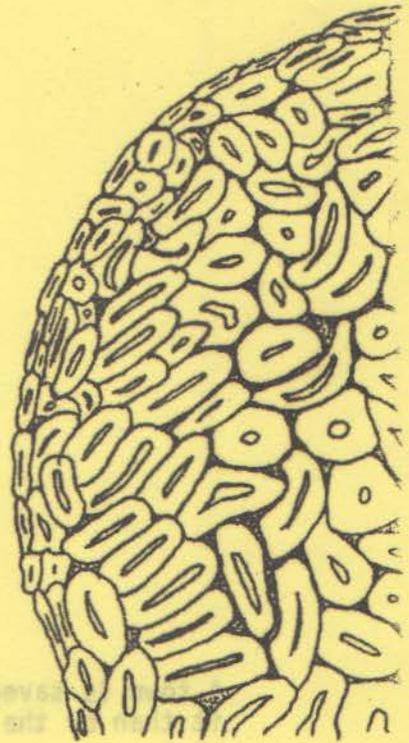
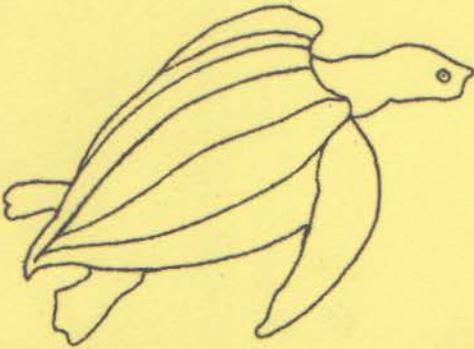
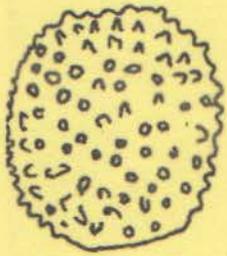
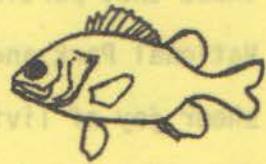
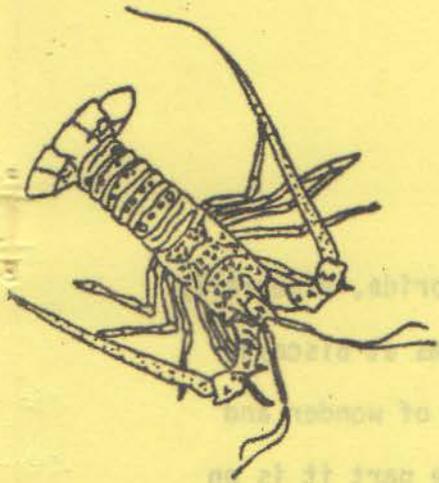


BISCAYNE NATIONAL PARK

THE  
NATIONAL  
ENVIRONMENTAL  
EDUCATION  
DEVELOPMENT  
PROGRAM

A  
PLANNING GUIDE  
FOR TEACHERS



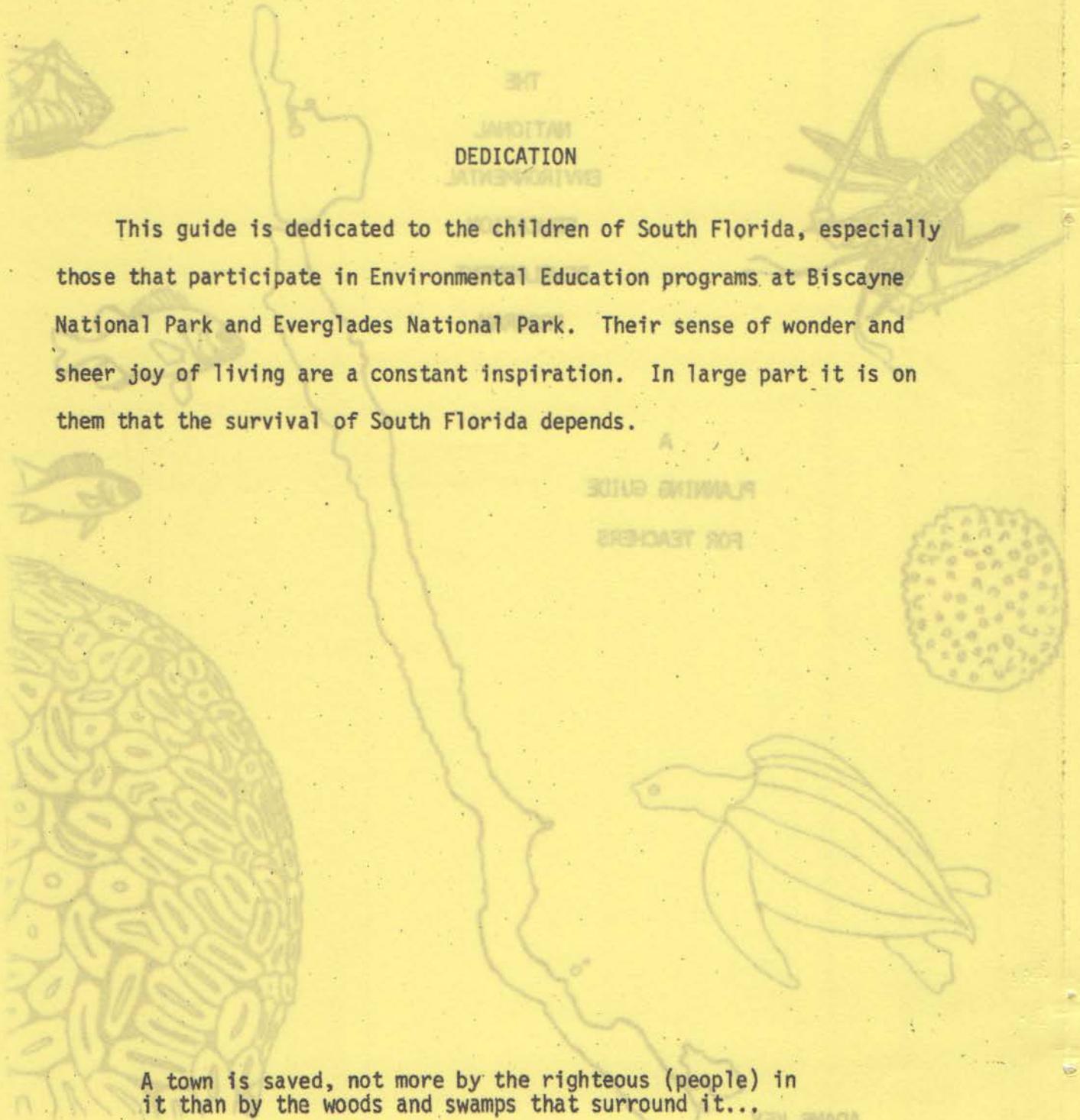
ADAMS KEY  
NEED SITE

CAROL A. MC NULTY  
ENVIRONMENTAL EDUCATION COORDINATOR

THE  
NATIONAL  
DEDICATION  
ENVIRONMENTAL

This guide is dedicated to the children of South Florida, especially those that participate in Environmental Education programs at Biscayne National Park and Everglades National Park. Their sense of wonder and sheer joy of living are a constant inspiration. In large part it is on them that the survival of South Florida depends.

A  
PLANNING GUIDE  
FOR TEACHERS



A town is saved, not more by the righteous (people) in it than by the woods and swamps that surround it...

-Henry David Thoreau

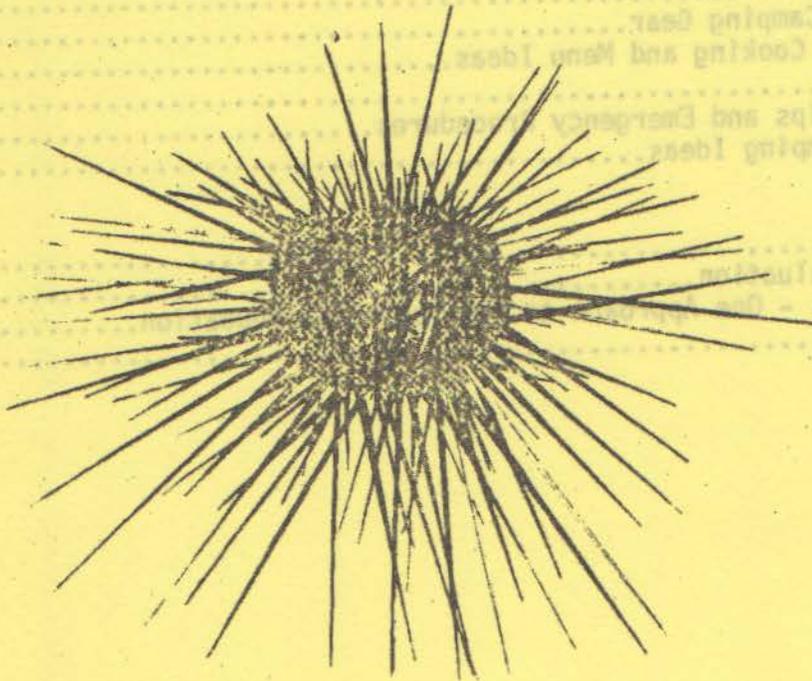
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## INTRODUCTION

In the past, Biscayne National Park has coordinated its pilot Environmental Education program through Everglades National Park. With the guidance and support of the Everglades staff we have developed the desire to stand on our own. This guide has been prepared to introduce you to our program, to help you prepare for your visit to Biscayne, and to encourage the perpetuation of life long environmental awareness in you and your students long after you leave Biscayne.

Remember, the Environmental Education program at Biscayne is still young and there will be growing pains. Please help us along by making suggestions and ideas for improving our program.



## WHY ENVIRONMENTAL EDUCATION?

### A WHOLISTIC VIEW

Spaceship earth is a complex vital system. Too often in our perception of the world we think only in terms of parts and fragments rather than perceiving our world as a whole system. This is not to say that all of the parts and fragments are not important and extremely significant, because we do need to understand and protect them. But, beyond that, we also need to get all the parts working together.

The Environmental Education program at Biscayne strives to place the parts of our world into a perspective that relates us and our actions to the total picture. The parts include both the natural world and the human world, emphasizing South Florida and the marine environment of the upper Florida Keys in particular. But, why bother?

The students of today are the voters, land owners, parents, business operators, and even toilet flushers of tomorrow. It is vital to the survival of the upper Florida Keys and South Florida in general that today's students be the enlightened concerned citizens of tomorrow.

Today, many people do not completely understand present day environmental threats facing the community. This lack of understanding is exemplified in the area encompassed by Biscayne National Park, which was the subject of great controversy during the 1960's. The increasing population of a rapidly growing urban area along with an expanding tourist industry caused the upper Florida Keys to be slated for development. Alarm grew among local residents as they realized that the natural beauty of the upper Florida Keys and surrounding marine environment might be lost forever. Local concern expanded to the national level. Fortunately, instead of developing the area into another Miami Beach, the upper Florida Keys and the associated marine environment of bay and reef tract were preserved in their natural state as Biscayne National Park. The fragile interrelationships between the three major ecosystems of bay, key, and coral reef cannot be underestimated. National Park status does not completely protect the area from all environmental threats such as sewage and waste disposal, commercial exploitation of the fisheries and in general the increasing population of South Florida along with the increasing demands such a population makes on the environment. Our future actions will serve to further protect this vulnerable area or expose it to threats that cannot be absorbed by nature.

Administrators, principals, teachers, parents, students, and park rangers must work together to produce a successful Environmental Education program. To be successful, we must define what we are and what we hope to accomplish.

The National Park Service defines Environmental Education as the process of experiences and observations which makes people aware of their relationship to the total environment and their responsibility to it. William Stapp of the University of Michigan extends this definition even further by saying that individuals must develop an awareness, understanding and concern for the environment in order to obtain the knowledge, skill and motivation to work towards solutions to current and projected environmental problems.

In applying these goals and objectives to Biscayne our program is designed to help the students learn more about the South Florida environment so that they, in turn, may develop the desire to help protect it. Specifically, our program will:

- 1) ACQUAINT THE STUDENTS OF SOUTH FLORIDA WITH THE UPPER FLORIDA KEYS AND THE ASSOCIATED MARINE ENVIRONMENT,
- 2) DEVELOP IN THE STUDENTS AN APPRECIATION FOR BISCAYNE'S THREE ECOSYSTEMS OF BAY, KEY, AND CORAL REEF, AND
- 3) DEVELOP IN THE STUDENTS AN UNDERSTANDING OF THE VALUE OF THE ENVIRONMENT OF THE UPPER FLORIDA KEYS TO THE TOTAL WEB OF LIFE.

Hopefully, this will MOTIVATE THE POPULATION MOST CLOSELY DEPENDENT ON THE KEYS AND THEIR ASSOCIATED MARINE ENVIRONMENT TO ACT POSITIVELY AND PARTICIPATE ACTIVELY IN THE SOLVING OF THE ENVIRONMENTAL PROBLEMS FACED BY SOUTH FLORIDA IN GENERAL AND BISCAYNE IN PARTICULAR.

These are certainly high goals. Can they be accomplished in one trip to Biscayne? No. Your trip to Biscayne is the experiential aspect of a total Environmental Education program. It reinforces what goes on at the school before the students visit the park and it stimulates their future study and activity when they return to the classroom. Both you and your students will benefit most by incorporating your experience into the entire curriculum. By doing so your trip to Biscayne will be more than a glorified field trip. Learning and having fun, woven together carefully, are complementary. It is imperative that the program be structured to include both.

Remember, Environmental Education is not just something to be taught and learned. Environmental Education is a way of teaching and learning. Instead of considering Environmental Education as a separate discipline to be tacked onto the existing curriculum, it should be considered a total concern -- a thread that should be woven into the entire curriculum, a perspective that encompasses all forms of study.

## ENVIRONMENTAL EDUCATION AT BISCAYNE NATIONAL PARK

The NEED (or National Environmental Education Development) Program at Biscayne is designed to give small groups of 5th grade elementary students an in-depth field learning experience while living in a natural environment. A school integrates Environmental Education into its curriculum, using the Biscayne environments as its focus. The field trip to the park is a three or four day camp-out at our NEED site on Adams Key, located about 7 miles from the mainland. Each camp includes a maximum of 25 students (minimum 20), one teacher/chaperone for each 5 students, and the services of one or two members of our interpretive staff. During the camp-out, a full schedule of activities is conducted under the supervision of the School NEED Coordinator and the assisting Park Ranger. The Park Ranger will be available for about 6 hours per day and occasionally may spend the night on the island. The rest of the time all activities and programs are the responsibility of the teachers.

Transportation to and from the NEED site is done in one trip on an NPS 45' boat. The tide levels are the major governing factor in scheduling departure and arrival times, and dates for all camps. In addition, there is a chance of a sudden mechanical breakdown of the boat or sudden bad weather which will automatically cancel the trip. To date, however, neither of these situations have been a problem.

Once at Adams Key, you and your class will stay in tents which we can provide if your school does not have them. You will have to provide all other camping and cooking gear as well as food, water, and ice for your entire stay. The island has a building with a classroom and research laboratory in it, along with two ranger residences and a boat dock. There is also a half mile nature trail and an area for wading and swimming.

A two-day overnight camping workshop is held for NEED teachers. The NEED workshop provides teachers with the experience and knowledge to conduct a NEED program in their school and at the park. The workshop is designed to make teachers more comfortable with the marine environment of Biscayne, to present ideas and techniques of Environmental Education, and to reinforce relations between schools and the park staff. Each school is required to send the designated NEED Coordinator and one other teacher to the workshop. Any other teachers or chaperones who will camp with the students are encouraged to attend as well. (Classes are required to have one adult chaperone for each 5 students.) Attendance at the workshop will enable Dade or Monroe County teachers to obtain 9 Master Plan Points. Teachers from other counties will need to contact their respective school districts to make similar arrangements.

## THE ROLE AND RESPONSIBILITY OF KEY PERSONNEL

Many people are involved in making a NEED Program successful. Three such people are (1) the School Principal, (2) the School Coordinator, and (3) the Park EE Coordinator. The following is a description of the role and responsibility of each of these people in the NEED Program.

(1) Often, the School Principal first learns of the NEED Program through a teacher on the staff who has participated in the NESA Program or the NEED Program either at Biscayne or Everglades. Other times, the park staff contacts the Principal directly. In either case, it is the School Principal who decides if his/her school is to become part of the NEED Program. By examining the school's curriculum and by assessing the goals and objectives of the school curriculum, the Principal decides to commit him/herself and the school to the philosophy of the NEED Program.

The next step is to designate a School NEED Coordinator. Sometimes, the Principal decides to do it him/herself; other times s/he appoints the interested teacher who first brought the program to his/her attention. With the Coordinator, the Principal selects a staff of teachers who will prepare and instruct the students before, during and after the camp-out.

The Principal and School Coordinator decide which of them will be responsible for certain details, but the Principal is normally concerned with the following:

- (A) Proper goal and objective-setting for the special needs of the school.
- (B) Development of a program for the students participating in the NEED camp.
- (C) Selection of 5th grade students in a manner that benefits the opportunity for selection of minority and exceptional students.
- (D) Proper adherence to school system regulations such as parental permission slips, travel out-of-county authorization, and field trip regulations.
- (E) Follow-up programs for the students which reinforce the experience of the campout.
- (F) Evaluation and improvement of the total program.

(2) The School Coordinator is a jack-of-all-trades who attends to large and small details. S/He works closely with the Principal and Park EE Coordinator to orchestrate the overall program for the school. The School Coordinator is in charge of the camp. S/He also delegates responsibility to the other teachers and chaperones involved. Above all, the School Coordinator is thoroughly committed to the NEED philosophy, and passes on his/her enthusiasm for the program to the other teachers and to the students.

Some of the many tasks which a School Coordinator shoulders him/herself or delegates to others include:

- (A) Arranging a date for the campout.
- (B) Preparation of an agenda for the campout on Adams Key.
- (C) Informing the Park Coordinator well ahead of time (four weeks) so that conflicts in the agenda can be resolved.
- (D) Coordination of a pre-site and post-site program at the school.
- (E) Preparation of a menu and buying the necessary food through the cafeteria or other outlets.
- (F) Arranging transportation to and from the park.
- (G) Gathering necessary equipment for campout, and being responsible for keeping it in good working order.
- (H) Student check to see that all have necessary clothes and personal gear.
- (I) Decision-making throughout the entire campout.
- (J) Arrangements for parent and student meeting before or after the campout.
- (K) Delegation of responsibility to teachers and chaperones during the campout.

(3) The Park EE Coordinator is the liason between Biscayne National Park and the schools in the NEED Program. S/He assists the schools by arranging workshops, providing boat transportation to the camping area, giving suggestions and advice, and providing activities and assistance during the camp.

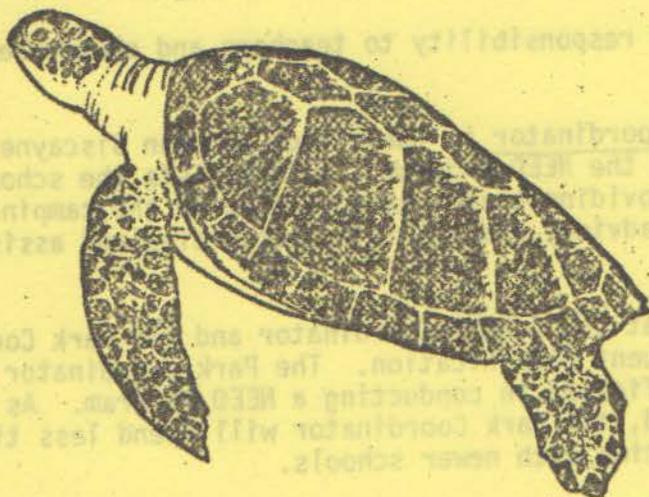
It is important that the School Coordinator and the Park Coordinator maintain close and frequent communication. The Park Coordinator assists the schools in becoming proficient in conducting a NEED Program. As a school becomes more experienced, the Park Coordinator will spend less time with those schools and more time with newer schools.

Some of the responsibilities of the Park EE Coordinator include:

- (A) Communication of the NEED Program and its philosophy to local schools and administrators.
- (B) Providing physical camping sites at the park, and often, providing boat transportation to these camp sites.
- (C) Assisting School Coordinators in the preparation of a camp agenda.
- (D) Providing assistance during a camp for special programs like snake handling, and shoreline exploring.
- (E) Coordination of camping dates and boat transportation for all participating schools.
- (F) Holding NEED Workshops each year that introduce new ideas and techniques to teachers in the program.
- (G) Constructive evaluation of each camp so that future camps might be improved.
- (H) Attending parent and student meetings at the schools before or after the camp.
- (I) Checking for safety hazards during the school camp.

It is worthy to note that some school systems or administrative areas have curriculum specialists who assist NEED schools under their jurisdiction. In Dade County, the North Central Area has such an arrangement. In addition, the North and North Central Areas of Dade County have camping equipment for schools to use. In Lee County, a Curriculum Team of Environmental Education Specialists conduct the entire program for the schools.

Principals, school coordinators, and others involved in the NEED Program are advised to utilize these resource people. In addition, veteran school coordinators and teachers are invaluable sources of ideas and advice, and are more than willing to assist when called upon.



## A PRINCIPAL'S AND SCHOOL COORDINATOR'S CHECKLIST

### SIX-WEEK COUNTDOWN

This very useful checklist has been adapted from ones developed by the North Central Area of Dade County in their Everglades Environmental Study Unit and by the Everglades EE staff.

#### Date of Action

#### Principal's & Coordinator's Task

##### 6 Weeks before camp

1. Write memorandum to appropriate office requesting permission for out-of-county travel, if necessary.
2. Confirm date for camping, use of equipment, and boat transportation with assigned park coordinator.
3. Select goal statements and desired student behaviors.
4. Select staff for the camp, provide orientation and assign responsibilities.
5. Send selected staff members to first-aid training.

##### 5 Weeks before

1. Select chaperones (if 5 teachers are not available).
2. Initiate student selection process.
3. Arrange for transportation carrier, if used.
4. Supervise selected staff in planning responsibilities.

##### 4 Weeks before

1. Finalize student selection (25 students).
2. Initiate menu planning, order from Food Services.
3. Make arrangements for additional resource personnel at camping site, if needed.
4. Order instructional supplies for on-site activities if needed.
5. Send proposed schedule of activities to Biscayne National Park EE Coordinator, detailing camp's activities from "dawn-to-dusk".

Date of Action

Principal's & Coordinator's Task

3 Weeks before camp

1. Begin pre-site activities (emotional/social, conceptual) with the selected students.
2. Initiate student orientation of specific campsite behavior.
3. Train chaperones in day-to-day activities, precautions for safety and well-being.
4. Submit temporary duty leave forms for selected staff members to appropriate office
5. Obtain signature on Assurance and Release of Liability form if transportation carrier is used.
6. Arrange for coverage of classes for staff attending the Biscayne NEED Camp.

2 Weeks before

1. Hold pre-site campout or cookout for selected students, teachers, and chaperones. Practice tent set-up.
2. Orient parents of students.
3. Insist that all permission forms be on file this week.
4. Conduct joint staff-chaperone planning session
5. Continue pre-site activities for students.

1 Week before

1. Collect all money.
2. Assist assigned staff member in checking camping equipment and in repairing defects.
3. Call final staff meeting to check on procedures, items needed, and emergency contact system.
4. Continue pre-site activities for students.
5. Hold evening meeting with students and their parents.
6. Invite Park EE Coordinator to attend.
7. Call the Park the day before leaving to verify that no emergencies have stopped the trip, such as a mechanical breakdown.

## PREPARING THE CAMP SCHEDULE

### A. Set the Stage

NEED camps are most successful when a school comes to the park prepared with an agenda that has every minute of the stay planned. This does not mean that every minute from dawn to dusk is filled with activity. Instead it means that periods of activity, meal preparation, clean-up, and rest are all mapped out prior to the beginning of the camp. The schedule should be carefully balanced to include active, fun, quiet, and educational activities. If everyone knows what is to be done, and when it is to be done, both teacher and students benefit. Of course, it is essential to be flexible -- the sched can be altered when an opportunity like a bald eagle flies by.

The School Coordinator begins to prepare a camp schedule one to two months before the camp date. The first step in preparing the schedule is to determine the objectives for the camp. The overall goals and objectives of the EE program have been outlined in another Section of this guide (Environmental Education? A Wholistic View). They serve as a framework for setting specific individualized objectives for a particular school. Once these objectives are formulated, the actual schedule can be planned.

A sample NEED camp schedule is included. First time schools will often find themselves using the suggested schedule fairly closely. But experienced schools are encouraged and often do individualize their schedules to better meet their school's particular needs.

Each planned activity should have its own specific objectives. If, for instance, one activity is poetry writing, one objective for it might read, "At the end of this activity each student will write one poem which compares and contrasts the Biscayne environments with their school and community environments." Or, if the planned activity is a shoreline hike, the objective might be, "At the end of the shoreline hike, each student will be able to describe the adaptations organisms must have to survive in an intertidal zone

One month before the camp, submit the schedule to the Park EE Coordinator. S/He consults with the School Coordinator and checks to see that the schedule is realistic and meets with the objectives of the NEED program. S/He also decides, with the School Coordinator, where s/he provides ranger assistance. Conflicts are ironed out, and the School Coordinator finalizes the schedule for presentation to the students and their parents. New NEED schools can depend on more ranger assistance than experienced ones. Experienced schools should be able to generate new ideas and activities on their own, and incorporate them into their camp schedule. An experienced school is considered to be one which retains the same School Coordinator and most of the teachers who camp with the students from one year to the next. If an experienced school changes its coordinator and most of its staff, the school is presumed to be a "new" school, even though it has been in the camping program before. Ranger assistance is given to all schools for activities like Shoreline Exploring.

## B. Sample NEED Camp Schedule At Adams Key

This schedule is a sample to be used in designing your school's schedule. Remember, a Park Ranger will be available only for about 6 hours each day. It is essential that you come prepared to conduct enough activities on your own. The workshop is designed to help you do this. (An \* designates ranger assisted activities.)

### Day One

- 9:00 A.M. Leave School
- 10:00 A.M. Arrive Convoy Point; Biscayne National Park Headquarters, adjacent to Homestead Bayfront Park
- \*Welcome by Park Ranger  
Issue Life Jackets  
Safety Regulations  
Pack Boat
- 10:30 A.M. Depart for Adams Key
- 10:45 A.M. \*Orientation from the middle of the Bay
- 11:15 A.M. Arrive Adams Key  
Unload boat  
Set up camp  
Lunch
- 1:30 P.M. \*Hike-Explore Adams Key, Sensitizing Activities
- 4:00 P.M. Teacher time.
- 5:00 P.M. Dinner and clean-up, check water usage
- 6:00 P.M. Rest time, prepare for night activities, practice skits
- 7:00 P.M. Evening Program - Teacher activity
- 8:00 P.M. Campfire Program/Skits





Day Three

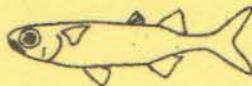
Day Two

- 6:00 A.M. Sunrise Ceremony, Silent walk, Sketch sunrise over the ocean.
- 7:00 A.M. Breakfast and cleanup, check water usage.
- 8:00 A.M. Teacher Conducted Activities (divide into groups)
  - A. Beach Walk/Intertidal Adaptations
  - B. Minipark game  
Scavenger Hunt
- 9:00 A.M. Switch groups
- 10:30 A.M. Energy Activities
- 11:30 A.M. New Games
- 12:00 P.M. Lunch/Clean-up/check water usage
- 1:00 P.M. \*Shoreline Exploring with Ranger  
Students are in two groups
  - \*Group A - Glass-bottom buckets/Seine Nets with Ranger
  - Group B - Teacher time - Arts/Crafts Activity  
Conservation Project
- 3:00 P.M. Groups Switch
- 5:00 P.M. Clean-up/Rest-time/Work on logs
- 6:00 P.M. Dinner/Clean-up/check water usage
- 7:00 P.M. New Games
- 7:30 P.M. \*Evening Program - Ranger conducted
- 8:30 P.M. Bathroom Brigade



(continued)

### Day Three



7:00 A.M.	Rise and Shine
7:30 A.M.	Breakfast/Clean-up/check water usage
8:30 A.M.	Take down tents/Pack belongings/Litter Patrol
9:30 A.M.	*Ranger Activities
10:30 A.M.	Load boat/Travel to Mainland
11:15 A.M.	Arrive Convoy Point/Load bus
11:45 A.M.	Lunch - Convoy Point
12:15 P.M.	Depart for School

Please remember - This is only a sample schedule. Each School Coordinator will be required to draft a schedule for their particular camp, reflecting their particular class needs. This schedule must be approved by the assisting Park Ranger prior to the school's arrival.

In addition, please note that scheduling may vary for each camp due to the tides and the inability of the boat to travel during low tide. A tide table and an explanation of its use is found in the appendix.

### C. Ideas

The following is a list of ideas that can be used before, during, and after a NEED camp. They have been gathered, with help from the Everglades staff, from past workshop agendas, camp schedules, and ideas sent in by school coordinators. The ideas are listed here without explanation -- we want to jog your memory and stimulate your thinking. Pick and choose from these suggestions to develop your own camp schedule. Contact the park EE coordinator or an experienced teacher for further explanation.

#### Before the camp

- view films on coral reefs and estuaries.
- create a marine section in the school library
- hold parent and student meetings before the camp
- touch bags with objects from Biscayne Bay
- practice setting up tents
- hold a one-night campout on school grounds before going to the park
- on the way to the park, have students gather vegetables for camp at "U-Pic" fields

(continued)

- do "web of life" activities
- students create their own rules and regulations for camp
- students are assigned to tents and to a teacher; each tent group picks a name and makes an appropriate sign for the tent
- study ecological problems associated with Biscayne Bay and the Florida Keys
- marine vocabulary studies
- create words for songs about Biscayne Bay
- do map studies of the Florida Keys - compare the upper & lower keys
- make bulletin boards of wildlife and plants found on the Florida Keys
- do an historical study of the school area -- find out what it used to look like before 1900.
- plan camp menus with student's keeping basic nutrition in mind

#### During the camp

- students keep diaries
- sensitivity activities such as Rock Friend, Natural Scavenger Hunt, Trust Walks, Build a Nest
- reading of stories like The Giving Tree (Shel Silverstein) or The Lorax (Dr. Seuss)
- bird watching
- plankton net construction; seining; water testing
- energy education and conservation
- sunrise and sunset watches
- Martin County (Florida) curriculum materials for marine studies
- hula-hoop study areas
- sketching, poetry writing about Biscayne
- evening skits
- photo sessions -- each student allowed a set number of pictures
- puppeteering
- snake programs
- New Games
- zonation studies of plant communities
- environmental awareness cards
- skins and skulls
- evaluate each camper and give awards
- personal water budget records
- orienteering activities with compass (Park compasses available)
- star gazing, night sounds activities
- environmental art; trash plaques
- Seton Watching
- sing-a-thon using environmental awareness and Biscayne Bay songs.
- Haiku and cinquain poetry
- Outdoor Biology Instructional Strategies (OBIS)
- historic presentations

(continued)

- Van Matre's Acclimatization activities such as Angles, Identifying with a Natural Object, Sensory Wheels
- Energy Egg Hunt, Magic Talking Stick
- Camp energy budget keeping -- what comes in?, what goes out?

After camp

- poster displays
- make a presentation to PTA meetings about the trip
- student evaluation of the camp
- games constructed and used for instruction in wildlife identification; threatened Florida wildlife
- write songs and poetry about Biscayne
- hold a contest to see who can list the most ways to conserve water
- oral reports to other teachers and students
- prepare and present assembly to entire student body, complete with photographs made by students and teachers
- student essays beginning with, "To me, Biscayne means. . ."
- students edit teacher slides and write script for slide show on the camp
- draw pictures of animals, plants and scenery, and display in school
- communicate with action organizations like National Wildlife Federation, National Audubon Society, or Defenders of Wildlife
- skits for other classes
- write letters to government agencies and elected officials in favor of a better South Florida environment
- create a mural of the many environments of Biscayne
- organize an environmental action club

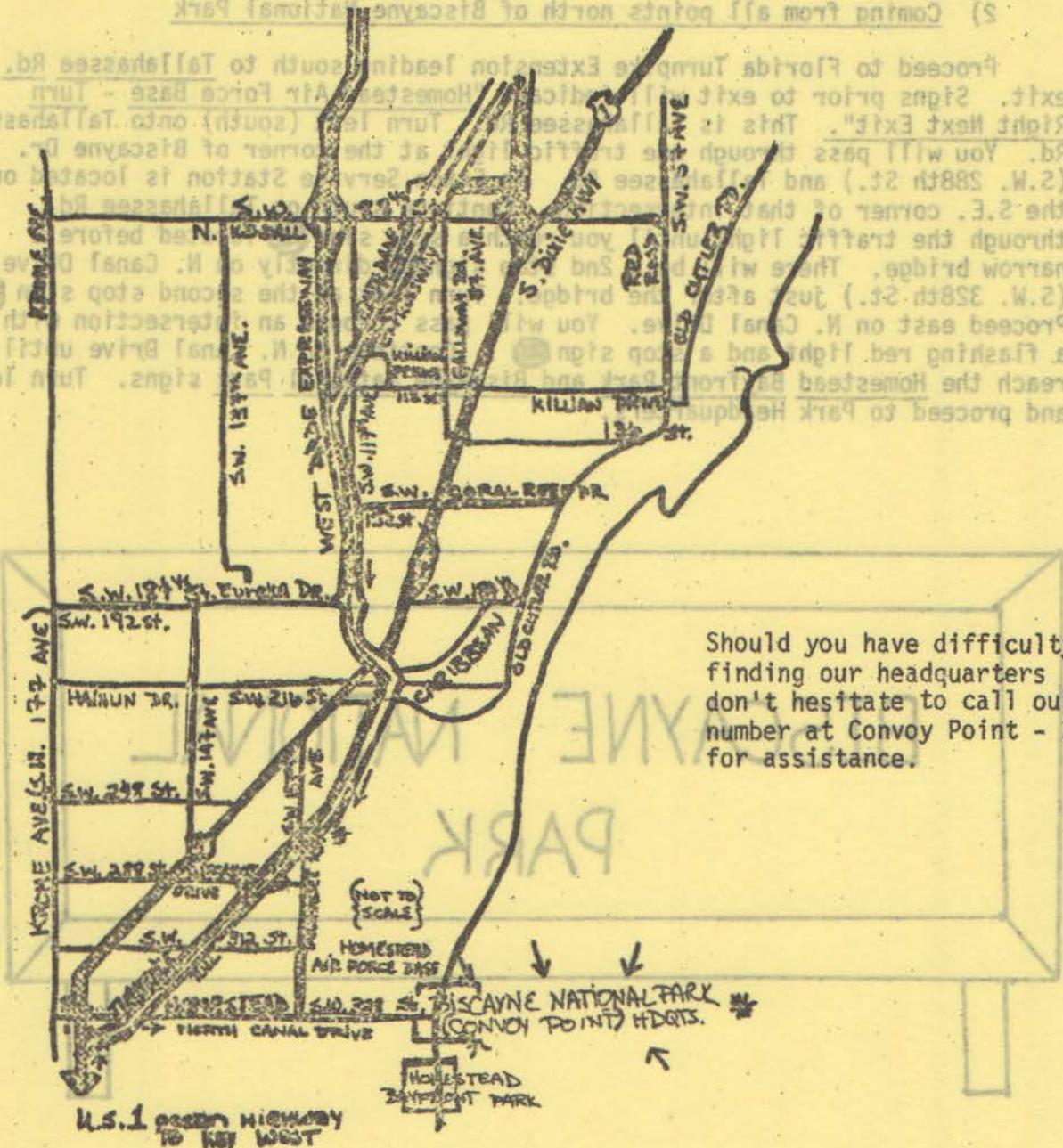


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THE LOGISTICS OF CAMPING

A. Transportation: How do we get to Biscayne National Park?

It is best to transport students to and from the park by bus. Insurance is not a worry then and camping gear can be stowed easily. However, some schools have had difficulty paying for a bus. They have transported student and gear in private cars or rented vans. Some teachers have received compensation for their private vehicle use, some have not. Whatever method you use make sure it meets school board regulations.

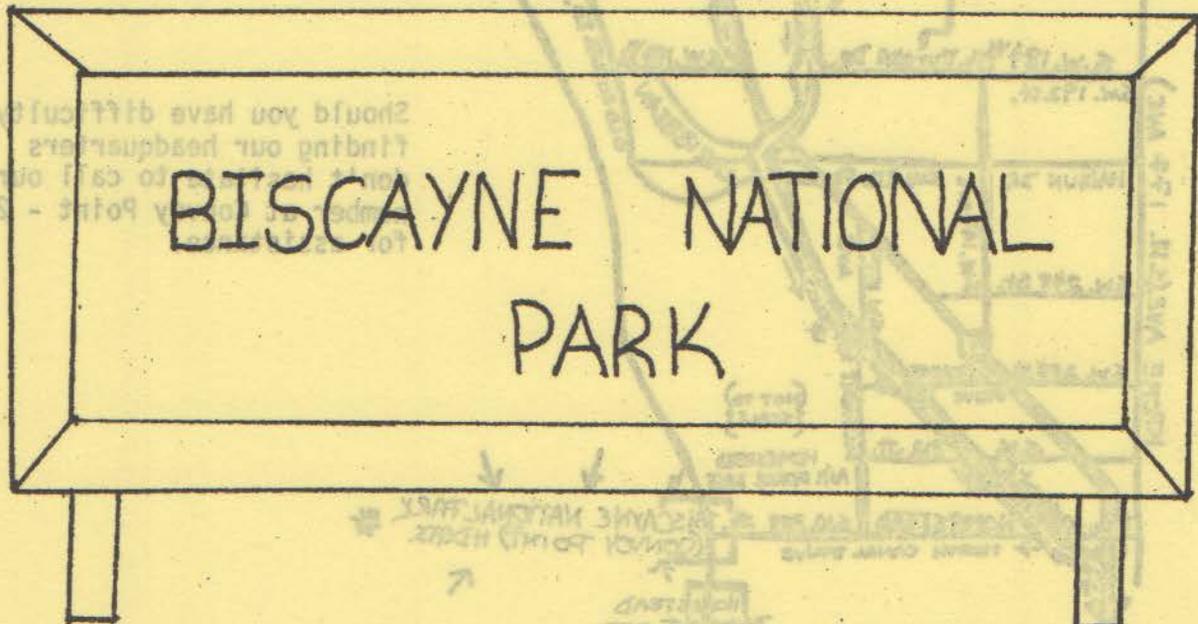


1) Coming from all points south of Biscayne National Park

Drive on U.S. 1 until you reach the intersection of U.S. 1 and North Canal Drive (also called: S.W. 328th St., S.E. 8th St., & Lucy St.). Follow the signs to Villages of Homestead will help you find this intersection. At this intersection there will be 3 service stations located on the S.E., N.E., and S.W. corners. Turn right and proceed 8 miles east on N. Canal Drive. You will pass through an intersection with a flashing red light and a stop sign. Continue on N. Canal Drive until you reach the Homestead Bayfront Park and Biscayne National Park signs. Turn left and proceed to Park Headquarters.

2) Coming from all points north of Biscayne National Park

Proceed to Florida Turnpike Extension leading south to Tallahassee Rd. exit. Signs prior to exit will indicate "Homestead Air Force Base - Turn Right Next Exit". This is Tallahassee Rd. Turn left (south) onto Tallahassee Rd. You will pass through one traffic light at the corner of Biscayne Dr. (S.W. 288th St.) and Tallahassee Rd. An Exxon Service Station is located on the S.E. corner of that intersection. Continue south on Tallahassee Rd. through the traffic light until you reach a stop sign located before a narrow bridge. There will be a 2nd stop sign directly on N. Canal Drive (S.W. 328th St.) just after the bridge. Turn left at the second stop sign. Proceed east on N. Canal Drive. You will pass through an intersection with a flashing red light and a stop sign. Continue on N. Canal Drive until you reach the Homestead Bayfront Park and Biscayne National Park signs. Turn left and proceed to Park Headquarters.



## B. Personal Gear

There will be no need for "fancy dress." Children will be more comfortable if their clothing is not brand new.

Each student will need to bring most of the following items. Gear should be packed in something that is compact and waterproof such as a duffel bag, backpack or cloth sack/garbage bag combination. The student's name should be on as many things as possible. Rubber stamps or laundry pens work well for most items. Fingernail polish is satisfactory for metallic objects.

Each camper should assist in packing his/her gear so that s/he knows where each article is located.

2 gallons fresh water.....	Towel (1).....
Sleeping bag or two	Washcloth (1).....
blankets.....	Comb or hair brush.....
Sheet.....	3 clothespins.....
Pillow.....	2 pairs sneakers or
Toothpaste.....	comfortable shoes.....
Toothbrush.....	(one pair old & able to get wet)
Soap.....	Underwear (3-4 changes).....
Reuseable drinking cup.....	Long pants (2 pairs).....
Mess kit.....	Shorts (1 pair).....
Fork & Spoon.....	Pajamas.....
Necessary medication (if	2 long sleeve shirts.....
applicable notify teacher	Sweater.....
before hand).....	Jacket (weather proof) wind
Handkerchief.....	breaker, raincoat, or
Canteen.....	poncho.....
2 plastic bags (for wet	Stocking cap or hat.....
items).....	Flashlight.....
1, 12 x 18 sketch pad.....	Liquid or creme mosquito
4 pairs of socks.....	repellent (no aerosols)..
2 pencils.....	Facial tissues.....

### Optional Items

Clipboard  
Camera  
Film

### Items to be Left at Home

Candy & gum  
Comic Books  
Radios  
Knives  
Make-up  
Pets  
Money

C. General Camping Gear

B. Personal Gear

Biscayne National Park will provide 10 x 13 Coleman American Heritage tents, stakes, and hammers if your school does not have them. We advise school districts to purchase their own tents once they are in the program. All other equipment must be furnished by the schools.

The following list of equipment can serve as a guide to planning. It is based on previous NEED camps. Adjust this list to your particular needs.

- Screen-porch tent or canopy for kitchen/eating area.....
- 1 complete first aid kit.....
- 1 fire extinguisher.....
- 3-4, 48-quart ice chests.....

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- 2-3 propane or white gas lanterns.....
- 2, 5-gallon water coolers.....
- 1 large propane gas grill w/wind guard.....
- 2, 20-pound propane cylinders for lanterns.....
- 3-4 small propane cylinders for lanterns.....
- 4 extra lantern mantles.....
- 6 insect repellent (liquid repellent such as Cutters is more effective than the spray variety).....
- 2-4 camp flashlights.....
- 1 broom.....
- 1 roll plastic tape for hoses, tent repairs.....
- 6 boxes wooden safety matches.....
- 3 large soup pots.....
- 1 large frying pan.....
- 2 sauce pans.....
- 2 large serving dishes.....
- 1 colander.....
- 2 can openers.....
- 4 plastic storage containers.....
- 6 extra mess kits (for visiting purposes).....
- 4 pot holders.....
- 4 dish towels.....
- 1 bag of charcoal.....
- 1 package of aluminum foil.....
- 1 large bottle of (biodegradable) dishwashing liquid.....
- 1 gallon of bleach (disinfectant).....

Sample Menu

BREAKFAST  
LUNCH

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### D. Creative Cooking and Menu Ideas

An exciting element to remember about camp cooking is that everyone has the chance to become involved. Menus can be creative and fun, at the same time they are fast and easy. It is important to keep nutrition and enjoyment in mind while preparing your menus. Some necessary components of meal planning are listed below.

**IMPORTANT:** Please remember that there is no fresh water on Adams Key. Sufficient fresh water and ice need to be brought for the duration of the camp! It is suggested that each child bring two gallons of water with his/her personal gear. (One gallon for private use, and one gallon for community use.) In addition, the school supplies the ice and extra water.

**QUANTITY:** How much food do we need to bring?

Allow a large enough portion for each child and adult to be satisfied but not stuffed. Your cafeteria manager is a good person to consult for exact size proportions. Children usually eat more during a camp experience so cafeteria portions may not be adequate. It is a good idea to plan for extras, either visitors or very hungry campers.

**FOOD:** What type of food is best to bring?

Plan to use your perishable foods such as meats on the first evening or second lunch. After that it is wise to rely on dried or canned products. These are easy to store and prepare in addition to being raccoon proof. Some canned food suggestions are: Spaghetti, soups, tuna, vegetables, and fruits. Dried and boxed food suggestions include, pancake mix, rice, powdered milk and iced tea mix.

**PACKING:** How do we bring the food to Biscayne National Park?

Food may be packed in boxes by meals, and marked clearly on all sides. (For example: LUNCH WEDNESDAY.) All perishable foods need to be stored in ice chests with sufficient ice to preserve them.

**WHAT DO WE EAT?** And still survive!

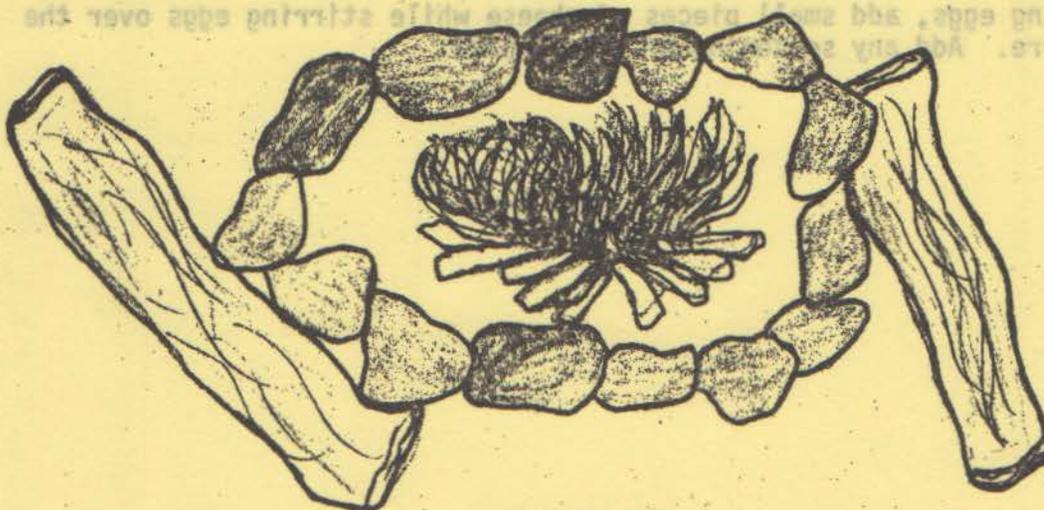
Your students are an invaluable asset in planning and preparing meals. Participation by the students enhances their enjoyment of a learning experience. Rotating tents to help with meal preparation gives every student the chance to learn elements of camp cooking that they can use again; it also lightens the load of the head cook.

Following is a four day menu used in the past by NEED camps. It will give you some traditional menu planning ideas to help you wherever you camp. Creative menus and other camping suggestions are included to spark your creativity as well as that of your students.



Creative Menu Suggestions

BREAKFAST	LUNCH	DINNER	SNACK
Bacon and Eggs in a Sack Toast Orange Juice Milk	Campfire sandwich Potato salad Carrot sticks Fresh Fruit Sun Ice Tea	Cannon Balls Corn on Cob Hot Pot Green beans Milk	Granola Bars Fresh Fruit Gorp
Cream of Wheat w/ butter, salt, honey, raisins, and fresh fruit.	Pigs in a Blanket Salad Canned Vegetables Ice Tea Milk	Stuffed Zucchini Baked Potato Fried Tomatoes Baked Apples	Cake baked in an orange Hot Chocolate
French Toast Milk and Orange Juice Fresh Fruit	Minute Pizza Vegetable Ice Tea or Punch Cookies	Chicken on a spit Cole Slaw Fresh cooked vegetables Biscuits Milk or Tea	No Bake Cookies
Scrambled Eggs w/ cheese Grits Milk or Orange Juice	Sloppy Joes Macaroni salad Fresh vegetable sticks Fruit Juice or Milk	Quick Macaroni Casserole Salad Fruit Milk	Banana Boat



## Creative Menu Recipes

This section contains instructions on quantity and preparation of the menus listed on the previous page. If you have any further questions you may refer to Roughing It Easy by Dian Thomas, pages 143-230.

\* NOTE: On all recipes you will need to adjust the ingredients to obtain an appropriate yield for the number of students and staff attending the camp.

### BREAKFAST RECIPES

1. Bacon and Eggs In a Sack-- Yield: 1      Cooking time: 5-10 min.

Cover bottom of lunch sack with 2 strips of bacon, drop 1 egg over bacon. Roll sack down in one inch folds and shove sharp pointed skewer through paper sack. Place over stove or coals.

2. Cream of Wheat-- Follow amounts on package      Cooking time: approx. 12 min.

Sprinkle cereal slowly into boiling salted water and stir constantly. Cook over medium heat until thickened. Serve with butter and salt; add any of the following for extra sweetness: HONEY, RAISINS, DATES, FRESH BERRIES, JAM OR JELLY, BROWN SUGAR, OR FRESH FRUIT.

3. French Toast-- Yield: 10 slices      Cooking time: until golden brown

Combine in bowl 3 eggs,  $\frac{1}{2}$  cup milk or  $\frac{2}{3}$  cup canned milk,  $\frac{1}{2}$  teaspoon salt. Dip into egg mixture 10 slices of bread. Fry until golden brown in oil or margarine. A variation is to roll the bread dipped in egg mixture, in corn flakes and place in pan. Cover with lid while cooking.

4. Scrambled Eggs With Cheese-- Yield: 2 eggs per person

Cooking time: approx. 10 min.

After beating eggs, add small pieces of cheese while stirring eggs over the stove or fire. Add any seasoning of your choice.



## Creative Menu Recipes (cont.)

### LUNCH RECIPES

1. Campfire Sandwich-- Yield: 1 sandwich    Cooking time: 5 min. per side

Method uses aluminum foil. Place chipped beef and slice of cheese on bun. Place in foil. Warm in coals or on stove. Variation is to use other kinds of meat.

2. Potato salad-- Yield: 8-10 servings    Time: 45 min. cooking, 10 min. mixing

Boil and dice 6 to 8 medium sized potatoes and 4 to 6 eggs. Chop 1 cup celery, 2 to 3 medium green onions. Mix 3/4 to 1 cup salad dressing thinned with canned milk. Combine all ingredients and add salt and pepper to taste.

3. Pigs in a Blanket-- Yield: 10 servings    Cooking time: 10 min. or until golden brown

Prepare Bisquick or canned biscuits. Roll dough to 3/8 inch thickness. Cut dough into strips and wrap around 10 weiners. Place over heat and cook.

4. Minute Pizza-- Yield: 10-12 pizzas    Cooking time: 10-15 min.

Open one can prepared pop-can biscuits or English muffins and one pizza sauce. Slice one pepperoni sausage or green pepper and 10 to 12 slices cheese. Flatten and spread individual biscuits into round shapes on foil. Put sauce, pepperoni or pepper, and 1 slice of cheese on each biscuit. Variations can be made with olives, onions, and other kinds of meat.

5. Sloppy Joes-- Yield: 7-8 servings    Cooking time: 20 min.

Brown one pound hamburger, one onion (diced). Add one can chicken gumbo soup, and one tablespoon catsup (or more), and one teaspoon mustard. Serve hot in hamburger buns.

6. Cole Slaw-- Yield: 6-8 servings    Cooking time: 10 min.

Finely chop 1/2 head cabbage. Mix together 1/2 cup mayonnaise, 1 to 2 tablespoons canned milk, and 1 teaspoon sugar or honey. Mix and pour over cabbage. Variations: 1/2 cup salted peanuts, one small can crushed pineapple, 1/2 cup raisins, diced green peppers and tomatoes, or add sour cream to dressing mixture.

Creative Menu Recipes (cont.)

LUNCH RECIPES

1. Campfire Sandwich--Yield: 1 sandwich    Cooking time: 5 min. per side  
Method uses aluminum foil. Place sliced beef and slice of cheese on bun. Place in foil. Warm in coals or on stove. Variation is to use other kinds of meat.
2. Potato salad--Yield: 8-10 servings    Time: 45 min. cooking, 10 min. mixing  
Boil and dice 6 to 8 medium sized potatoes and 4 to 6 eggs. Chop 1 cup celery, 2 to 3 medium green onions. Mix 3/4 to 1 cup salad dressing thinned with canned milk. Combine all ingredients and add salt and pepper to taste.
3. Pigs in a Blanket--Yield: 10 servings    Cooking time: 10 min. or until golden brown  
Prepare biscuit or canned biscuits. Roll dough to 3/8 inch thickness. Cut dough into strips and wrap around 10 weiners. Place over heat and cook.
4. Minute Pizza--Yield: 10-12 pizzas    Cooking time: 10-15 min.  
Open one can prepared pop-can biscuits or English muffins and one pizza sauce. Slice one pepperoni sausage or green pepper and 10 to 12 slices cheese. Flatten and spread individual biscuits into round shapes on foil. Put sauce, pepperoni or pepper, and 1 slice of cheese on each biscuit. Variations can be made with olives, onions, and other kinds of meat.
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## Creative Menu Recipes (cont.)

### DINNER RECIPES

1. Cannon balls-- Yields: 4-5      Cooking time: 15-20 min.

Cut horizontally in half 1 onion for each serving. Scoop out the centers of the half onions. Fill both halves with basic hamburger mix. Place onions together and wrap, using aluminum foil. Cook.

2. Stuffed Zucchini-- Yield: 4-6      Cooking time: 20-25 min.

Lay out, aluminum foil three to four inches longer than zucchini. Prepare basic hamburger mix. Clean and cut seed center out of 4 to 6 zucchini squashes. Stuff center of squash with basic hamburger mix and sprinkle grated cheese over top. Wrap in aluminum foil. Place in coals or on stove and cook.

3. Chicken on a Spit-- Yield: 1 chicken      Cooking time: 1½-2 hours

Place chicken on spit and wire tightly. Brush with barbecue sauce. Place ½ feet above coals and cook until done, turning about every 5 minutes.

4. Quick Macaroni Casserole-- Yield: 5-6 servings      Cooking time: 20-30 min.

Melt 2 tablespoons margarine or butter. Saute ¼ cup chopped onion, 1 cup chopped green pepper. Add and cook ½ pound ground beef until brown. Add 1 can chicken gumbo soup, 1 can cream of chicken soup, ¾ to 1½ cup water, 1 teaspoon salt, 1/8 teaspoon pepper, gradually stirring in 2 cups uncooked macaroni. Cover and cook until macaroni is tender. (If liquid thickens too much, add water to right consistency.)

### SNACK RECIPES

1. Granola Bars-- These should probably be made beforehand.

Stir together and warm in double boiler ½ cup crunchy peanut butter, 2 tablespoons honey, 1 teaspoon lemon juice. Add and mix well 1½ cups granola with dates. Either roll into balls or press into lightly greased 8 x 8 inch pan. Cut into squares, after drying until firm in dryer or low over (120°) with door open.

2. Gorp-- Yield: according to amount of people.

Mix together roasted peanuts, raisins, shelled sunflower seeds, pecans, shredded coconut, dried apricots, and M & M's if desired.

Creative Menu Recipes (cont.)

DINNER RECIPES

1. Cannon balls--Yields: 4-5      Cooking time: 15-20 min.  
Cut horizontally in half 1 onion for each serving. Scoop out the centers of the half onions. Fill both halves with basic hamburger mix. Place onions together and wrap, using aluminum foil. Cook.
2. Stuffed Zucchini--Yield: 4-6      Cooking time: 20-25 min.  
Lay out aluminum foil three to four inches longer than zucchini. Prepare basic hamburger mix. Clean and cut seed center out of 4 to 6 zucchini squashes. Stuff center of squash with basic hamburger mix and sprinkle grated cheese over top. Wrap in aluminum foil. Place in coals or on stove and cook.
3. Chicken on a Spit--Yield: 1 chicken      Cooking time: 1 1/2 hours  
Place chicken on spit and wire tightly. Brush with barbecue sauce. Place feet above coals and cook until done, turning about every 5 minutes.
4. Quick Macaroni Casserole--Yield: 5-6 servings      Cooking time: 20-30 min.  
Melt 2 tablespoons margarine or butter. Sauté 1/2 cup chopped onion, 1 cup chopped green pepper. Add and cook 1/2 pound ground beef until brown. Add 1 can chicken gumbo soup, 1 can cream of chicken soup, 3/4 to 1 1/2 cup water, 1 teaspoon salt, 1/8 teaspoon pepper, gradually stirring in 2 cups uncooked macaroni. Cover and cook until macaroni is tender. (If liquid thickens too much, add water to right consistency.)

SNACK RECIPES

1. Granola Bars--These should probably be made beforehand.  
Stir together and warm in double boiler 1/2 cup crunchy peanut butter, 2 table-  
spoons honey, 1 teaspoon lemon juice. Add and mix well 1/4 cups granola with  
dates. Either roll into balls or press into tightly greased 8 x 8 inch pan.  
Cut into squares after drying until firm in dryer or low oven (120°) with  
door open.
2. Gorp--Yield: according to amount of people.  
Mix together roasted peanuts, raisins, shelled sunflower seeds, pecans, shredded  
coconut, dried apricots, and M & M's if desired.

## Creative Menu Recipes (cont.)

### SNACK RECIPES (cont.)

3. Cake baked in an orange-- Yield: 1 orange per person, 10-12 servings

Cooking time: 10-15 min.

Mix one cake mix and ingredients. Slice off 1/3 down from top of 10 to 12 oranges. Spoon fruit out of bottom 2/3's, leaving an empty shell. Fill the hollow shell 1/2 full with cake batter. Place lid back on orange. If available, wrap orange in 6 x 6 piece of foil. Place on heat. Variations would be to use gingerbread mix in a grapefruit shell.

4. No Bake Cookies-- Yield: 3-4 dozen      Cooking time: until liquid ingredients boil.

Prepare waxed paper or foil sheet. Mix together and boil 2 cups sugar, 1/2 cup milk, 1/2 cup shortening, 3 tablespoons cocoa, 1/2 teaspoon salt. Add to mixture 3 cups quick oats (instant), 1/2 cup nuts, 1 cup coconut, 1 teaspoon vanilla. Drop by spoonfuls on sheet. Leave until cool and set up.

5. Banana Boat-- Yield: 1 banana for each person.      Time: 5 min.

Cut wedge-shaped section in banana. Remove wedge. Place marshmallows and chocolate chips in hollow left in banana. Cover marshmallow with peeled-back banana skin and wrap in aluminum foil. Place in coals or stove until chocolate and marshmallows are heated.

6. No Cook Fudge-- Yield: 10 pieces      Time: Until set up

Blend together 1/2 cup cocoa, scant square butter, 1/4 lb. grated cheese (room temp.) Add 1 lb. powdered sugar, 1/2 cup chopped nuts, 1 tablespoon vanilla. Mix thoroughly. Shape into long rolls; put in waxed paper. Let set and slice.

7. Shaggy Dogs-- Cooking time: 3 min.

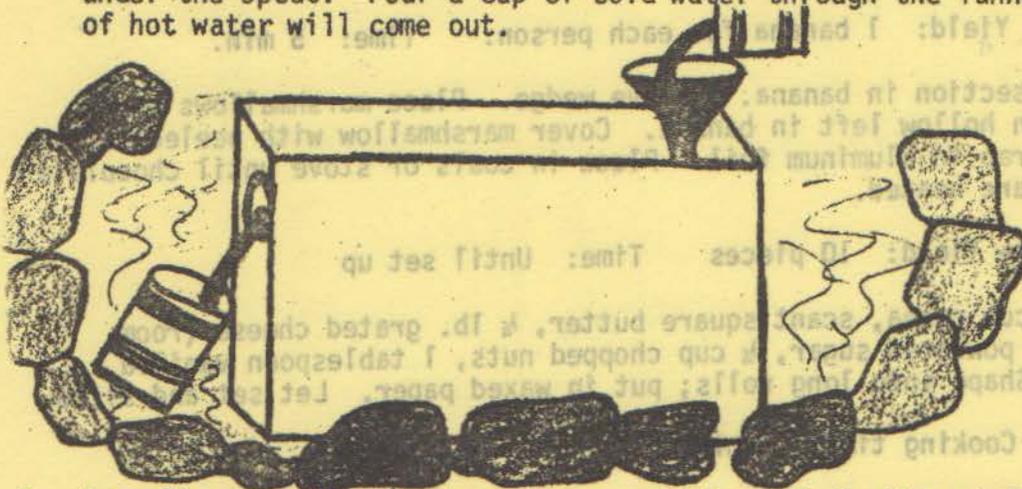
Heat one can chocolate syrup. Toast one package marshmallows until golden brown. Dip marshmallows in chocolate syrup and roll in one package coconut.

8. S'mores-- Cooking time: 2-3 min., until marshmallows are golden brown.

Toast 2 marshmallows over coals on a stick. Place 1 chocolate Hershey square on bottom graham cracker square. Place toasted marshmallows on chocolate square. Place one graham cracker square on top. HINT: Chocolate will melt better if placed in center of marshmallows.

### Creative Kitchen Ideas

1. Prepare the necessary quantities of muffin and biscuit mix ahead of time, blending all ingredients except liquid and eggs.
2. To store eggs, break them into a plastic container with a tight seal. Pour the eggs out, one at a time, or as needed. Use within four days.
3. Soap the outsides of all pans before using them on an open fire (with bar soap or liquid detergent). This will make it easier to wash off the black carbon buildup.
4. Constant Hot Water: With a five-gallon square can and a long necked funnel, you can construct a hot-water tank. Poke a hole in one side of the can large enough to allow the neck of a funnel to go all the way into the can. The hole for the funnel should be placed as far as possible from the spout of the can. Place the can on its side, filled with water up to the original spout opening. Place the tank in the hot coals, keeping the end with the funnel farthest from the heat source. When you need a cup of hot water, place an empty container under the spout. Pour a cup of cold water through the funnel. One cup of hot water will come out.



5. A small netted bag (such as those used to pack fruit or onions) may be used to wash individual dishes/mess kits.
6. A novel way to prepare some items of food is to cook them inside other foods. Some foods will act as natural buffers against the heat while giving the foods inside additional flavor. Example: Cook an egg inside an onion, by cutting a lid off the onion and taking out the center part. (Do not remove the meat from the lid because it will add flavor.) Break the egg into the onion shell. Replace the lid and wrap in foil or place directly on the coals. Variations include using an orange peel instead of an onion or using hamburger instead of an egg.

## E. Tents

The best way to learn how to set up a tent is by actually doing it! Your first experience can sometimes be frustrating. But, there is a great feeling of joy when you finally succeed! Basically, these steps can be followed in erecting any tent:

- (1) Spread the tent out & position it.
- (2) Stake the tent down, pulling all corners tight.
- (3) Organize the tent poles.
- (4) Connect the tent poles and place them on the tent.
- (5) Raise the tent to completed position.
- (6) Check all poles, stakes, loops, zippers, and make final adjustments.

Never put tent stakes in front of a doorway -- students may trip over them. Also, make sure that all stakes (especially on corners) are level with the ground. Almost all accidents at NEED camps have involved falling on exposed tent stakes.

Zippers are usually the first item to break on tents; the less they are used, the better. Students should be taught to open all zippers on a door completely before going in or out. Half opened zippers receive too much stress to last long.

Each tent must have one adult in charge. This adult should sleep in the tent with the students. It helps to assign students to a tent before they arrive in the park. Then they can put up and take down their own tent as a team. A tent name like the "Biscayne Barracuda's" or "Royal Terns" with a banner displaying the name encourages pride and promotes care of the tent.

When properly cared for, tents provide reliable shelter for students and their gear. Tents will not stand up to rough-house behavior. Rest, sleep, changing clothes, shelter from rain and log entrees are the only appropriate activities to take place in the tents. If the camp is planned properly, the students will have little extra time in the tents.

It helps to have students practice putting up and taking down the tents before they arrive. If an extra tent is available, it can be set up on the school grounds the week before a camp. This will allow more time at the camp for other activities, since less time will be spent on tents.

If a tent is rolled up wet, it must be erected again and dried out as soon as possible. Mildew grows on wet, rolled tents in a day or so.

## F. Safety Tips and Emergency Procedures

Your NEED camp will be an intense period of many different experiences that actively involve both students and adults. If certain precautions are taken, the chance for an accident will be minimized. It is the responsibility of all participants (adults and children) to think safety at all times. Some important safety considerations are listed below:

1. Parents - Do they know where their children are? Parents are put at ease if a parent's night is held prior to the campout. Parents need to know exactly where their children will be, how to contact them if they need to, and what the children will be doing.

Should a situation arise in which it is imperative that the parent get in touch with his/her child there are two phone numbers to use:

247-2044 - Biscayne National Park Headquarters - The staff on the island is in radio contact with this office from 8:00 - 4:30 everyday.

247-6211 - Everglades National Park - 24 hour dispatcher - The staff on Adams Key can be reached by radio 24 hours per day through Everglades.

A Ranger, trained in Advanced First Aid, is in residence on Adams Key. In addition, during an unlikely emergency, a U. S. Coast Guard helicopter can be on the island within 30 minutes.

2. Boat Safety - Life preservers will be issued to each camp participant before the boat trip to the island. These life preservers must be worn by both adults and children while on the boat and during water activities. A buddy system will be instituted for additional safety during these times. Shoes must also be worn while on the boat, during water activities and at all times during the camp.

3. Mosquitoes, sand fleas, and chiggers will not spoil a camp unless you let them. Insects are not usually a problem during the winter/early spring NEED camps. However, one or two camps each season experiences an unexpected outbreak of mosquitoes and sand fleas. Bugs are part of life on Adams Key, so we accept it as part of the total experience. Slap on some Cutter's liquid or cream insect repellent and go ahead with the schedule. (Aerosol insect sprays are not as effective as liquids and are contrary to an environmental ethic since some aerosols harm the atmosphere and all too easily pollute the lungs of people near the can.) Insects are an important part of the food chain in South Florida. If an outbreak occurs during your camp, seize the opportunity to include the insects in your program, since you cannot ignore them.

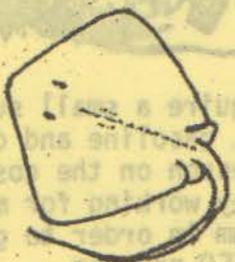
4. Raccoons cannot be ignored either. Store all food securely at night, and do not allow students to keep or even take food into their tents at any time. Raccoons easily smell food (and even crumbs) from a distance. Raccoons will do their best to find any food they smell, even if it is under your pillow! If there is no food in the tents, raccoons will have no reason to even come near the tent area.

5. Poisonwood is a common plant on Adams Key. It is easy to recognize and avoid. (The Park Ranger assigned to your camp will gladly point it out to you.) If you know that you have been in contact with poisonwood, immediately flush the area with soap and water, and you may prevent a rash from developing. If a rash does develop, medication such as Caladryl Lotion or Rhuilcream is recommended.

6. Meal Safety - While students are encouraged to help with meal preparation, there are some duties which should be left to adults. These include all activities around the stove such as lighting and refueling it. Keep a fire extinguisher near the stove at all times and know how to use it. (A box of baking soda works well to extinguish small fires.)

7. Tent Safety - Tent stakes should be pounded flush with the ground to eliminate stepping on them and cutting or spraining a foot. No stakes should be used near the doors of the tents.

8. Adequate Clothing - Make sure that each child brings adequate clothing. As everyone learned in January, 1977 - it can freeze in southern Florida. Children should be prepared for the possibility of extremely cold and windy weather. Several layers of light clothing (jackets, sweat shirts, sweaters and wind breakers), rather than one heavy garment, should be brought to camp by students. As the temperature drops, layers can easily be added to trap body heat; they can just as easily be removed when the temperature rises. Because 80% of the body's heat escapes through the head, a warm cap should be brought to camp. Temperatures in the 30° - 50° F range, combined with winds can rapidly chill a body. Be prepared!

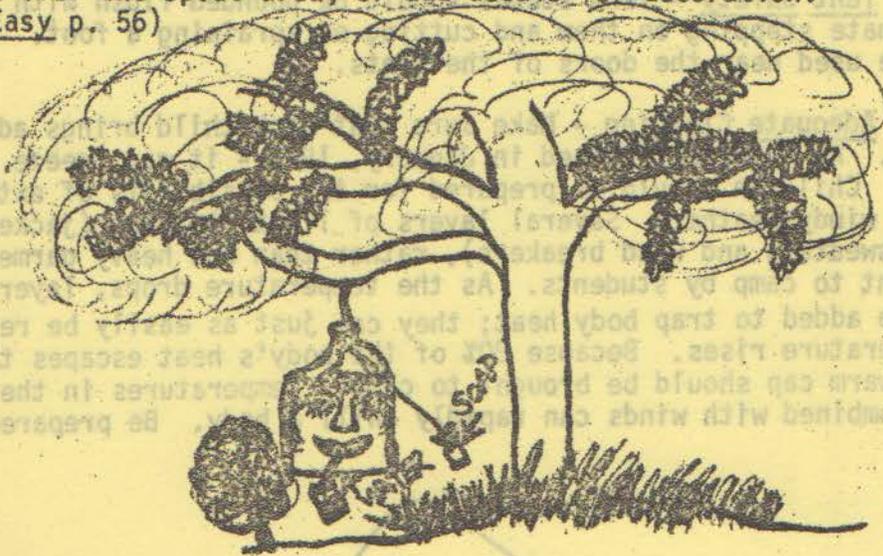


5. Money - Most schools require a certain amount of money from each student to pay for food, programs, and other incidents, (which gives you an opportunity for a lesson on the cost of energy or on the unique way we "hunt" for energy.) Schools are advised to keep costs to a minimum. Schools are given the chance of participating in the NEED program. Fund-raising events are the best way for students to raise money for the camp. Donations are often given by PTA's and other organizations. Free punch and other food can often be obtained from local fast-food establishments.

## G. Extra Camping Ideas

1. Washing and Cleaning Up (Bodies, that is) - Take a large plastic bleach bottle and poke a pinhole in the front near the bottom to make a spout. Fill the bottle with water. When you are ready to wash your hands, loosen the lid; this will allow a small stream of water to flow from the spout. When the lid is airtight, the water will stay inside the jug. (A plastic lining will keep a leaky lid airtight.) If the hole grows larger and starts to leak, plug it with a toothpick. To allow a larger stream of water to flow from the jug, enlarge the hole and plug it with a golf tee. Tie the tee to the jug handle.

Attach a rope to the handle and tie the jug to a tree limb. Place a bar of soap in a nylon stocking or a piece of net and tie the soap to the handle. (Or drill a hole through the center of the soap and place a heavy string through the hole.) Add interest to the jug by painting a face on it with the mouth over the spout area, or add decals for decoration. (Roughing It Easy p. 56)



2. Money - Most schools require a small sum of money from each student to pay for food, propane, gasoline and other incidentals, (which gives you an opportunity for a lesson on the cost of energy or on the unique way we "hunt" for energy by working for money.) Schools are advised to keep costs to a minimum in order to give all students an equal chance of participating in the NEED program.

Fund-raising events are the best way for students to raise money for the camp. Donations are often given by PTA's and other organizations. Free punch and other food can often be obtained from local fast-food establishments

## TIDE TABLES

In scheduling boat transportation for each field trip, it is essential that the tides are taken into account. For your reference, a tide table is included. It will also come in handy for scheduling individual activities such as Beach Walks and Intertidal Studies.

The tides which follow are those found at the Miami harbor entrance. At Convoy Point high tide is  $2\frac{1}{2}$  hours later than high tide at Miami Harbor. Our boat can operate from Convoy Point two hours on either side of high tide.

Example: November, 1980

DAY	TIME	HEIGHT	
	h.m.	ft.	m.
20	0609	3.4	1.0
TH	1219	0.1	0.0
	1822	3.3	1.0

On November 20, 1980 at Convoy Point, high tide = 0609 hours +  $2\frac{1}{2}$  hours = 8:39 A.M.

Our boat can travel from Convoy Point from 2 hours before high tide through two hours after high tide, or between 6:39 - 10:09 A.M. The loaded boat can leave Convoy Point no later than 10:09 A.M. on this day, to include 30 minutes travel time. Expensive damage to the park boat may result by leaving the dock later than 10:09 A.M. Late arrivals will have to be cancelled completely. In addition, there is a chance of sudden mechanical breakdown of the boat or sudden bad weather which will automatically cancel the trip. To date, however, neither of these situations have been a problem.

Generally, low tide is 6 hours past high tide. However, for specific areas in the park low tide varies from the Miami Harbor entrance as follows:

Convoy Point.....+3.5 hours  
Elliott Key.....+3.0 hours  
Adams Key.....+2.5 hours

If you have any questions about the tides and scheduling, please contact the park.

TIDE TABLES

In scheduling boat transportation for each field trip, it is essential that the tides are taken into account. For your reference, a tide table is included. It will also come in handy for scheduling individual activities such as Beach Walks and Intertidal Studies.

The tides which follow are those found at the Miami Harbor entrance. At Convo Point high tide is 2 1/2 hours later than high tide at Miami Harbor. Our boat can operate from Convo Point two hours on either side of high tide.

Example: November, 1980

DAY	HEIGHT	
	h. m.	ft. m.
SO 0609	3.4	1.0
TH 1219	0.1	0.0
1822	3.3	1.0

On November 20, 1980 at Convo Point, high tide = 0609 hours + 2 1/2 hours = 8:39 A.M.

Our boat can travel from Convo Point from 2 hours before high tide through two hours after high tide, or between 6:39 - 10:09 A.M. The loaded boat can leave Convo Point no later than 10:09 A.M. on this day, to include 30 minutes travel time. Expensive damage to the park boat may result by leaving the dock later than 10:09 A.M. Late arrivals will have to be cancelled completely. In addition, there is a chance of sudden mechanical breakdown of the boat or sudden bad weather which will automatically cancel the trip. To date, however, neither of these situations have been a problem.

Generally, low tide is 6 hours past high tide. However, for specific areas in the park low tide varies from the Miami Harbor entrance as follows:

- Convo Point.....+3.5 hours
- Elliott Key.....+3.0 hours
- Adams Key.....+2.5 hours

If you have any questions about the tides and scheduling, please contact the park.

MIAMI HARBOR ENTRANCE, FLA., 1981  
Times and Heights of High and Low Waters

JANUARY						FEBRUARY						MARCH						
Day	Time	Height	Day	Time	Height	Day	Time	Height	Day	Time	Height	Day	Time	Height	Day	Time	Height	
	h.m.	ft. m.		h.m.	ft. m.		h.m.	ft. m.		h.m.	ft. m.		h.m.	ft. m.		h.m.	ft. m.	
1	0438	2.1 0.6	16	0443	2.4 0.7	1	0536	2.1 0.6	16	0624	2.4 0.7	1	0403	1.9 0.6	16	0513	2.3 0.7	
Th	1043	0.4 0.1	F	1051	-0.1 0.0	Su	1141	0.1 0.0	M	1232	-0.2 -0.1	Su	1009	0.3 0.1	M	1126	0.0 0.0	
	1637	2.1 0.6		1651	2.3 0.7		1733	2.0 0.6		1833	2.2 0.7		1606	1.8 0.5		1728	2.2 0.7	
	2259	0.0 0.0		2313	-0.6 -0.2		2353	-0.4 -0.1					2228	-0.2 -0.1		2344	-0.3 -0.2	
2	0526	2.2 0.7	17	0541	2.5 0.8	2	0621	2.2 0.7	17	0050	-0.6 -0.2	2	0459	2.0 0.6	17	0505	2.3 0.7	
F	1128	0.3 0.1	Sa	1149	-0.2 -0.1	M	1226	0.0 0.0	Tu	0711	2.4 0.7	M	1104	0.1 0.0	Tu	1216	-0.1 0.0	
	1724	2.1 0.6		1749	2.4 0.7		1821	2.1 0.6		1319	-0.3 -0.1		1704	2.0 0.6		1821	2.3 0.7	
	2341	-0.2 -0.1								1922	2.3 0.7		2323	-0.3 -0.1				
3	0608	2.4 0.7	18	0009	-0.7 -0.2	3	0039	-0.5 -0.2	18	0136	-0.7 -0.2	3	0547	2.2 0.7	18	0034	-0.3 -0.1	
Sa	1214	0.2 0.1	Su	0637	2.6 0.8	Tu	0703	2.4 0.7	M	0755	2.5 0.8	Tu	1155	-0.1 0.0	M	0651	2.4 0.7	
	1806	2.2 0.7		1245	-0.3 -0.1		1310	-0.2 -0.1		1404	-0.4 -0.1		1757	2.2 0.7		1300	-0.2 -0.1	
				1842	2.4 0.7		1907	2.2 0.7		2006	2.3 0.7					1905	2.4 0.7	
4	0024	-0.3 -0.1	19	0101	-0.8 -0.2	4	0124	-0.7 -0.2	19	0219	-0.6 -0.2	4	0013	-0.5 -0.2	19	0117	-0.4 -0.1	
Su	0650	2.5 0.8	M	0727	2.7 0.8	M	0747	2.5 0.8	Th	0834	2.5 0.8	M	0634	2.4 0.7	Th	0731	2.4 0.7	
	1256	0.1 0.0		1334	-0.3 -0.1		1353	-0.3 -0.1		1443	-0.4 -0.1		1242	-0.3 -0.1		1341	-0.3 -0.1	
	1848	2.3 0.7		1934	2.5 0.8		1954	2.4 0.7		2048	2.3 0.7		1845	2.4 0.7		1948	2.4 0.7	
5	0104	-0.4 -0.1	20	0149	-0.8 -0.2	5	0207	-0.7 -0.2	20	0259	-0.6 -0.2	5	0101	-0.6 -0.2	20	0158	-0.4 -0.1	
M	0731	2.5 0.8	Tu	0813	2.7 0.8	Th	0829	2.5 0.8	F	0911	2.4 0.7	Th	0719	2.5 0.8	F	0907	2.4 0.7	
	1336	0.0 0.0		1422	-0.4 -0.1		1436	-0.5 -0.2		1523	-0.4 -0.1		1327	-0.5 -0.2		1417	-0.4 -0.1	
	1930	2.3 0.7		2022	2.5 0.8		2040	2.5 0.8		2128	2.3 0.7		1934	2.6 0.8		2026	2.5 0.8	
6	0146	-0.5 -0.2	21	0236	-0.7 -0.2	6	0253	-0.8 -0.2	21	0338	-0.4 -0.1	6	0148	-0.7 -0.2	21	0235	-0.3 -0.1	
Tu	0810	2.6 0.8	M	0857	2.6 0.8	F	0910	2.6 0.8	Sa	0948	2.3 0.7	F	0802	2.7 0.8	Sa	0841	2.4 0.7	
	1417	0.0 0.0		1507	-0.4 -0.1		1520	-0.4 -0.2		1600	-0.4 -0.1		1413	-0.7 -0.2		1451	-0.4 -0.1	
	2012	2.4 0.7		2108	2.4 0.7		2127	2.5 0.8		2209	2.2 0.7		2022	2.7 0.8		2103	2.4 0.7	
7	0226	-0.5 -0.2	22	0321	-0.6 -0.2	7	0339	-0.7 -0.2	22	0416	-0.3 -0.1	7	0234	-0.8 -0.2	22	0309	-0.2 -0.1	
M	0850	2.6 0.8	Th	0940	2.6 0.8	Sa	0954	2.6 0.8	Su	1024	2.2 0.7	Sa	0846	2.7 0.8	Su	0915	2.4 0.7	
	1458	-0.1 0.0		1550	-0.4 -0.1		1606	-0.6 -0.2		1637	-0.3 -0.1		1457	-0.8 -0.2		1527	-0.3 -0.1	
	2054	2.4 0.7		2154	2.3 0.7		2216	2.5 0.8		2248	2.1 0.6		2110	2.8 0.9		2140	2.4 0.7	
8	0310	-0.5 -0.2	23	0404	-0.5 -0.2	8	0429	-0.6 -0.2	23	0455	-0.2 -0.1	8	0322	-0.8 -0.2	23	0346	-0.1 0.0	
Th	0931	2.6 0.8	F	1021	2.4 0.7	Su	1040	2.5 0.8	M	1101	2.1 0.6	Su	0931	2.7 0.8	M	0949	2.3 0.7	
	1540	-0.2 -0.1		1633	-0.3 -0.1		1653	-0.6 -0.2		1716	-0.3 -0.1		1544	-0.8 -0.2		1600	-0.3 -0.1	
	2140	2.4 0.7		2238	2.2 0.7		2308	2.5 0.8		2330	2.0 0.6		2200	2.8 0.9		2216	2.3 0.7	
9	0354	-0.5 -0.2	24	0445	-0.3 -0.1	9	0518	-0.5 -0.2	24	0535	0.0 0.0	9	0410	-0.7 -0.2	24	0421	0.0 0.0	
F	1015	2.6 0.8	Sa	1103	2.3 0.7	M	1130	2.4 0.7	Tu	1140	2.0 0.6	M	1018	2.7 0.8	Tu	1024	2.2 0.7	
	1626	-0.2 -0.1		1716	-0.2 -0.1		1746	-0.6 -0.2		1756	-0.2 -0.1		1633	-0.8 -0.2		1637	-0.2 -0.1	
	2229	2.4 0.7		2322	2.1 0.6								2252	2.7 0.8		2255	2.2 0.7	
10	0441	-0.4 -0.1	25	0530	-0.1 0.0	10	0004	2.4 0.7	25	0015	1.9 0.6	10	0501	-0.5 -0.2	25	0500	0.1 0.0	
Sa	1101	2.5 0.8	Su	1143	2.1 0.6	Tu	0615	-0.3 -0.1	M	0620	0.1 0.0	Tu	1108	2.5 0.8	M	1100	2.1 0.6	
	1714	-0.2 -0.1		1759	-0.1 0.0		1223	2.3 0.7		1222	1.9 0.6		1725	-0.7 -0.2		1714	-0.1 0.0	
	2322	2.4 0.7					1843	-0.6 -0.2		1841	-0.1 0.0		2346	2.6 0.8		2338	2.1 0.6	
11	0535	-0.3 -0.1	26	0012	2.0 0.6	11	0105	2.3 0.7	26	0105	1.9 0.6	11	0556	-0.3 -0.1	26	0542	0.3 0.1	
Su	1151	2.4 0.7	M	0615	0.0 0.0	M	0715	-0.2 -0.1	Th	0709	0.3 0.1	M	1202	2.4 0.7	Th	1139	2.0 0.6	
	1807	-0.3 -0.1		1225	2.0 0.6		1321	2.2 0.7		1309	1.8 0.5		1822	-0.6 -0.2		1756	0.0 0.0	
				1847	-0.1 0.0		1945	-0.5 -0.2		1931	0.0 0.0							
12	0020	2.3 0.7	27	0100	1.9 0.6	12	0212	2.2 0.7	27	0203	1.8 0.5	12	0049	2.4 0.7	27	0024	2.1 0.6	
M	0631	-0.2 -0.1	Tu	0705	0.2 0.1	Th	0821	-0.1 0.0	F	0805	0.3 0.1	Th	0659	-0.1 0.0	F	0628	0.4 0.1	
	1244	2.3 0.7		1313	1.9 0.6		1425	2.1 0.6		1405	1.7 0.5		1302	2.2 0.7		1223	1.9 0.6	
	1905	-0.3 -0.1		1934	0.0 0.0		2052	-0.5 -0.2		2031	0.0 0.0		1925	-0.4 -0.1		1847	0.1 0.0	
13	0124	2.3 0.7	28	0157	1.8 0.5	13	0321	2.2 0.7	28	0303	1.8 0.5	13	0153	2.3 0.7	28	0116	2.0 0.6	
Tu	0733	-0.1 0.0	M	0758	0.3 0.1	F	0932	0.0 0.0	Sa	0908	0.3 0.1	F	0805	0.0 0.0	Sa	0724	0.4 0.1	
	1344	2.3 0.7		1402	1.8 0.5		1533	2.1 0.6		1505	1.7 0.5		1408	2.1 0.6		1321	1.8 0.5	
	2007	-0.3 -0.1		2027	0.0 0.0		2158	-0.5 -0.2		2131	-0.1 0.0		2034	-0.3 -0.1		1944	0.1 0.0	
14	0231	2.3 0.7	29	0255	1.8 0.5	14	0430	2.2 0.7	29	0414	2.2 0.7	14	0304	2.2 0.7	29	0216	2.0 0.6	
M	0841	0.0 0.0	Th	0857	0.3 0.1	Sa	1038	-0.1 0.0	Sa	0918	0.1 0.0	Sa	0918	0.1 0.0	Su	0825	0.4 0.1	
	1447	2.3 0.7		1457	1.8 0.5		1638	2.1 0.6		1521	2.1 0.6		1426	1.9 0.6		1426	1.9 0.6	
	2111	-0.4 -0.1		2121	-0.1 0.0		2302	-0.5 -0.2		2145	-0.3 -0.1		2047	0.1 0.0		2047	0.1 0.0	
15	0340	2.3 0.7	30	0351	1.9 0.6	15	0529	2.3 0.7	30	0514	2.2 0.7	15	0414	2.2 0.7	30	0320	2.0 0.6	
Th	0948	0.0 0.0	F	0956	0.3 0.1	Su	1139	-0.1 0.0	Su	1023	0.1 0.0	Su	1023	0.1 0.0	M	0930	0.3 0.1	
	1551	2.3 0.7		1551	1.8 0.5		1739	2.2 0.7		1627	2.1 0.6		1627	2.1 0.6		1533	2.0 0.6	
	2214	-0.5 -0.2		2215	-0.2 -0.1		2357	-0.6 -0.2		2248	-0.3 -0.1					2153	0.0 0.0	
			31	0446	2.0 0.6											31	0419	2.2 0.7
			Sa	1051	0.2 0.1											Tu	1030	0.2 0.1
				1643	1.8 0.5												1635	2.2 0.7
				2305	-0.3 -0.1												2252	-0.1 0.0

Time meridian 75° W. 0000 is midnight. 1200 is noon.  
Heights are referred to mean low water which is the chart datum of soundings.

MIAMI HARBOR ENTRANCE, FLA., 1981  
 Times and Heights of High and Low Waters

APRIL						MAY						JUNE											
Day	Time	Height		Day	Time	Height		Day	Time	Height		Day	Time	Height		Day	Time	Height					
	h.m.	ft.	m.		h.m.	ft.	m.		h.m.	ft.	m.		h.m.	ft.	m.		h.m.	ft.	m.				
1	0512	2.3	0.7	16	0012	0.0	0.0	1	0528	2.6	0.8	16	0024	0.1	0.0	1	0042	-0.4	-0.1	16	0111	0.1	0.0
W	1123	-0.1	0.0	Th	0621	2.4	0.7	F	1144	-0.4	-0.1	Sa	0624	2.3	0.7	M	0544	2.8	0.9	Tu	0702	2.2	0.7
	1731	2.4	0.7		1233	-0.1	0.0		1800	2.8	0.9		1237	-0.2	-0.1		1303	-0.9	-0.3		1318	-0.3	-0.1
	2347	-0.3	-0.1		1845	2.4	0.7						1858	2.5	0.8		1926	3.1	0.9		1944	2.5	0.8
2	0602	2.5	0.8	17	0053	-0.1	0.0	2	0014	-0.3	-0.1	17	0103	0.1	0.0	2	0135	-0.4	-0.1	17	0149	0.1	0.0
Th	1211	-0.3	-0.1	F	0650	2.4	0.7	Sa	0619	2.8	0.9	Su	0701	2.3	0.7	Tu	0736	2.8	0.9	W	0741	2.2	0.7
	1824	2.7	0.8		1311	-0.2	-0.1		1234	-0.6	-0.2		1314	-0.2	-0.1		1354	-0.9	-0.3		1355	-0.4	-0.1
					1925	2.5	0.8		1853	3.0	0.9		1933	2.5	0.8		2018	3.1	0.9		2022	2.5	0.8
3	0037	-0.5	-0.2	18	0130	-0.1	0.0	3	0104	-0.4	-0.1	18	0139	0.1	0.0	3	0227	-0.4	-0.1	18	0228	0.1	0.0
F	0648	2.7	0.8	Sa	0735	2.4	0.7	Su	0709	2.9	0.9	M	0735	2.3	0.7	W	0827	2.8	0.9	Th	0818	2.2	0.7
	1259	-0.6	-0.2		1346	-0.2	-0.1		1323	-0.8	-0.2		1347	-0.3	-0.1		1445	-0.9	-0.3		1434	-0.4	-0.1
	1914	2.9	0.9		2001	2.6	0.8		1944	3.2	1.0		2010	2.6	0.8		2110	3.1	0.9		2059	2.5	0.8
4	0126	-0.6	-0.2	19	0207	-0.1	0.0	4	0154	-0.5	-0.2	19	0216	0.1	0.0	4	0320	-0.4	-0.1	19	0306	0.1	0.0
Sa	0735	2.8	0.9	Su	0809	2.4	0.7	M	0757	3.0	0.9	Tu	0810	2.3	0.7	Th	0919	2.7	0.8	F	0859	2.2	0.7
	1348	-0.8	-0.2		1420	-0.3	-0.1		1412	-0.9	-0.3		1422	-0.3	-0.1		1536	-0.8	-0.2		1513	-0.3	-0.1
	2003	3.0	0.9		2037	2.6	0.8		2034	3.2	1.0		2046	2.6	0.8		2202	2.9	0.9		2139	2.4	0.7
5	0215	-0.6	-0.2	20	0243	0.0	0.0	5	0245	-0.5	-0.2	20	0253	0.1	0.0	5	0412	-0.3	-0.1	20	0345	0.1	0.0
Su	0821	2.9	0.9	M	0842	2.4	0.7	Tu	0847	3.0	0.9	W	0845	2.3	0.7	F	1013	2.6	0.8	Sa	0941	2.2	0.7
	1434	-0.9	-0.3		1453	-0.3	-0.1		1502	-0.9	-0.3		1458	-0.3	-0.1		1629	-0.6	-0.2		1555	-0.3	-0.1
	2053	3.1	0.9		2112	2.5	0.8		2125	3.2	1.0		2124	2.5	0.8		2253	2.8	0.9		2218	2.4	0.7
6	0304	-0.6	-0.2	21	0317	0.1	0.0	6	0336	-0.4	-0.1	21	0329	0.2	0.1	6	0506	-0.2	-0.1	21	0427	0.1	0.0
M	0908	2.9	0.9	Tu	0915	2.3	0.7	W	0938	2.9	0.9	Th	0921	2.2	0.7	Sa	1109	2.4	0.7	Su	1024	2.2	0.7
	1523	-0.9	-0.3		1528	-0.2	-0.1		1554	-0.8	-0.2		1535	-0.2	-0.1		1725	-0.4	-0.1		1637	-0.2	-0.1
	2142	3.1	0.9		2149	2.5	0.8		2218	3.0	0.9		2202	2.5	0.8		2348	2.6	0.8		2301	2.4	0.7
7	0354	-0.5	-0.2	22	0354	0.1	0.0	7	0429	-0.3	-0.1	22	0408	0.2	0.1	7	0604	-0.1	0.0	22	0511	0.1	0.0
Tu	0957	2.8	0.9	W	0949	2.3	0.7	Th	1030	2.7	0.8	F	1001	2.2	0.7	Su	1207	2.3	0.7	M	1114	2.1	0.6
	1613	-0.8	-0.2		1603	-0.2	-0.1		1647	-0.6	-0.2		1615	-0.1	0.0		1620	-0.2	-0.1		1727	-0.1	0.0
	2236	3.0	0.9		2226	2.4	0.7		2313	2.9	0.9		2240	2.4	0.7						2346	2.3	0.7
8	0445	-0.4	-0.1	23	0431	0.2	0.1	8	0525	-0.1	0.0	23	0447	0.3	0.1	8	0044	2.4	0.7	23	0602	0.0	0.0
W	1049	2.7	0.8	Th	1026	2.2	0.7	F	1127	2.5	0.8	Sa	1043	2.1	0.6	M	0702	0.0	0.0	Tu	1209	2.1	0.6
	1706	-0.7	-0.2		1640	-0.1	0.0		1745	-0.4	-0.1		1658	-0.1	0.0		1309	2.2	0.7		1821	-0.1	0.0
	2330	2.8	0.9		2306	2.3	0.7						2324	2.3	0.7		1921	0.0	0.0				
9	0542	-0.2	-0.1	24	0513	0.3	0.1	9	0012	2.7	0.8	24	0534	0.3	0.1	9	0140	2.3	0.7	24	0039	2.3	0.7
Th	1143	2.5	0.8	F	1106	2.1	0.6	Sa	0825	0.0	0.0	Su	1130	2.1	0.6	Tu	0801	0.0	0.0	W	0655	-0.1	0.0
	1802	-0.5	-0.2		1722	0.0	0.0		1228	2.3	0.7		1747	0.0	0.0		1412	2.1	0.6		1310	2.2	0.7
					2349	2.2	0.7		1846	-0.2	-0.1						2021	0.1	0.0		1920	0.0	0.0
10	0031	2.6	0.8	25	0559	0.4	0.1	10	0113	2.5	0.8	25	0012	2.3	0.7	10	0235	2.2	0.7	25	0136	2.3	0.7
F	0643	0.0	0.0	Sa	1154	2.0	0.6	Su	0729	0.1	0.0	M	0625	0.3	0.1	W	0858	0.1	0.0	Th	0755	-0.2	-0.1
	1247	2.3	0.7		1812	0.1	0.0		1336	2.2	0.7		1228	2.1	0.6		1515	2.1	0.6		1414	2.2	0.7
	1906	-0.3	-0.1						1950	0.0	0.0		1643	0.1	0.0		2121	0.2	0.1		2024	0.0	0.0
11	0134	2.4	0.7	26	0041	2.2	0.7	11	0216	2.4	0.7	26	0106	2.2	0.7	11	0331	2.1	0.6	26	0233	2.3	0.7
Sa	0750	0.1	0.0	Su	0652	0.4	0.1	M	0835	0.2	0.1	Tu	0721	0.2	0.1	Th	0952	0.0	0.0	F	0856	-0.3	-0.1
	1353	2.2	0.7		1247	2.0	0.6		1445	2.2	0.7		1329	2.1	0.6		1611	2.1	0.6		1519	2.4	0.7
	2015	-0.1	0.0		1908	0.2	0.1		2057	0.1	0.0		1944	0.1	0.0		2214	0.3	0.1		2127	0.0	0.0
12	0243	2.3	0.7	27	0138	2.1	0.6	12	0318	2.3	0.7	27	0206	2.2	0.7	12	0419	2.1	0.6	27	0332	2.4	0.7
Su	0858	0.2	0.1	M	0752	0.4	0.1	Tu	0937	0.1	0.0	W	0823	0.1	0.0	F	1038	0.0	0.0	Sa	0956	-0.5	-0.2
	1506	2.1	0.6		1355	2.0	0.6		1550	2.2	0.7		1436	2.2	0.7		1659	2.2	0.7		1623	2.5	0.8
	2124	0.0	0.0		2013	0.2	0.1		2159	0.2	0.1		2048	0.1	0.0		2303	0.2	0.1		2230	-0.1	0.0
13	0349	2.3	0.7	28	0241	2.2	0.7	13	0414	2.3	0.7	28	0304	2.3	0.7	13	0503	2.1	0.6	28	0433	2.5	0.8
M	1006	0.2	0.1	Tu	0855	0.3	0.1	W	1031	0.1	0.0	Th	0925	-0.1	0.0	Sa	1122	-0.1	0.0	Su	1054	-0.6	-0.2
	1614	2.2	0.7		1504	2.1	0.6		1646	2.2	0.7		1542	2.4	0.7		1745	2.2	0.7		1721	2.7	0.8
	2230	0.0	0.0		2119	0.1	0.0		2254	0.2	0.1		2153	0.0	0.0		2349	0.2	0.1		2328	-0.2	-0.1
14	0448	2.3	0.7	29	0341	2.3	0.7	14	0502	2.3	0.7	29	0403	2.4	0.7	14	0545	2.1	0.6	29	0531	2.6	0.8
Tu	1102	0.1	0.0	W	0955	0.1	0.0	Th	1121	0.0	0.0	F	1021	-0.3	-0.1	Su	1203	-0.2	-0.1	M	1150	-0.8	-0.2
	1712	2.3	0.7		1609	2.3	0.7		1736	2.3	0.7		1643	2.6	0.8		1826	2.3	0.7		1818	2.8	0.9
	2326	0.0	0.0		2223	0.0	0.0		2341	0.2	0.1		2253	-0.1	0.0								
15	0539	2.4	0.7	30	0436	2.4	0.7	15	0544	2.3	0.7	30	0459	2.6	0.8	15	0030	0.2	0.1	30	0026	-0.3	-0.1
W	1152	0.0																					

NEED CAMP EVALUATION - BISCAYNE NATIONAL PARK

Reviewing this evaluation before your camp will make the evaluation process easier. As you see things throughout the camp worth commenting on, make a point of remembering them. Then, complete the evaluation very soon after the camp, while your ideas are still fresh. The evaluation is completed by both the School Coordinator and the assisting Park Ranger. The School Principal and Biscayne's Environmental Education Coordinator should both receive copies.

To be filled out by the assisting Park Ranger:

1. What did you like about the school's contribution to the entire program?
2. What could the school do to make next year's program better?

Other comments:

To be filled out by the School Coordinator:

1. What did you like about Biscayne's contribution to the entire program?
2. What could Biscayne do to make next year's program better?
3. How were you and your children affected by the NEED camp?

Other comments:

School & Address: \_\_\_\_\_ #Students: \_\_\_\_\_

NEED Area: \_\_\_\_\_ # Days Camped: \_\_\_\_\_

School Coordinator: \_\_\_\_\_ Camp Date: \_\_\_\_\_

\_\_\_\_\_  
School Coordinator

\_\_\_\_\_  
Park Ranger

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SPICE STRANDS

ONE APPROACH TO ENVIRONMENTAL EDUCATION

There are many productive ways in which to make use of the environment as an educational tool. One approach is strictly classification: everything has a name and a specific way of interacting with the universe. Scientists describing unique objects use this taxonomical method as a principal operational procedure in their investigations. This method, however, has a drawback for the teacher with a limited scientific background, who may not know the multitude of specific names and conditions with which to describe the environment scientifically.

Another way of approaching environmental study is through an investigative, completely open-ended method. The teacher guides students in their attempts to discover what is present in their surroundings and to place their discoveries into some kind of perspective. The advantage of this method is that it provides the kind of study that activates sensory awareness and enables the student to develop creative problem-solving techniques. The difficulty rests with the development of research skills. Research skills are another tool of the scientific investigator, and although they would provide a good background in problem-solving for the student, it takes time to develop them.

The SPICE Strand approach commonly used in National Park Service areas, draws upon the advantages of both of these methods while eliminating the disadvantages. It incorporates both the specific and the investigative approaches into a third approach with which both student and teacher can feel more comfortable. It requires identification and classification, but on a modified basis. It also requires open-ended investigation leading to problem-solving. Yet all of its requirements can be taught by a teacher and fulfilled by a student who has little of the rigorous scientific training demanded by the other approaches.

The Strand approach makes necessary a reorganization of thinking into unfamiliar patterns, which may at first be difficult. The valuable, unifying characteristic of the Strand approach, however, makes whatever initial effort may be necessary unquestionably worthwhile.

The Strand approach uses five broad, universal concepts as a way of drawing the environment under a total, integrated "umbrella". They are known as the SPICE Strands because the first letter of each concept makes up one of the letters of the word SPICE.

NEED Area: \_\_\_\_\_

School Coordinator: \_\_\_\_\_

Camp Date: \_\_\_\_\_

Park Ranger: \_\_\_\_\_

These concepts or Strands are:

**SIMILARITY AND VARIETY:** Many likenesses and differences occur among living and nonliving things. A variety of functions, sizes and structures exist in plants and stars, rocks and animals, processes and people. Yet there are sufficient similarities to permit their classification into orderly patterns. These classifications increase one's understanding of the world.

**PATTERNS:** Organizational patterns are kinds of structures that may be found in rock formations as well as in social groups of people and animals. Functional patterns include traffic movements and classroom schedules. Spatial arrangements are patterns that often please us. Such patterns occur both in nature and in artistic design.

**INTERACTION AND INTERDEPENDENCE:** Nothing exists in isolation. Individuals are constantly interacting with living and nonliving things: their families, their belongings, their friends, and their world. An individual's surroundings also depend on the individual to function properly. The process is a continuous part of the life cycle, even after death, for dead life forms nourish the living.

**CONTINUITY AND CHANGE:** Both living and nonliving things are constantly changing -- whether among galaxies and planets or within body cells and body systems. Some things remain the same in spite of change. Matter and energy may change in form, but they can never be created or destroyed.

**EVOLUTION AND ADAPTATION:** Over centuries and centuries, living and nonliving things alter and develop in the process called evolution. Probably the greatest number of changes over the longest periods of time come about in order to enable an organism to adapt to the environment. For mere survival hereditary factors preserve the continuing elements. The characteristics that enable the organism to adapt best (for example, the best food finder) are the traits passed on from generation to generation, thus ensuring survival of the species.

Similarity and variety means the simple recognition of each organic and inorganic thing. A classification is derived by noting similar characteristics in distinct objects. Once a classification is made, an object's Patterns can be identified. What is the nature of its design? Of its function - what does it do? Of its organization? The functional pattern leads directly to Interaction and Interdependence. How does the specific variety interact with air, water, earth, and other populations? As it Continues to Change, it is constantly undergoing Evolution and Adaptation, according to how it fits into the Pattern of existence. If a substance does not adapt in its present form, it Evolves, through Continuity and Change, into a new Variety, with a new Pattern of Interaction and Interdependence.

Using these large concepts, or Strands, teachers who have had no particular scientific or ecological training can instruct or guide students toward open-ended, purposeful activities. The scope of the Strands can be focused on the specific at almost any level of detail or sophistication. Within the Strands there is a synthesis of environmental relationships. This synthesis makes the Strands applicable to the wide range of disciplines within the school program, yet the Strands provide a tool for study that can be specifically related to the most widely differing ecological situations. For example, Patterns can be applied to the arrangements of beach fauna (biology), mountain ecology (natural history), or people living in an urban area (social sciences).

Teachers should think of themselves as catalysts -- permitting the students to develop the answers themselves whenever possible, which will result in a greater retention of the basic understandings. Once the basic Strand understandings are established with the students, they will continue to seek new examples in new environments, leading to a keen awareness of human interaction within the world.

The Strands can be disastrously misused. The danger inherent with any methodology is that the methodology can be used as a thing in itself, for its own sake. There have been unfortunate examples where the Strands were taught as a subject, instead of used to integrate disciplines or to understand processes. At other times, students were told to memorize and parrot them like multiplication tables. Avoid these dangers. The Strands are a framework. You may never have to mention them at all. Like the girders in a building, they are hidden from view, but keep everything from collapsing.

Perhaps the best thing about the Strands is that students can use them as a reference point to interrelate the things they know, see and feel in their own lives with all their future experience and education. It is fairly clear that the only way people achieve higher levels of understanding is by understanding new ideas in terms of old ones. Otherwise, people are reduced to learning information and facts without new awareness.

There is one thing about the Strands which should never be forgotten: the Strands exist simultaneously in all things at all times. You will find that while using the Strands, one irresistably leads into the others. Often one becomes indistinguishable from another. The Strands always reinforce one another. This is as it should be. In a world of process, it is inevitable that an honest framework is as dynamic as the world it views.



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B. Resource Materials

Adventure in Environment

National Environmental Education Development Materials (K-8)  
Silver Burdett Company  
Box PM-S  
Morristown, New Jersey 07960

Brevard County Environmental Curriculum Materials (K-8)  
Center for Environmental Learning  
705 Avocado Avenue  
Cocoa, Florida 32922

Environmental Studies (all ages)  
Addison-Wesley Publishing Company  
Menlo Park, California

Martin County Environmental Curriculum Materials (K-8)  
Environmental Study Center  
2900 N.E. Indian Drive  
Jensen Beach, Florida 33457

Outdoor Biological Instructional Strategies (OBIS) (4-8)  
Lawrence Hall of Science  
University of California  
Berkeley, California 94720

SO YOU WANT TO LEARN? TO GROW? TO UNDERSTAND? TO KNOW?  
THEN DO NOT RUN WILDLY THROUGH THE TRAILS OF LIFE. SLOW  
DOWN. COME TO CENTER. BREATHE DEEPLY. SENSE THE COLORS  
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FORTH THE ENERGY OF THE SUN. LOOK, BETTER EVEN, STARE  
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-DR. TOM SMITH

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The efforts of many people made this book possible:

Mike Watson, Debbe Wade and the Environmental Education staff at Everglades National Park are a constant source of encouragement, advice and ideas. The past and present planning guides prepared by the Everglades staff were closely modeled while preparing this guide.

Jacqui Ferber is responsible for the section on The Logistics of Camping. Carol Bottorff spent hours typing and retyping drafts. Edna Good prepared the final draft for printing and duplication. Jacqui, Carol, and Edna, along with Dedie Ford and Linda Amidon reviewed and edited the guide during its entire preparation.

The support and administrative efforts of Superintendent Jim Sanders and Chief Ranger Tim Setnicka make the expansion of the Environmental Education program at Biscayne possible. Many thanks to all!

Sincerely,

*Carol A. McNulty*

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Environmental Education Coordinator

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