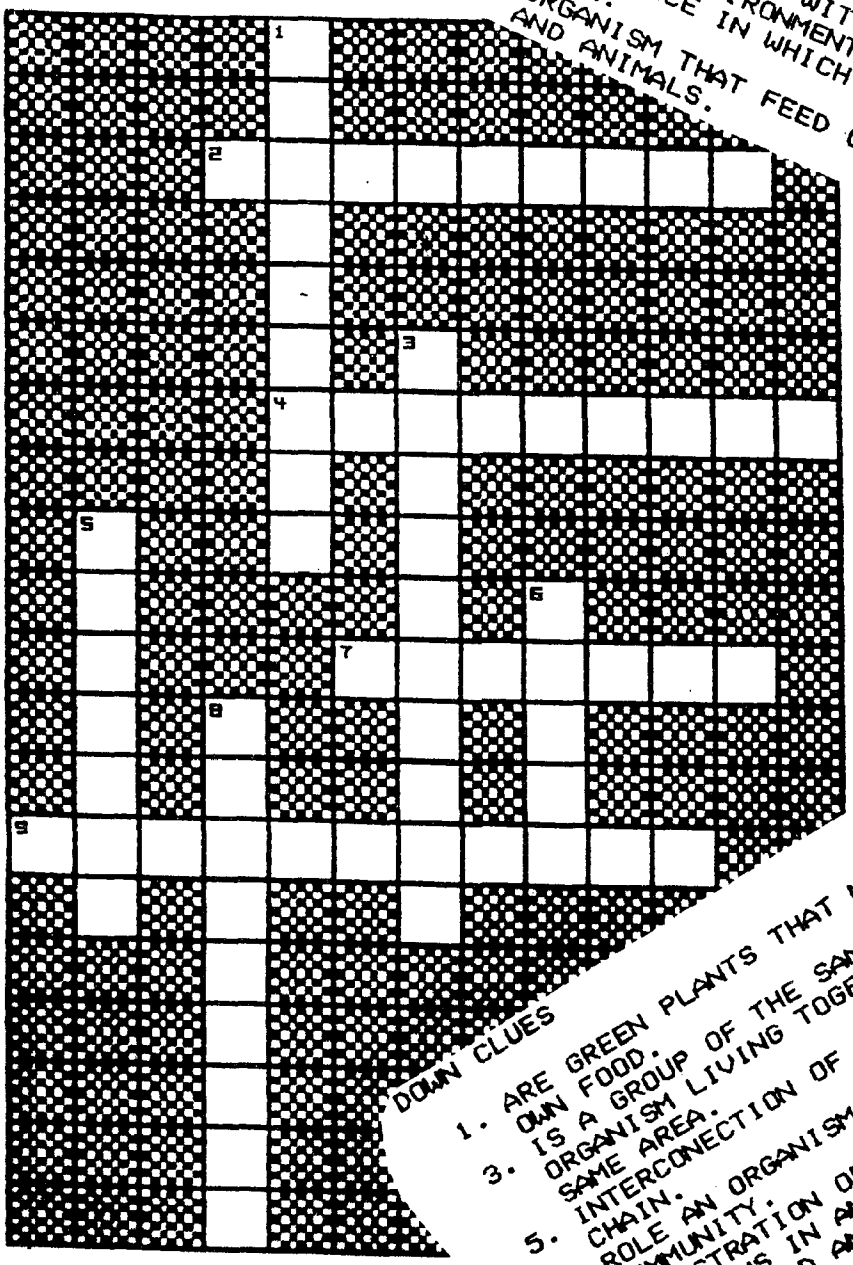
NAME: _____
DATE: _____
PERIOD: _____

ECOSYSTEM CROSS WORD PUZZLE



ACROSS CLUES

2. ORGANISMS THAT FEED DIRECTLY OR INDIRECTLY ON PRODUCERS.
4. GROUP OF ORGANISMS IN AN AREA THAT INTERACT WITH THEIR NON LIVING ENVIRONMENT.
7. THE PLACE IN WHICH AN ORGANISM LIVE.
9. ORGANISM THAT FEED ON DEAD PLANTS AND ANIMALS.

DOWN CLUES

1. ARE GREEN PLANTS THAT MAKE THEIR OWN FOOD.
3. IS A GROUP OF THE SAME TYPE OF ORGANISM LIVING TOGETHER IN THE SAME AREA.
5. INTERCONECTION OF DIFFERENT FOOD CHAIN.
6. ROLE AN ORGANISM PLAYS IN ITS COMMUNITY.
8. ILLUSTRATION OF HOW GROUPS OF ORGNISMS IN AN ECOSYSTEM GET THEIR FOOD AND ENERGY.

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Student Sheets

NAME: _____
DATE: _____
PERIOD: _____

FIELD INVESTIGATION

1). Make a list of plants and animals found at the biome:

_____ _____
_____ _____
_____ _____
_____ _____
_____ _____
_____ _____
_____ _____
_____ _____
_____ _____
_____ _____

2). Describe the biome making sure to include: water color, transparency, surface and bottom temperature, and substrate type.

_____
_____
_____
_____
_____

Draw the aquatic vegetation:

****Collect a water sample for use in class tomorrow**
*****Gather historical information about the biome**

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Student Sheets

NAME: _____
DATE: _____
PERIOD: _____

1). Use a microscope and field guide to identify phytoplankton and zooplankton Draw and name what you find below:

2). Conduct a water chemistry analysis: ph, CO_2, O_2. What are your findings?

_____
_____
_____
_____

3) Draw the pond food chain and food web:

4). Write field trip and laboratory conclusions:

_____
_____
_____
_____
_____
_____
_____
_____
_____

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15. Ecosystem Interactions: How do organisms interact in an Ecosystem?

OBJECTIVES:

1). To determine human impact on marine ecosystems.

2). To consider limiting factors in an ecosystem.

3). To evaluate the effect of water pollution on an ecosystem.

THE STUDENTS WILL:

1). Make a model of a marine ecosystem

2). Observe the relationships among organisms within a marine ecosystem.

3) Evaluate human impact on the environment and make recommendations to minimize that impact.

COMPETENCIES: Grades 6-8

SCHEDULE: 1st Day - 40 minutes (set-up)
5-10 minutes per day for 2 weeks

VOCABULARY:

habitat	population	community	niche
ecosystem	ecology		

MATERIALS:
aquarium with pump (aerator) & lid
materials collected from site
sand
salt water
aquatic plants
small stones
variety of life collected - see attached
warming light
gravel

PREPARATION: Provide students with background concerning the relationships of living organisms in an aquarium ecosystem.

BACKGROUND: Students discover how plants and animals interact with each other in an ecosystem. One type of interaction is illustrated through food chains from simple to more complex. Water, energy, oxygen, nitrogen and carbon are recycled and not wasted.

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Ecology

In an ecosystem, organisms interact with members of their own population as well as other members of their community along with the non-living aspects of the environment. Natural cycles provide an example of systems that maintain a balance of resources in the environment. Energy is evident in the ecosystem's food chain. In this complex system, various organisms either acquire food energy through photosynthesis, by consuming producers or by decomposition of organic matter.

Human Impact on the Environment

Since prehistoric times, people have changed their environment. Early people lived spread out over large areas so the changes they made to the environment had little overall affect. Today, with increased population, people live closer together. Changes to the environment are more extensive and affect many people. All products of today's life style makes our life easier but adds greatly to the human impact on the environment. Until only recently have people become aware of their impact on the air, water, and land.

Living Space

Limiting factors for people include food, water, shelter, clothing, health care, energy, entertainment, transportation etc. Because these items are plentiful in urban areas, many people prefer to live in cities. But as the population in urban areas grow, some of these items are becoming scarce.

Water Pollution

Polluting substances are added to the environment in many ways. Detergents, fertilizers and garbage often wash into streams. These substances can influence the growth of algae in fresh water. As algae growth increases, dissolved O2 is used up in the water causing other organisms to die that need O2.

PROCEDURE: Create 4 classroom aquatic biomes for observation

1). Place aquariums in a sunny area but not direct sunlight.

2). On one side of aquarium place gravel and sand sloping the sand to have a thinner layer.

3). Place aquatic plants and stones in aquarium

4). Add water

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5). Add collected (either collected by the teacher or by students) specimens.

6). Place lid on and warming light

7). Keep a daily record of the happenings in the ecosystem for two weeks. Observe both the living organisms and the non-living features.

SAFETY INFORMATION: Care should be taken to set up a "drip loop" for aquarium tubing so as to avoid danger of electrical shock.

ASSESSMENT: Completion of Data Sheet.

CONNECTIONS: Art, Language, Science, Social Studies, and Math

ENRICHMENT: If you wanted to fill more niches in this ecosystem, what would you add?

Follow-Up Activities

* Test the effects of detergent, fertilizer and garbage on the growth of algae in water and observe and record changes that occur in the water environments for one more week.
* Calculate the area, population and population density of your classroom.
* Determine how decreased area and increased population change population density and determine how high population density affects people.
* Make a survey of your neighborhood or town to observe people's impact on the environment. **Report back to the class**
* Use the record the way in which humans have affected your local environment and suggest some ways people can change their impact on the environment.

RESOURCES

Software

Food Webs, Diversified Educational Enterprises.
Balance - Predator - Prey Stimulation, Diversified Educational Enterprises.

Audiovisual

Introducing Ecology, film, Coronet/MTL.
Relationships, laser disc, Syscon Corporation.
Food Cycle and Food Chains, film, Coronet/MTL.
The Ecosystem, Network of Life, film, BFA.

Other Resources

Odum, Eugene P. (1989) Ecology and Our Endangered Life-Support Systems, Sunderland, MA: Sinauer Associates Inc.

" Florida Coral Reefs are Imperiled" National Geographic July 1990

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NAME: _____
DATE: _____
PERIOD: _____

15. Ecosystem Interactions: How do organisms interact in an Ecosystem?

OBJECTIVES:

1). To determine human impact on marine ecosystems.

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THE STUDENTS WILL:

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3) Evaluate human impact on the environment and make recommendations to minimize that impact.

COMPETENCIES: Grades 6-8

SCHEDULE: 1st Day - 40 minutes (set-up) 5-10 minutes per day for 2 weeks

VOCABULARY:

habitat	population	community	niche
ecosystem	ecology		

MATERIALS:
aquarium with pump (aerator) & lid
materials collected from site
sand
salt water
aquatic plants
small stones
variety of life collected
warming light
gravel

BACKGROUND: Discover how plants and animals interact with each other in an ecosystem. One type of interaction is illustrated through food chains from simple to more complex. Water, energy, oxygen, nitrogen and carbon are recycled and not wasted.

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DATE: _____
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Ecology

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PROCEDURE: Create 4 classroom aquatic biomes for observation

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2). On one side of aquarium place gravel and sand sloping the sand to have a thinner layer.

3). Place aquatic plants and stones in aquarium

4). Add water

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NAME: _____
DATE: _____
PERIOD: _____

5). Add collected (either collected by the teacher or by students) specimens.

6). Place lid on and warming light

7). Keep a daily record of the happenings in the ecosystem for two weeks. Observe both the living organisms and the non-living features.

SAFETY INFORMATION: Care should be taken to set up a "drip loop" for aquarium tubing so as to avoid danger of electrical shock.

ASSESSMENT: Completion of Data Sheet.

ENRICHMENT: If you wanted to fill more niches in this ecosystem, what would you add? _____

_____

ADDITIONAL RESOURCES

Software

Food Webs, Diversified Educational Enterprises.
Balance - Predator - Prey Stimulation, Diversified Educational Enterprises.

Audiovisual

Introducing Ecology, film, Coronet/MTL.
Relationships, laser disc, Syscon Corporation.
Food Cycle and Food Chains, film, Coronet/MTL.
The Ecosystem, Network of Life, film, BFA.

Other Resources

Odum, Eugene P. (1989) Ecology and Our Endangered Life-Support Systems, Sunderland, MA: Sinauer Associates Inc.

" Florida Coral Reefs are Imperiled" National Geographic July 1990

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Student Sheets

NAME: _____
DATE: _____
PERIOD: _____

CLASSROOM MARINE BIOME OBSERVATIONS AND CONCLUSIONS:

DATE: _____

DATE: _____

DATE: _____

DATE: _____

DATE: _____

DATE: _____

DATE: _____

DATE: _____

DATE: _____

DATE: _____

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Student Sheets

NAME: _____
DATE: _____
PERIOD: _____

After the two week observation period, what conclusions can you draw about "created" biomes? _____

1). Label each tank as follows: **Control, Detergent, Fertilizer, and Garbage**
2). Test the effects of detergent, fertilizer and garbage on the growth of algae in water and observe and record changes that occur in the water environments for one more week. Record your observations below:

DATE: _____

DATE: _____

DATE: _____

DATE: _____

DATE: _____

3). Also, during the test week, observe human actions with the environment around your home. Record your observations below:

DATE: _____

DATE: _____

DATE: _____

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Student Sheets

NAME: _____
DATE: _____
PERIOD: _____

DATE: _____

DATE: _____

Calculate the area, population and population density of your classroom.

How does decreased area and increased population change population density and people?

What effect does the introduction of things like detergent, fertilizer, garbage, and higher population have on already stressed environments?

What are some solutions?

Create a picture or model of the perfect "Home Sweet Home."

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16. The Water Table and Flooding

OBJECTIVE: To measure the percolation rates of rainfall and try to determine the underlying ground water condition.

THE STUDENTS WILL:

1). Measuring the rate of rainfall percolating into the ground.

2). Record comparative rates of rainfall being absorbed by the ground water.

COMPETENCIES: Dade CBC: Grades 6-8

SCHEDULE: Varies from 1 - 5+ hours or class periods

VOCABULARY:

percolation	drainage	water table	water cycle
Biscayne Aquifer			

MATERIALS:

CONSUMABLE	NONCONSUMABLE
water	coffee can (5 lb. size)
graph paper	hammer
	carrying container
	watch with second hand

PREPARATION: In order to find a wide range of drainage sites, walk around the school area after a rain. Also ask the school grounds keeper. He will know where the water remains.

BACKGROUND: As more of Florida is built up, the underground system of drainage has been impacted. Commercial development is one of the common causes of these changes. Flooding is sometimes the result of this impact.

TEACHING SUGGESTIONS: Provide students with background about the water cycle.

PROCEDURE: Using your school yard, you can find areas that flood and areas that drain easily.

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Analysis of rates of percolation

1). Draw a diagram of the school and its fields.

2). Select about 10 sites to test. Use sites that are varied whether they remain wet or dry after a rain.

3). Cut off the top and bottom of a large can (coffee can size).

4). Hammer 3"-6" of the can into the ground.

5). Pour 5 liters of water into the can and time it until all the water has drained into the soil.

6). Record the time and plot a graph comparing the location and the time.

Note: The students will clearly see the range in percolation rates. In a class discussion, make educated guesses about the soil types (sand, coral, etc.)

REINFORCEMENT: 1). Field trip to a water treatment plant.
2). Research and map flooding disasters in Florida, the United States and worldwide.

FURTHER READING:

Freshwater Ecology, and Investigating Aquatic Ecosystems, Prentice-Hall

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NAME: _____
DATE: _____
PERIOD: _____

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2). Record comparative rates of rainfall being absorbed by the ground water.

COMPETENCIES: Dade CBC: Grades 6-8

SCHEDULE: Varies from 1 - 5+ hours or class periods

VOCABULARY:
percolation drainage water table water cycle
Biscayne Aquifer

MATERIALS:

CONSUMABLE	NONCONSUMABLE
water	coffee can (5 lb. size)
graph paper	hammer
	carrying container
	watch with second hand

BACKGROUND: As more of Florida is built up, the underground system of drainage has been impacted. Commercial development is one of the common causes of these changes. Flooding is sometimes the result of this impact.

PROCEDURE: Using your school yard, you can find areas that flood and areas that drain easily.

Analysis of rates of percolation

1). Draw a diagram of the school and its fields.
2). Select about 10 sites to test. Use sites that are varied whether they remain wet or dry after a rain.
3). Cut off the top and bottom of a large can (coffee can size).
4). Hammer 3"-6" of the can into the ground.
5). Pour 5 liters of water into the can and time it until all the water has drained into the soil.
6). Record the time and plot on a graph comparing the location and the time.

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Student Sheets

NAME: _____
DATE: _____
PERIOD: _____

MAP OF SCHOOL:

SITE #	INFILTRATION TIME	GRAPH
1	_____	
2	_____	
3	_____	
4	_____	
5	_____	
6	_____	
7	_____	
8	_____	
9	_____	
10	_____	

FURTHER READING:

Freshwater Ecology, and Investigating Aquatic Ecosystems, Prentice-Hall

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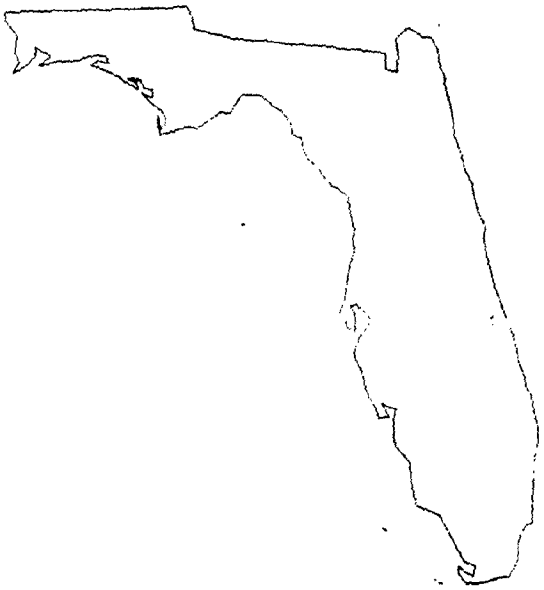
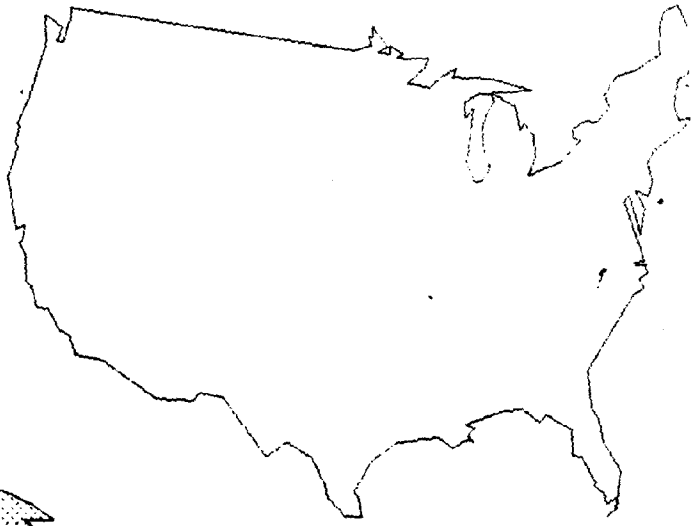
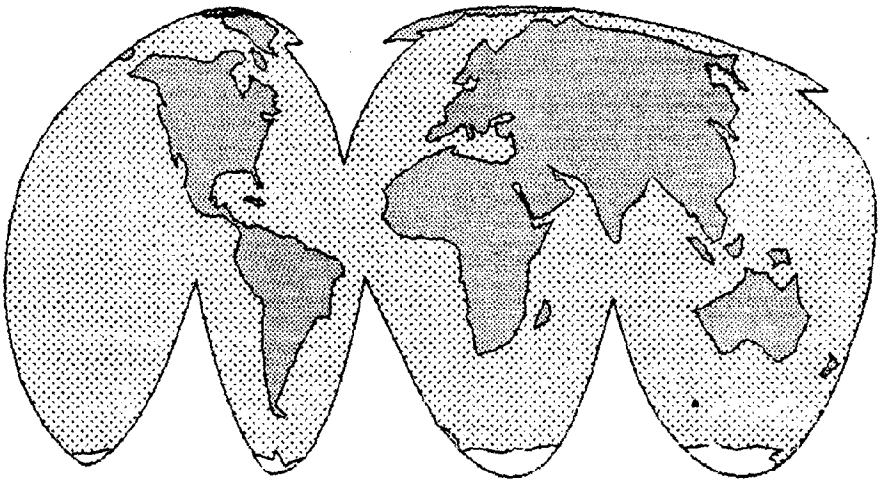
Student Sheets

NAME: _____
DATE: _____
PERIOD: _____

Research and map flooding disasters in Florida, the United States and worldwide.







COMPARE YOUR FINDINGS.

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17. Florida's Greatest Wetlands: The Everglades

OBJECTIVES: To answer the following questions:

1). If the Everglades become extinct, what impact would it have on wildlife and humans?

2). Is the survival of South Florida and the biodiversity of living things dependent upon the Everglades?

THE STUDENTS:

1). Describe characteristics of wetlands.

2). Describe the value and functions of wetlands with regard to wildlife and humans.

3). Identify the four kinds of mangroves and their importance to the wetland ecosystem.

4). State and discuss local, state and federal actions to be taken to protect / preserve the Everglades.

5). Suggest ways students could make a difference to preserve the Everglades.

COMPETENCIES: Dade CBC

SCHEDULE: 4 Class Periods and 1 Field Trip

VOCABULARY:

marsh	swamp	wetland	salt marsh
habitat	endangered species		threatened species

MATERIALS:

CONSUMABLE	**NONCONSUMABLE**
Markers Poster Paper	Teacher-made slide presentation of Everglades/ Wetlands taken in Everglades National Park markers poster paper

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PREPARATION: Compile teaching resource materials for students to refer to in the classroom.

BACKGROUND: The Everglades is the most complicated ecosystem under threat in the United States.

TEACHING SUGGESTIONS: Contact Everglades National Park, the South Florida Water Management District and the U.S. Army Corps of Engineers for resource material to be used in the classroom as background to this lesson plan.

CONNECTIONS: Science, Social Studies, Language Arts, Fine Art

PROCEDURE:

Day 1 Introduction to Wetlands:

1). Divide students into groups of 3-4.
2). Show slide presentation with no narration
3). Direct students to list observations - plants, animals, characteristics.
4). Allow students to discuss their observations
5). Have each group list 5 plants and animals of the Everglades Ecosystem.
6). Create a class list on the board using 3 columns:

Characteristics	Plants	Animals

7). Distribute markers / posters and resource materials to each group.
8). Have the students to create their own interpretation of a wetland.
9). Define Everglades as meaning "River of Grass"

Day 2
Have the cooperative groups come up with "Wetland Metaphors." Share these by writing them on the "wetland" posters and displaying them.

Day 3
Field Trip - Everglades National Park, Everglades - Holiday Park, or Loxahatchee National Wildlife refuge

Day 4
Discuss mangrove community
Students to observe mangrove mountings
Discuss food webs in mangrove communities

Day 5
Quiz / Test
Questionnaire - survey of students / parents

Day 6
Share survey results

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MULTICULTURAL COMPONENTS: Compare world-wide wetland locations and the inhabitant's impact on those ecosystems.

ADDITIONAL INFORMATION / CROSS REFERENCES:

Cavanaugh, Peggy and Margaret Spontak (1992) Protecting Paradise Phoenix Publishing Fairfield, Fl

Davis, Steven M and John C. Ogden (1994) Toward Ecosystem Restoration

Everglades National Park, Teacher's Resource Notebook (available through participation in Teacher Workshop - Sandy Dayhoff, Ranger Loop Road Station, (813) 695-4796).

Focus on Life Science (1986) Charles E. Merril Publishing Co.

Florida Salt Marshes (publication) Florida Department of Natural Resources Bureau of Marine Research P.O.Box F St. Petersburg, Fl 33731

Meyers, Ronald L. and John J. Ewel (1990) Ecosystems of South Florida

"Project Wild" Western Regional Environmental Education Council pp. 54-56

"Restoring the Everglades"The Miami Herald 14 January 1994

"The Everglades: Reversing Man's Mistakes"(Special Report) The Palm Beach Post 11 April 1993

The Source Book of Marine Sciences Florida Oceanographic Society pp. 1-10

"Walking Trees" (publication) Florida Department of Natural Resources

Weaver, James and Bradford Brown et al (1993) Science Subgroup Report of the Federal South Florida Ecosystem Restoration Working Group

Wetlands of the Florida Keys (publication) The Florida Keys Chapter of the Izaak Walton League of America P.O. Box 465 Islamorada, Fl 33036

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2). Is the survival of South Florida and the biodiversity of living things dependent upon the Everglades?

THE STUDENTS WILL:

1). Describe characteristics of wetlands.

2). Describe the value and functions of wetlands with regard to wildlife and humans.

3). Identify the four kinds of mangroves and their importance to the wetland ecosystem.

4). State and discuss local, state and federal actions to be taken to protect / preserve the Everglades.

5). Suggest ways students could make a difference to preserve the Everglades.

COMPETENCIES: Dade CBC

SCHEDULE: 4 Class Periods and 1 Field Trip

VOCABULARY:

marsh	swamp	wetland	salt marsh
habitat	endangered species		threatened species

MATERIALS:

CONSUMABLE	NONCONSUMABLE
Markers Poster Paper	Teacher-made slide presentation of Everglades/ Wetlands taken in Everglades National Park markers poster paper

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Student Sheets

NAME: _____
DATE: _____
PERIOD: _____

PROCEDURE:

1). Watch the slide presentation
2). List your observations - plants, animals, characteristics.
3). In your group list 5 plants and animals of the Everglades Ecosystem.
4). Create a class list on the board using 3 columns:

Characteristics	Plants	Animals

5). Using your markers and poster board, create your own interpretation of a wetland.

Day 2
Within your cooperative groups, come up with "Wetland Metaphors." Share these by writing them on the "wetland" posters and displaying them.

Day 3
Field Trip

Day 4
Discuss mangrove community
observe mangrove mountings
Discuss food webs in mangrove communities

Day 5
Quiz / Test
Conduct a survey of students / parents by asking the following questions:

- **Is there a swamp, bog, freshwater marsh, salt marsh, or other type of wetland in or near your community? If so describe it.**
- **Can you give seven reasons who wetlands are important?**
- **Can you name several animals that depend on wetlands?**
- **Can you name two famous wetlands in North America?**

Day 6
Share survey results

MULTICULTURAL COMPONENTS: Compare world-wide wetland locations and the inhabitant's impact on those ecosystems.

ADDITIONAL INFORMATION / CROSS REFERENCES:

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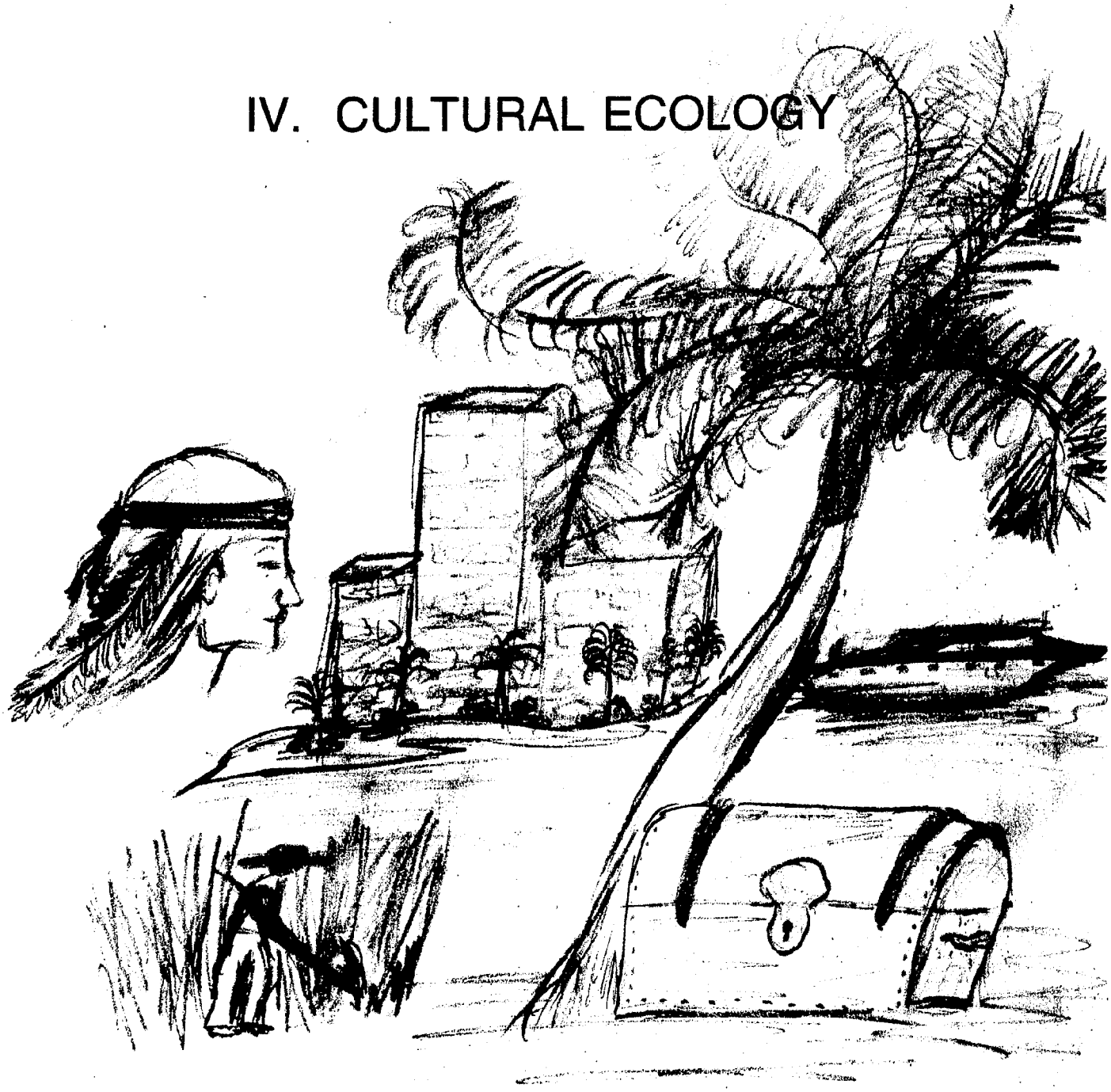
IV. CULTURAL ECOLOGY



THE HISTORY OF DEERFIELD ISLAND PARK

TREASURE HUNT

SEMINOLE BURIAL GROUNDS

YOUR OPINION PLEASE

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18. The History of Deerfield Island Park ("Al Capone's Island")

OBJECTIVES:

1). To acquaint students with laws from the "Florida State Wilderness Act" to include:
   a). 258.18 Statement of Legislative Intent
   b). 258.19 Definitions
   c). 258.25 Number of Areas
   d). 258.26 Priority of Establishment
   e). 258.22 Selection of Wilderness Areas

2). To involve students in a hands-on activity to go with Al Capone History Lecture by labeling map of Deerfield Island Park.

THE STUDENTS WILL:

1). Learn the history of Deerfield Island Park

2). Identify the flora and fauna of the island

3). Construct a map of the island

COMPETENCIES: Dade CBC: Grades 6-8

SCHEDULE: One Class Period (50 minutes)

VOCABULARY:

island	habitat	canal	waterway
marina	park		

MATERIALS:
CONSUMABLE
(1 per student)
outline map of Deerfield Island Park
(the learner will label points of interest on the map)

PREPARATION: Become familiar with Deerfield Island Park and how activities overlap with one another.

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BACKGROUND: A brief outline of the history -

a). Al Capone acquired 55.2 acres of land on the north side of Hillsboro Canal (A1A and the Intracoastal Waterway).

b). In the last years of Prohibition, Capone had troubles with the IRS and the Boca Raton Council.

c). 1930 - Capone wants to build homes, but Boca Raton Council refused by requiring him to build an access road into town.

d). 1934 - U.S. Government requires property of Capone's bankrupt estate and conveys it to the Florida Island Navigation District (F.I.N.D.). This conveyance was subject to the Army Corps of Engineers as a spoil area. (Spoil Area #702).

e). 1952 - F.I.N.D. gave option to J. Meyer Schine's Corporation, Boca Raton Club Inc.

f). 1956 - Arvida entered the picture and dug a canal from the Intracoastal Waterway west to Hillsboro Canal and then the Capone property became an Island.

g). 1959 - Arvida gave F.I.N.D. a 50' x 300' deed easement for any future bridge. J. Meyer Schine Corp., Boca Raton Club Inc. went to State and Federal Courts claiming a 95 year lease and abridged its right to first refusal. Schine lost in both courts.

h). 1977 - Broward County allocated $179,000 for the first phase of construction. Broward County asked Boca Raton to provide water. Since then, Deerfield Beach has provided water to the island.

i). 1978 - FP&L plans to provide electricity.

j). Today - Royal Palm Improvement Association is helping Broward County to develop a water related recreational area and protection for all wildlife.

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On Deerfield Island Park, the following plants and animals are found:

Flora

Hardwood Trees	Understory Trees and Shrubs	Ferns
Red Mangrove	Wild Coffee	Serpent Fern
White Mangrove	Brazilian Pepper Tree	Leather Fern
Gumbo Limbo	Sea Grape	Swamp Fern
etc.	etc.	etc.

Fauna

Reptiles & Amphibians	Mammals	Birds
Soft Shell Turtle	Raccoon	Brown Pelican
Newt Salamander	Grey Squirrel	Common Egret
Green Tree Frog	Cottontail Rabbit	Mangrove Cuckoo
etc.	etc.	Little Blue Heron
		Carolina Wren
		etc.
		(migratory birds)

TEACHING SUGGESTIONS: Develop each activity as an integrated part of the whole lesson.

Activity One: Identifying Indigenous Flora and Fauna of Deerfield Island Park
(Classroom Activity)

Have site specific lab stations, information on manila folders that describes the flora or fauna (4 per station). Also on one side of the manila folder, questions would be stated that the learner will answer about each species at that station. The lab station will have either live species or a picture of each species and observational tools such as hand lens, microscope, etc.. The learner will then draw the species in their own folders.

Depending on the number of species, it is possible to have at least six or more lab stations. To facilitate flow, allow the learners either 15 minutes per station.

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The last 30 minutes of lab work, ask for clues from the learners to list and identify the species in their own folders. These should be copies into the folders to use on the field trip to locate and draw the species.

Assessment: Grade questions and answers. Grade drawings. Check clue list.

Activity Two: "Trail Blazing on Deerfield Island Park"

1). Students will follow map directions according to teacher instructions. Students should be able to get from point A to point B.
2). Students will divide up into groups - each group will "blaze" or mark their own trail. After marking their own trail, groups will exchange trails to see if they can follow the marking of the group that originally blazed the trail.

Activity Three: Scavenger Hunt

1). Each learner is to locate each of the 20 species. Then, draw the habitat and species (especially fauna) on site.

2). The student must then return to the teacher to have it checked for accuracy. When checked off, they may either draw at least 2 sketches of a site or the island and label or add detail to the map in activity two.

3). Have a "Treasure Reward" for completion of the projects!

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AS A SUBGRANT AWARDED BY N.O.A.A. - NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

NAME: _____
DATE: _____
PERIOD: _____

18. The History of Deerfield Island Park ("Al Capone's Island")

OBJECTIVES:

1). To acquaint students with laws from the "Florida State Wilderness Act" to include:
   a). 258.18 Statement of Legislative Intent
   b). 258.19 Definitions
   c). 258.25 Number of Areas
   d). 258.26 Priority of Establishment
   e). 258.22 Selection of Wilderness Areas

2). To involve students in a hands-on activity to go with Al Capone History Lecture by labeling map of Deerfield Island Park.

THE STUDENTS WILL:

1). Learn the history of Deerfield Island Park

2). Identify the flora and fauna of the island

3). Construct a map of the island

COMPETENCIES: Dade CBC: Grades 6-8

SCHEDULE: One Class Period (50 minutes)

VOCABULARY:

island	habitat	canal	waterway
marina	park		

MATERIALS:
CONSUMABLE
Manila Folders
outline map of Deerfield Island Park
(the learner will label points of interest on the map)

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Student Sheets

NAME: _____
DATE: _____
PERIOD: _____

BACKGROUND: A brief outline of the history -

a). Al Capone acquired 55.2 acres of land on the north side of Hillsboro Canal (A1A and the Intracoastal Waterway).

b). In the last years of Prohibition, Capone had troubles with the IRS and the Boca Raton Council.

c). 1930 - Capone wants to build homes, but Boca Raton Council refused by requiring him to build an access road into town.

d). 1934 - U.S. Government requires property of Capone's bankrupt estate and conveys it to the Florida Island Navigation District (F.I.N.D.). This conveyance was subject to the Army Corps of Engineers as a spoil area. (Spoil Area #702).

e). 1952 - F.I.N.D. gave option to J. Meyer Schine's Corporation, Boca Raton Club Inc.

f). 1956 - Arvida entered the picture and dug a canal from the Intracoastal Waterway west to Hillsboro Canal and then the Capone property became an Island.

g). 1959 - Arvida gave F.I.N.D. a 50' x 300' deed easement for any future bridge. J. Meyer Schine Corp., Boca Raton Club Inc. went to State and Federal Courts claiming a 95 year lease and abridged its right to first refusal. Schine lost in both courts.

h). 1977 - Broward County allocated $179,000 for the first phase of construction. Broward County asked Boca Raton to provide water. since then, Deerfield Beach has provided water to the island.

i). 1978 - FP&L plans to provide electricity.

j). Today - Royal Palm Improvement Association is helping Broward County to develop a water related recreational area and protection for all wildlife.

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Student Sheets

NAME: _____
DATE: _____
PERIOD: _____

On Deerfield Island Park, the following plants and animals are found:

Flora

Hardwood Trees	Understory Trees and Shrubs	Ferns
Red Mangrove	Wild Coffee	Serpent Fern
White Mangrove	Brazilian Pepper Tree	Leather Fern
Gumbo Limbo	Sea Grape	Swamp Fern
etc.	etc.	etc.

Fauna

Reptiles & Amphibians	Mammals	Birds
Soft Shell Turtle	Raccoon	Brown Pelican
Newt Salamander	Grey Squirrel	Common Egret
Green Tree Frog	Cottontail Rabbit	Mangrove Cuckoo
etc.	etc.	Little Blue Heron
		Carolina Wren
		etc.
		(migratory birds)

Activity One: Identifying Indigenous Flora and Fauna of Deerfield Island Park
(Classroom Activity)

1). With your group, travel to the lab stations in your class. The information on the manila folders describes flora or fauna and asks several questions. The lab station will have either live species or a picture of each species and observational tools such as hand lens, microscope, etc.. **Read the information, take a close look at the species, answer the questions and draw the species in your own folders.**

2). The last 30 minutes of lab work, share clues with the class to help identify the species that will be seen on the field trip.

Activity Two: "Trail Blazing on Deerfield Island Park"

1). Follow map directions according to teacher instructions. Be able to get from point A to point B.

2). Divide up into groups - each group will "blaze" or mark their own trail. After marking a trail, exchange trails with another group to see if they can follow the markings.

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Student Sheets

NAME: _____
DATE: _____
PERIOD: _____

Activity Three: Scavenger Hunt

1). Try to locate each of the 20 species. Draw the habitat and species (especially fauna) on site.

2). Return to the teacher to have it checked for accuracy. When all species are checked off, either draw at least 2 sketches of a site or the island or add detail to the map in activity two.

Sketches:

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19. Treasure Hunt

OBJECTIVE: To understand how the Florida's reefs were responsible for hundreds of shipwrecks along the coast.

THE STUDENTS WILL:

1). Create a map using 1" to 1' scale to plot shipwreck "treasure" sunken of the Florida coast.

2). Develop mapping skills to find hidden "treasure".

COMPETENCIES: Grades 6-8

SCHEDULE: Three to six 60 minute class periods.

VOCABULARY:

Keys	reefs	cardinal directions	continental shelf
symbols	scale	Gulf Stream	

MATERIALS:

bandannas
patches,
jolly rogers and other pirate paraphanelia
parchment paper
rulers
compass
colored pencils
gold covered chocolate pieces
18 x 24 white drawing paper

PREPARATION:

1). Assign groups, arrange supplies and room.

2). Have rules and guidelines ready to hand out.

3). Inform students to bring pirate type clothing for day of treasure hunt.

BACKGROUND: Discuss stories about sunken treasure. (Treasure Island) Look at and discuss maps of the Florida Keys and the southern coast of Florida showing the reefs, continental shelf, gulf stream and underwater obstacles along the coast. Discuss why ships were sunk and where pirates may have hid their treasure. Make maps to relocate it. Discuss scale and how maps use scale.

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TEACHING SUGGESTIONS: Show the class the video of "Treasure Island".

PROCEDURE:

At the beginning of class, use masking tape to create a map of South Florida on the floor of the classroom. Get the students to help with this portion.

1). Discuss background information

2). Show students how to scale down a map

3). Draw small individual practice map to locate shipwreck " treasures"; separate into cooperative groups and make one larger map to mark shipwrecks off the coast of South Florida.

4). All groups make maps of their "treasure" spot.

5). Have all groups hide gold pieces, switch maps, and go find treasure.

6). All groups switch maps and go find the other group's "treasure".

MULTICULTURAL COMPONENT: Research the history of Spanish treasure fleets to Florida and the Caribbean.

CONNECTIONS: Social Studies, Art, Geography, Math; Write a pirate song and sing it to class; Design a pirate flag and show it to the class.

FURTHER READING:

1). Educational information from the Mel Fisher Maritime Heritage Society Museum in Key West.

2). Magazines, papers and books from school and public libraries.

3). The G.R.E.E.N. Book, Teachers Resource Guide for Monroe County.

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THE STUDENTS WILL:

1). Create a map using 1" to 1' scale to plot shipwreck "treasure" sunken of the Florida coast.

2). Develop mapping skills to find hidden "treasure".

COMPETENCIES: Grades 6-8

SCHEDULE: Three to six 60 minute class periods.

VOCABULARY:

Keys	reefs	cardinal directions	continental shelf
symbols	scale	Gulf Stream	

MATERIALS:

bandannas
patches,
jolly rogers and other pirate paraphanelia
parchment paper
rulers
compass
colored pencils
gold covered chocolate pieces
18 x 24 white drawing paper

BACKGROUND: Discuss stories about sunken treasure. (Treasure Island) Look at and discuss maps of the Florida Keys and the southern coast of Florida showing the reefs, continental shelf, gulf stream and underwater obstacles along the coast. Discuss why ships were sunk and where pirates may have hid their treasure. Make maps to relocate it. Discuss scale and how maps use scale.

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Student Sheets

NAME: _____
DATE: _____
PERIOD: _____

PROCEDURE:

At the beginning of class, use masking tape to create a map of South Florida on the floor of the classroom.

1). Discuss background information

2). Learn how to scale down a map

3). Draw small individual practice map to locate shipwreck " treasures"; separate into cooperative groups and make one larger map to mark shipwrecks off the coast of South Florida.

4). Within the groups, decide on a place to hide treasure. Make maps of that "treasure" spot using the floor map and classroom features.

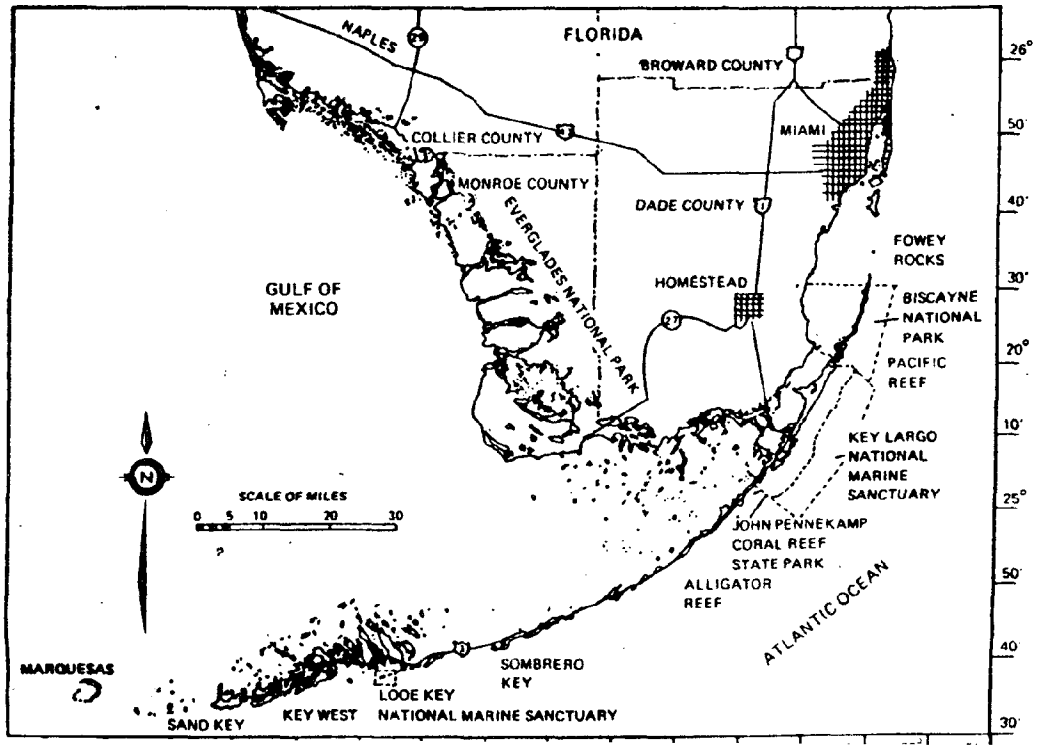
5). Hide gold pieces, switch maps with another group, and go find treasure.

6). All groups switch maps again and go find the other group's "treasure".

MULTICULTURAL COMPONENT: Research the history of Spanish treasure fleets to Florida and the Caribbean.

CONNECTIONS: Social Studies, Art, Geography, Math; Write a pirate song and sing it to class; Design a pirate flag and show it to the class.

FURTHER READING:
Educational information from the Mel Fisher Maritime Heritage Society Museum in Key West.



20. Seminole Burial Grounds

OBJECTIVE: To reinforce the importance of leaving sacred burial grounds and archaeological sites untouched.

THE STUDENTS:

1). Draw conclusions and make inferences from reading.

2). Visit archaeological and Native American museums.

COMPETENCIES: 6-8

SCHEDULE: Two class periods

VOCABULARY:

Seminole	burial grounds	sacred	Miccosukee
artifact	time-capsule	excavate	

MATERIALS:

class set of Vision Quest books
pictures
artifacts

PREPARATION: Reads Vision Quest books or similar reading material.

BACKGROUND: Have, in the classroom, a reading collection of appropriate material about Indian artifacts being illegally dug up from grave sites and sold to museums.

PROCEDURE:

1). Have the students research the practice of archaeological excavation for commercial purposes.

2). Have students prepare a debate on Grave Robbing.

3). Discuss how Broward County construction companies have built over Indian burial grounds. Cite examples such as Westin Coral Springs Reality Co.

4). Draw conclusions, finding similarities and differences in the way of other counties, states etc. have handled this problem.

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5). Make inferences about two different situations.

6). Discuss possible plans to prevent this in the future.

7). Create a class time capsule to bury on the school grounds. Ask each student to make a small contribution.

ENRICHMENT: Research the history and location of the various Indian tribes in Florida

CONNECTIONS: Social Studies, Archaeology, Art

MULTICULTURAL COMPONENT: Compare Seminole and Miccosukee traditional folkways to other Native American customs as well as world-wide (ie: Egyptian).

Invite local tribe members to share some of their tribal traditions and memories.

21. Your Opinion Please

OBJECTIVE: Students will determine their Representative in government and write a letter outlining personal opinions regarding crucial water issues.

COMPETENCIES: Grades 6-12, 1-40 students

SCHEDULE: 4 - 12 (or more) class periods

MATERIALS: Current events and editorials in the newspapers, Legislators' page from the telephone book, copy of voter's registration card.

PREPARATION: After discussing the necessity of water to all life, the problems of pollution, and the ease with which we accept inexpensive, fresh water, have the students collect and discuss water issues in the news.

BACKGROUND: Students collect newspaper articles and current events ranging from sewer pipe problems, Everglades cleanup, the building of "Wayne's World" Amusement Park, environmental group activities, exotic plants that consume too much water and land areas, or any other related issue.

TEACHING SUGGESTIONS: Prepare students sufficiently with the topic before the letter writing with current events topics and supplemental activities. A poster-sized sample letter may be necessary for those students who are not confident in letter format.

PROCEDURE: Once students have become familiar with water issues, they may be suggesting the most common logical step - local action. Some may want to take around petitions, but thoughtfully written letters have been said to be more effective tools to influence legislators. Some issues must be addressed at specific levels, local, state, or national and this must be carefully explained. The use of the Legislators' List in the telephone book, a copy of a voter's registration card and carefully selected maps may be effectively used.

A sample letter may be shown as an example as long as students realize they must not copy the body of the letter; the letter must reflect their own ideas and opinions.

Letters may be sent individually or in a large packet. Letters that are sent individually may receive more serious attention. Show students responses received from the legislators by previous writings by the teachers, so that the students may be motivated by the possibility of a response if the letter is clear and thoughtful; also remind students that a response may take a month or possibly two. Allow students to share ideas after their letters are written, and remind students that even the professional writers write at least one or two rough drafts before sending off their final copy.

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STUDENT DATA SHEETS: Learning the names of legislators is a valuable activity and it makes students more aware of the names and legislative roles as they appear on the news. Use the front section of the telephone book to get the most current legislative officers and their addresses.

MULTICULTURAL COMPONENT: Clean water is essential to all people and involvement in governmental action at all ages and levels is recommended by the competency-based curriculum. Students may be able to work in pairs or teams if they find the current events work or letter writing frustrating.

SAFETY INFORMATION: Remind students that letters must be serious, thoughtful, and non-threatening. Serious legal consequences can arise if students send threats through the postal system.

ASSESSMENT: Final copies of the letters may be put into the student's personal portfolio if that student chooses.

ENRICHMENT: Students may be encouraged to write to legislators at every level and to any other person who may be influential in the decision-making processes of government.

SPECIAL RESOURCES & BACKGROUND READING: The Miami Herald, Sun Sentinel, and Palm Beach Post are especially helpful. Contact them about participating in the Newspapers In Education.

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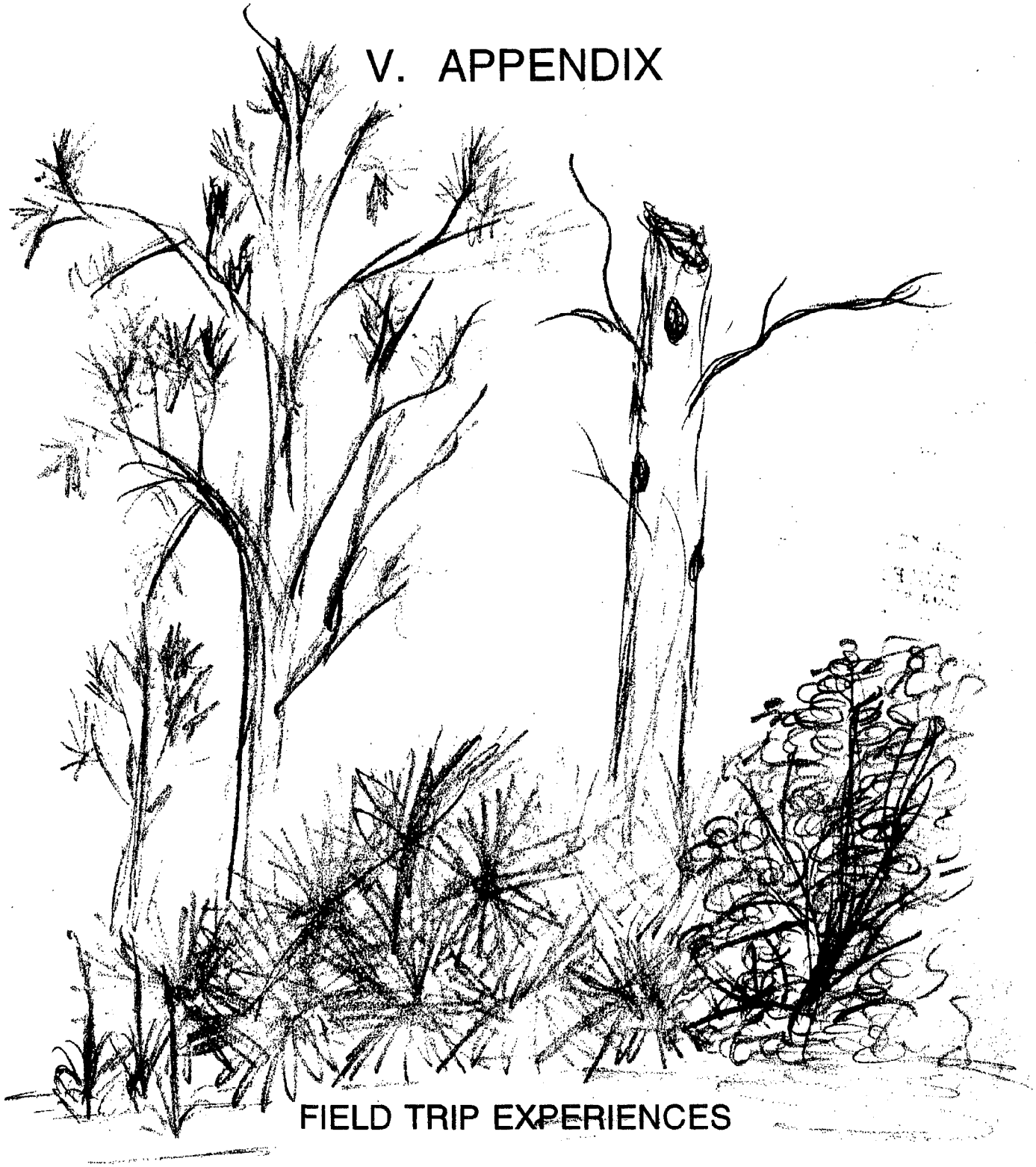
V. APPENDIX



FIELD TRIP EXPERIENCES

PINE JOG ENVIRONMENTAL EDUCATION CENTER

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FIELD EXPERIENCES

SAFTETY CONSIDERATIONS

*Proper lab procedures and safety are required.

*A First Aid kit will be available and complete for all activities.

*To participate in water activities, each student must be tested for swimming abilities and adequate skills must be displayed at that time.

*The buddy system should be used at all times.

*Proper clothing including foot wear should be worn at all times.

*Water communication signals will be taught to everyone

*When snorkeling at sites, a dive flag is required for each group of 6 students.

*Students should carefully collect living and non-living specimens (note: all living specimens will be returned their natural environments as soon as possible after observation.)

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WRECK, CORAL REEF, AND ARTIFICIAL REEF FIELD TRIP
Atlantis Dive Center

Address: 51 Garden Cove Drive, Key Largo, Fl 33037 (Monroe County)

Contact Person: Environmental Education Director

Telephone: 305-451-1325

Tour Guide: Yes, Dive Master

Handout Literature: Fliers

Restroom: Yes

Gift Shop: Yes

Parking: Yes

Admission: $5.00 for Students ($5.00 set snorkeling gear)

Lunch Spot: Snacks, pack lunch, restaurant

Hours: 8:00 A.M. - 6:00 P.M.

Public Telephone: Yes

Medical Facilities: Dive Master and Park Rangers trained in First Aid

Physically Impaired Access: Yes

Objectives: Marine Wildlife observation

Background Information: Program offers snorkeling or diving trips

Natural and Cultural Environment: Three different reef curriculums are available and can be combined with trips

Time Frame: 1 Dive (9:00 A.M. , 12:30, 3:30 P.M.); 2 Dives (8:30 A.M., 1:30 P.M.)

Group size: 40

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SANDY SHORE AND ROCKY SHORE FIELD TRIP
Metro Dade Parks & Recreation (Crandon Park)

Address: Natural Services, 3701 S.W. 70 Ave., Miami, Fl 33155
(400 Crandon Blvd., Key Biscayne, Fl 33149) Dade County

Contact Person: Alice Thurmono

Telephone: 305-662-4124 (361-5421)

Tour Guide: Yes, Environmental Center

Handout Literature: Tropical Trails

Restroom: Yes

Gift Shop: No

Parking: Yes

Admission: $2.00 per vehicle plus $1.00 toll on Rickenbacker Causeway

Lunch Spot: Picnic area, grills, concession stand

Hours: 8:00 A.M. - 5:00 P.M.

Public Telephone: Yes

Medical Facilities: Life Guards on duty, First Aid

Physically Impaired Access: Yes

Objectives: Touch the Bay - Hands-On program

Background Information: Crandon Park has three miles of scenic beach

Natural Environment: A unique black mangrove fossil reef, one of only two such reefs in the world.

Time Frame: High and low tides

Group Size: 30-60

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SNORKLE TRIP
John Pennekamp State Park

Objectives: To give students the experience of snorkeling over a live coral reef and actually seeing and experiencing this environment.

Background Information: The trip to Pennekamp will enable the students to observe and experience the following natural environments:

1). Tropical Hardwood Hammock
2). Mangrove Swamp
3). Lagoon area - in-shore fish, invertebrates and algae.

Activity Procedures:

1). Plan Field Trip - Make RSVP, get parent volunteers.
2). Teach class
3). Arrive Pennekamp
4). Check in for snorkel and get gear
5). Visit aquarium for dry fish ID
6). Snorkel in lagoon for last minute snorkeling lesson refresher and swim group practice.
7). Eat lunch and observe the mangrove swamp next to picnic tables and tropical hammock.
8). Board boat for ride out to reef - observe mangroves and erosion as you leave the dock.
9). Travel by tidal flats and then visit reef
10). Snorkel in groups for approximately 1- 1 1/2 hours.
11). Return to Pennekamp, shower, return gear and return home.
12). Next day - show videos taken on trip - discuss marine life.
13). Give post-test on fish ID, coral and marine food chains.

Group Size: Class size: 40 max., 15-20 ideal, over 40 - control becomes a problem.

Address: North Key Largo, Florida

Contact: Concessionaire / Dive locker

Phone: See Monroe County Telephone Book

Tour Guide: Teacher / Parents

Hand-Outs: Plastic fish ID cards 1 per each dive group - to be returned to teacher

Rest Rooms: By gift shop and dock

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Gift Shop: Next to aquarium - have chaprones go with students to prevent theft - gift shop and aquarium next to parking lot.

Admission: Fee waivers for State Park can be applied for by mail before trip. Cost per student for snorkel trip is $18.00 for boat and gear. (groups of 25 or more) $22.00 per person for adults.

Lunch Spot: Snack bar in gift shop, picnic tables across parking lot.

Hours: Snorkel Trips - Boats leave dock at 9 A.M., Noon and 4 P.M. Snorkelers must be at scheduling counter at snack bar / gift shop at least 1 hour before departure time - earlier is better to sign up. RSVP can be made before time and paid for reserved space.

Medical Facilities: First Aid station near snack bar. Students should have parent's permission slip signed and any medical problems.

WHAT TYPES OF FISH CAN BE CAUGHT IN THE SURF?
Juno Beach State Park

Contact Person: Florida marine Patrol Region IV, District 10

Telephone: 407-624-6935

Restroom: Yes

Parking: Yes

Admission: Free

Lunch Spot: The sea shore

Hours: Dawn to Dusk

Public Telephone: Yes

Medical Facilities: Nearest hospital: Jupiter Medical Center

Physically Impaired Access: Yes, in restrooms

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Field Experience Objectives:

1). To obtain an understanding of Florida's beach and surf habitats.
2). To learn fishing ethics and regulations
3). To discover fish quantities of different species caught in the surf.

Background Information: Use Fishing Lines Anglers Guide to Florida's Marine Resources as classroom text before field experience. Obtain texts from :

Department of Environmental Protection
Office of Communications
Mail Station 30
3900 Commonwealth Blvd.
Tallahassee, Fl 32399 - 3000
or
Gumbo Limbo Nature Center
(See handouts attached)

Multicultural Component: Learn names of fish in English and Spanish

Activity Procedure:

1). Draft a letter to be taken home by students to their parents asking if they would be willing to participate in a Saturday morning of surf fishing with their child. (Encourage catch and release fishing)
2). On a pre-arranged Saturday morning, meet with parents and children at the given stretch of beach or parking lot.
3). Surf fish for 2-4 hours recording all data on "Surf Fishing Data Table".

Time Frame: Two to Four hours

Group Size: Parents and children are to stay together and fish as a group.

Teacher Preparation and Teaching Tips:

1). Call parents of students who are going on the field trip.
2). Parents and children must provide their own rods, reels, bait, etc.
3). Parents are responsible for their child's transportation, food, drink etc.

Resource Materials and Reading List:

"Fishing Lines Anglers Guide to Florida Marine Resources"
"Florida Fishes" by Rube Allen, Great Outdoors Publishing
"Fish Florida Saltwater" by Boris Arnov, Gulf Publishing Co.
"The History of Angling" by C.F. Waterman, Winchester Press
Free Brochures - Florida Department of Environmental protection
100 Eighth Ave. S.E.
St Petersburg, Fl 33701 - 5095

OCEANOGRAPHIC, CULTURAL, ENVIRONMENTAL ACTIVITY NOTEBOOK
ADMINISTERED AND PUBLISHED BY PINE JOG ENVIRONMENTAL EDUCATION CENTER AT FLORIDA ATLANTIC UNIVERSITY
FUNDED BY THE STATE OF FLORIDA - FLORIDA COASTAL MANAGEMENT PROGRAM DEPARTMENT OF COMMUNITY AFFAIRS
AS A SUBGRANT AWARDED BY N.O.A.A. - NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

SANDY DUNE FIELD TRIP
MacArthur State Park

Rest Rooms: Yes

Gift Shop: Yes

Parking: Yes

Lunch Spot: Bring bag lunch

Hours: 9:00 A.M. - 5:00 P.M.

Public Telephone: Yes

Medical Facilities: First Aid Kit - teacher certified in First Aid and CPR

Physically Impaired Access: Yes

CORAL REEF, SANDY BEACH AND MANGROVE ESTUARY FIELD TRIP
Gumbo Limbo Nature Center and Red Reef Park

Address: A1A Boca Raton, Florida

Contact: City of Boca Raton Parks and Rec.

Tour Guide: Yes, Environmental Education Center

Handout Literature: Yes, in Center

Restroom: Yes

Gift Shop: Yes

Parking: Yes

Admission: Free with letter from field school

Lunch Spot : On the beach, student brings

Hours: 8:00 a.m. to 4:00 p.m.

Public Telephone: Yes

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Medical Facilities: Major medical facilities are nearby and center employees and life guards are trained in first aid and CPR.

Physically Impared Access: Yes

Objectives: Snorkel to view various ocean inhabitants. Compare their creations with real organisms and to visit a natural coastal environment

Time Frame: Approx. Time - 4 1/2 hours

Group Size: 40 Students
**Make sure students can swim and snorkel!

Observing/Collecting Specimens for a Model Ecosystem.

Objectives: The student will collect specimens for a model ecosystem.

Background Information:

Fishing Lines
Department of Environmental Protection
pp. 3-8 "Florida's Marine Habitat"

Florida Estuaries
Florida Sea grant College Program SGEB-23
pp. 2-9
Humphreys, Fraz Seaman

"Nationwide Study Looks at Pesticide Threat to Estuaries"
Fathom
Summer 1993; Vol. 5 #2; pp. 3-4

The Nature Co.
Palm Beach Gardens
3101 PGA Blvd.
West Palm Beach, FL
Contact: Kim Switzer - (407) 624-1066
"Exploring the Beach Ecosystem" Tour

Multicultural Component: p. 359, 361 (Glencoe) Science Interactions Book 1
Activities Booklet pp. 27-28 (See China Yangtze example)

Activity Procedures:

1). Using hand nets and large 2 person "drag" net students will collect specimens for their model ecosystem.

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2). Collect sand and water for ecosystem.

3). Collect specimens, place in collection buckets.

4). ID organisms collected (Handout: Chordinates / Invertebrates of Palm Beach County)

Time: 1 Hour

Group Size: 15-20 Students

Teacher Preparation and Teaching Tips:

1). Bring a whistle to regroup.

2). Students should wear water socks or bring an extra pair of sneakers to wear in the water and a dry pair to change in to.

3). Bring 12 collection buckets / containers.

4). Students should bring a towel.

5). Bag lunch, money for drink machine

6). Sunscreen

7). First Aid Kit

8). Bring Aerator for optimal survival rate.

MANGROVE FIELD TRIP
Biscayne National Park

Address: P.O. Box 1369, Homestead, Fl 33090 - 1369 (Dade County)

Contact Person: Public Outreach Coordinator

Telephone: 305-247-2044

Tour Guide: Yes, Park Rangers

Handout Literature: Park Brochure

Restroom: Yes

Gift Shop: Yes

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Parking: Yes

Admission: Free

Lunch Spot: Picnic areas available with tables & grills

Hours: 8:00 A.M. - Sunset

Public Telephone: Yes

Medical Facilities: Park Rangers trained in First Aid

Physically Impaired Access: Yes

Objectives: Marine Wildlife, Terrestrial and Cultural Identification

Natural and Cultural Environment: America's largest aquatic national park comprising 181,500 acres of islands and reefs, gives a picture of what South Florida looked like hundreds of years ago.

Multicultural Component: Tales of ancient shipwrecks and fascinating islands.

Time Frame: 9:00 A.M. - 2:30 P.M.

Group Size: Any size group

Wetland Wonders

Address: 6446 SW 42 St.
Davie, Florida 33314

Contact: Diane A. Vasily (of the Science Eye) and Ed Harrison of the Learning Center

Telephone: (305) 792-7393
1-800-423-9944

Time: 1 Day

Location: Everglades National Park - Alligator Alley

Transportation: Provided by Tour Group - Students to be picked up at school 8 A.M. and return 6 P.M.

Cost: $50 /student with food - for 36 or more students.

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Instruction: Provided by Tour Group

Natural Environment: Canoe trip into the waters of the Ten Thousand Island area of Florida to explore the mangrove, marshes and swamps. Students to explore the animals and plants, mangroves, freshwater big cypress and aquatic world of Southern Everglades.

Everglades Boat Ride - Everglades Holiday Park

Address: 21940 Griffin Rd.

Contact Person (s): "Angela" in the office

Telephone: (305) 434-8111

Tour Guide: Air Boat Captains - Bill Sidman

Handout Literature: Pamphlets

Rest Rooms: Yes

Gift Shop: Yes - Open 9:00 A.M. - 5:00 P.M. Combination Grocery store/ souvenir shop, also Indian artifacts on "Seminole Island"

Parking: Yes

Admission: Group rate available: half- day / full day

Lunch Spot: Food available on premises, may bring bag lunch

Hours: 9:00 A.M. - 5:00 P.M. Air boat captain will take students to "Picnic Island" where tables are available. Island located in the Everglades.

Public Telephone: Yes

Medical Facilities: First Aid Kits

Physically Impaired Access: Yes, boats will accommodate physically impaired individ.

Cost: Varies, average group rate
**Captain Bill Sidman will create a special tour according to your needs. He will, with two days notice, obtain grass samples, search out nesting locations of turtles and alligators etc. Captain Bill will show students the effects of pollution on plant life and aviary rookeries. Home phone: 680-6473

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Objectives: The objective of the Everglades field trip is to give all students a first-hand view of the "River of Grass" so that they may take the knowledge gained from "in-class" research and draw comparisons "in-field".

* Touch, feel and see life in the Everglades
  (Alligators are the exception ...)
* Students will take water and soil samples in order to obtain scientific data once they are back in the classroom.

Background Information: The Everglades located at the western end of Griffin Road is a totally natural environment other than the canals dug by the Army Corps of Engineers.

Multicultural Component: Seminole Island, although a tourist stop, does contain some Indian art work. "Jacob", the Seminole Indian alligator wrestler, has agreed to speak on Seminole history. He will also explain the anatomy of the alligator. This is a nice diversion and students will enjoy the "show". Call ahead and let them know you are coming. Call the park's number.

Activity Procedures: Procedures may vary according to your emphasis and the time you have in the park.

1). Call ahead and ask for reservations. Determine the length of time you would like to spend:
   a. touring the Everglades
   b. observing the wildlife
   c. observing environmental changes
   d. visiting "Picnic Island" for lunch
   e. visiting "Seminole Island"

2). Request, if possible, Capt. Bill. He is very accommodating and knowledgeable.

3). Enjoy!

Time: From Davie Road and 595, the drive is about one-half hour. The air boat ride will last a minimum of 90 minutes. However, arrangements can be made for varying time frames depending on your needs.

Group Size: One boat can accommodate 40 students. There are at least 4 boats available. They do have one boat available to hold 70 students.

Teacher Preparation and Teaching Tips: Students who have completed research studies will be more than delighted to view the "River of Grass" from the seat of an air boat.

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* Ask students to keep a close eye open for wildlife. Alligators are floating in the Everglades but are difficult to spot unless you are paying attention. The air boat captain does take you to nesting sites where animals are present.
* Students could be given a lesson ahead of time involving the drawing of wildlife which they should expect to see such as the heron, blue heron, alligator, catfish, oscar, etc.

*Science Eye: A private group located in Pompano Beach will conduct full day labs at this location. Contact "Jeff" at (305) 587-7977

The Treasures of Bonnett House

Address: Bonnett House
900 N. Birch Rd.
Ft. Lauderdale, Fl 33304

Telephone: 305-563-5393; Fax: 305-561-4147

Hand-Out Literature: Request from Bonnett House Literature

Rest Rooms: Yes

Gift Shop: Yes

Parking: Yes

Admission: $5.00

Lunch Spot: Yes

Public Phone: Yes

Medical Facilities: Within the city

Physically Impaired: Yes

Objectives: To be able to locate the "natural treasures" at this Ft. Lauderdale site that influenced settlers to stay.

Background Information: Contact Bonnett House for their hand out when, why, and how the house was built.

Environment:
Natural: Yes - an "island in the stream"
Cultural: Yes - Shows how early people lived
Built: Land not too badly disturbed

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Activity Procedure: Arrive by bus - divide into groups - escort through

Time Frame: 1-2 days to do background
1 day - visit
1 day - follow-up

Group Size: 30 max. - split

Teacher Preparation: Calling, getting information ready to present to class and to arrange buses from school.

Resource: Anything on early Ft. Lauderdale

Other Field Experiences:

The Graves Museum of Archaeology and Natural History.
This museum is operated by the:
Broward County Archaeological Society
481 South Federal Highway
Dania, FL 33004
Phone: (305) 925-7770
Fax: (305) 925-7064

Ah.Tha.Thi.Ki Seminole Museum and Visitors Center.
This historical and archaeological museum is operated by the Seminole Tribe of Florida on the Hollywood Reservation.
Contact Person: Billy L. Cypress, Executive Director
3240 North 64th Ave.
Hollywood, FL 33024
Phone: (305) 967-8997

Scientific observation fieldtrip to "Miami Springs Elementary School Biome,"contact:
Ms. Susan Lehrman (Principal)
or Ms. Judy Gelina (Community School Administrator)
Miami Springs Elementary School
51 Park Street
Miami Springs, Florida 33166
(305) 888-4558
Hours available: 8:30 a.m. to 6:00 p.m. except weekends
Background literature is available on request.

To schedule a Mulitcultural 1 to 2 day fieldtrip with "Florida Outback Safari's," contact:
Ed Harrison or Kenn Gorman
Florida Outback Safaris, Inc
6446 S.W. 42 St
Davie, FL 33314
(305) 792-7393 or 1 (800) 423-99444

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PINE JOG
A CENTER FOR ENVIRONMENTAL EDUCATION

6301 SUMMIT BOULEVARD, WEST PALM BEACH, FLORIDA 33415
(407)686-6600

MISSION

Pine Jog is an environmental education center with the purpose of providing environmental education programs which foster an awareness and appreciation of the natural world, promote an understanding of ecological concepts and instill a sense of stewardship toward the earth and all its inhabitants.

HISTORY

Pine Jog, established by Mr. and Mrs Alfred G. Kay, is a designated wildlife sanctuary and occupies 150 acres of natural wilderness surrounded by urban development.

The property, now known as the Pine Jog Environmental Education Center was first called Pine Jog Plantation by the Kays who purchased it in 1946 for the purpose of growing flowers, fruits, and vegetables. The Kays were involved in many philanthropic community projects and in 1960 created Pine Jog to educate young students about their natural environment and to instill in them a feeling of stewardship toward their environment. The biotic communities used in the educational programs include pine flatwoods, sawgrass, marsh, pond, grass meadow, and low hammock.

PUBLIC/PRIVATE SECTOR PARTNERSHIP

In 1970, Pine Jog established a formal relationship with Florida Atlantic University which created a unique public/private sector partnership. Pine Jog is a self-supporting unit within the College of Education of Florida Atlantic University and has a Board of Directors. Administrative responsibility for Pine Jog rests with Florida Atlantic University and the Board of Directors who are responsible to the president of Florida Atlantic University for the operation, policies and welfare of Pine Jog in accordance with University policies and procedures.

SERVICE POPULATION AND PROGRAMS

Pine Jog's primary target audiences are students and teachers with a focus on programs for the elementary sector.

Pine Jog has contracted with the School Board of Palm Beach County since 1972 and provides environmental education programs to approximately 50% of all schools in Palm Beach County, which is the third largest school system in the state. In addition to providing contracted services, Pine Jog offers programs to other public and private schools. Pine Jog currently provides 16 programs for student participation: two Earth Education programs, nine programs in a curriculum for gifted student, and first, third, fourth, fifth, and seventh grade programs.

Services to other populations include inservice training and workshops for teachers and educational opportunities of adults, families, scout groups, and local organizations. Summer camps for both students and teachers combine learning about ecology with exciting field trips to Florida's natural ecosystems.

PROGRAM DEVELOPMENT PROJECT

Beginning in 1991, the Program development Task Team completed a K-5 curriculum framework and program development criterion. With funding from the John D. and Katherine T. MacArthur Foundation, the task team developed and field tested a comprehensive sequence of environmental education programs for grades three, four, and five and is currently conducting a substantive research project to measure the effectiveness of the new programs.

WATER RESOURCES TEACHER EDUCATION

Since 1992, Pine Jog has contracted with the South Florida Water Management District to maintain an infrastructure of trained workshop facilitators and to coordinate teacher inservice workshops in a 16 county region.

LEADERSHIP AT THE STATE LEVEL

Pine Jog administers the Region V Environmental Education Service project for the State Department of Education. The RSP-V is intended to meet the environmental education needs in a seven county region by providing the programs, services, and leadership at all levels to meet the mandate to integrate environmental education throughout the Florida educational system. The RSP-V serves the school districts, community colleges, and state universities throughout Martin, Palm Beach, Broward, Dade, Monroe, Collier, and Hendry counties.

LITTER PREVENTION/BEACH CLEAN-UP CAMPAIGN

To increase public awareness and impact the beach litter problem, in 1988, Pine Jog implemented an on going Litter Prevention/Beach Clean-up Campaign. The campaign includes the following elements: (1) coordination of an annual beach clean-up; (2) establishment of "Adopt-A-Shore" program; (3) education presentations; (4) informal display for exhibit at public events; (5) coordination with the Center for Marine Conservation with Pine Jog serving as Palm Beach County zone captain; and (6) media campaign.

STAFF

Pine Jog staff consists of an Executive Director, Director of Education, Regional Service Project staff, Water Resource Education Project Staff, Program Development Staff, Instructional Specialists, Instructional Interns, Secretaries, Groundskeeper, and Custodian. The following boards/committee provide support:

- Pine Jog Board of Directors
- Education Advisory Council
- Coastal Clean-up Steering Committee
- Regional Service Project Board
- Regional Service Project County Advisory Councils (7)
- CATT Advisory Council

BUDGET

Income to support the operating budget, exclusive of capital allocations is derived from the following sources:

- Clubs and organizations
- Corporations/Businesses
- Foundations and Trusts
- Individual Special Gifts
- Interest
- Program Services
- State and Federal Sources

ROLE IN THE COMMUNITY

In April 1991, with the completion of interpretative exhibits and two self-guiding trails, Pine Jog officially opened to the public. Pine Jog staff also provide presentations and community consultation to schools and community groups and serve on advisory councils and governing boards.

It Matters To This One

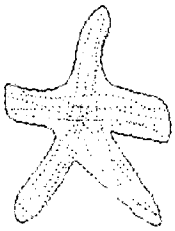
As I walked along the seashore
This young boy greeted me.
He was tossing stranded starfish
Back into the deep blue sea.
I said "Tell me why you bother,
Why you waste your time this way.
There's a million stranded starfish
Does it matter, anyway?"

And he said "It matters to this one.
It deserves a chance to grow.
It matters to this one.
I can't save them all. I know.
But it matters to this one.
I'll return it to the sea.
It matters to this one.
And it matters to me."

I walked into the classroom.
The teacher greeted me.
She was helping Johnny study,
He was struggling, I could see.
I said, "Tell me why you bother,
Why you waste your time this way.
Johnny's only one of millions,
Does it matter anyway?"

And she said "It matters to this one.
He deserves a chance to grow.
It matters to this one.
I can't save them all. I know.
But it matters to this one.
I'll help him be what he can be.
It matters to this one.
And it matters to me."

Unknown Author



"Children First - Each One Matters"

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