EVERGLADES NATIONAL PARK

SANDFLY ISLAND

NATIONAL ENVIRONMENTAL STUDY AREA

by Sandy Dayhoff
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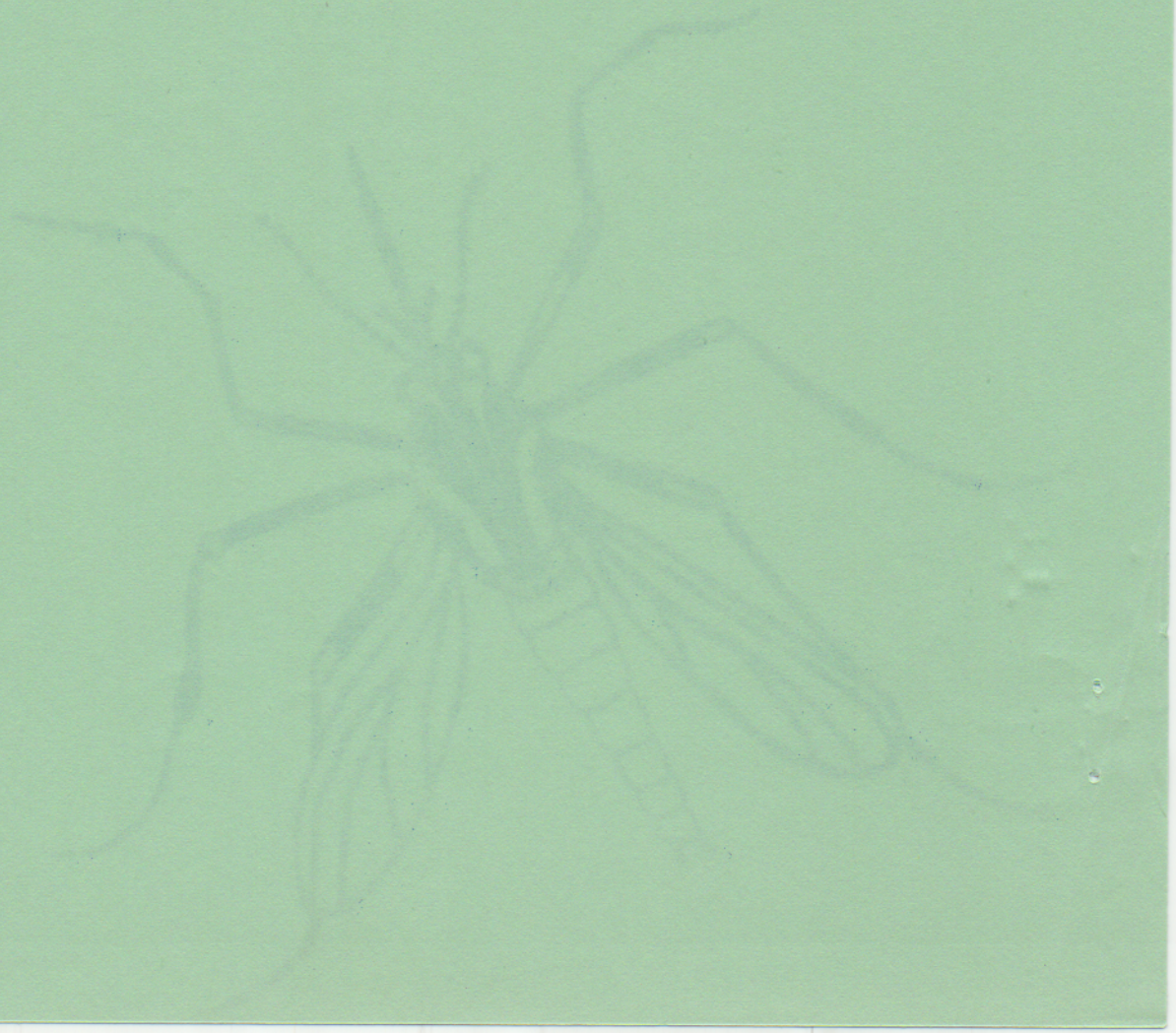

ACKNOWLEDGEMENTS

The following people contributed greatly to the completion of this reference:

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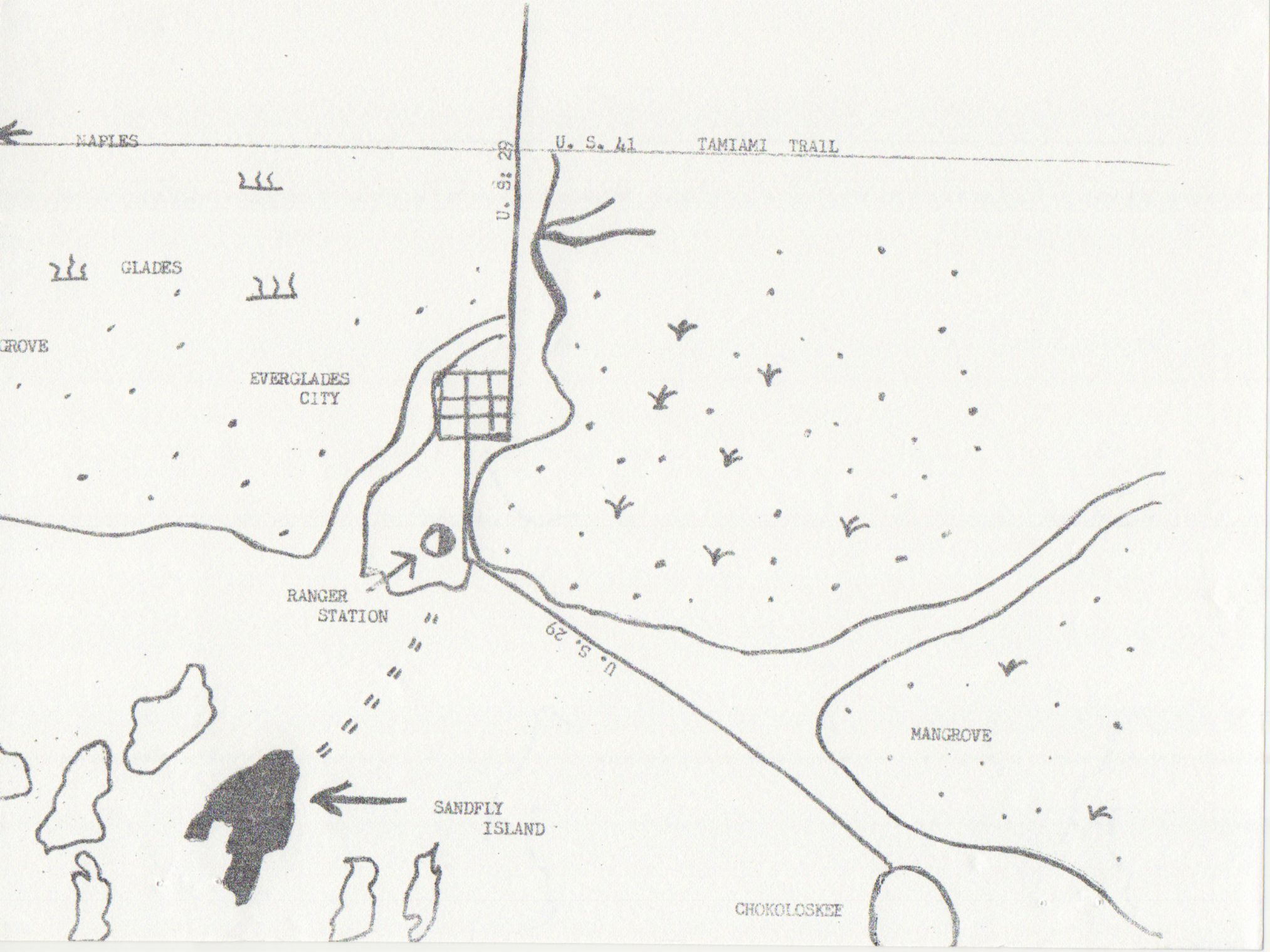
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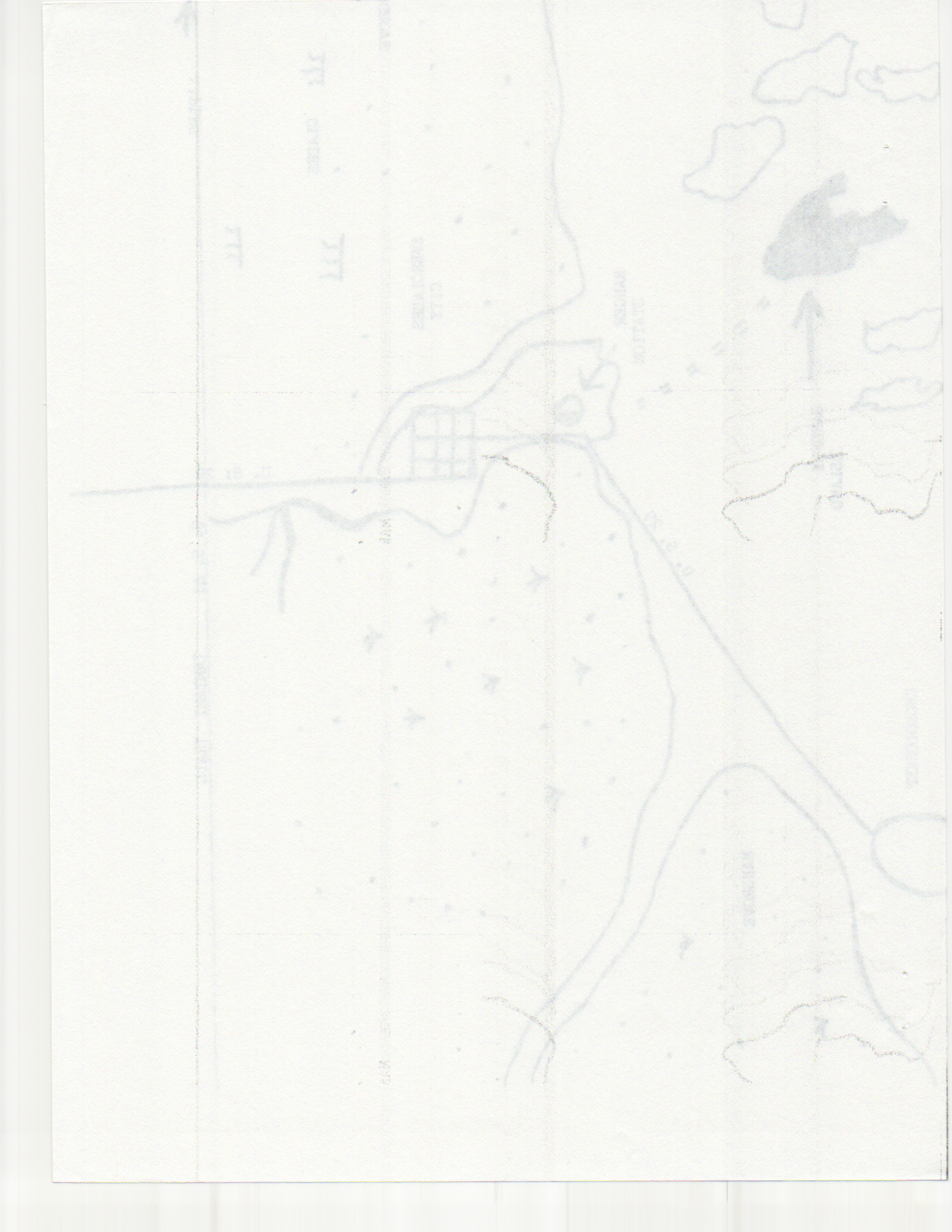


The National Park Service is greatly concerned about man's future in Southern Florida. In recognizing man's plight, the Everglades National Park has begun an environmental education program. We don't pretend to have all the answers, but through you and this program we hope to achieve part of our goals which are:

1. Acquaint the children of South Florida with the Everglades through a pleasant and memorable experience, in order to

2. Develop within them an understanding of the value of the Everglades to the total web of life which is a prerequisite we must achieve in order to effectively

3. Develop within them an appreciation for the total environment which must be accomplished in order to

4. Activate the population most closely dependent upon the Everglades to a status of positive thinking, if not active particiapation, in the environmental problems faced not just by Everglades National Park, but by the total population of South Florida.

Sandfly Island is a continually growing mangrove island, in many ways similar to a child's mind. Child and island will expand and grow and change. Man and nature will work to create their future. We can only hope, as educators, this growing process in children will be enhanced by this one unique wilderness experience.

You, the teacher, are the essential link in this program. Your teaching and influence will help make the program a success. This guide is meant to serve as a reference for you. We hope it will serve you in helping your students discover the Everglades and will be a springboard for new ideas. We solicit your suggestions for Improving the program.

A child's mind is similar to a seed; once planted properly, it will slowly grow and develop into a healthy, beautiful "flower" which will provide seed for future generations. Together we rangers and teachers are the caretakers of those very precious seeds. Welcome to our program. Between this guide and your workshop, we hope you will feel confident in embarking on a new and exciting school year in environmental education.

WHAT TO EXPECT WHEN YOU ARRIVE AT EVERGLADES CITY

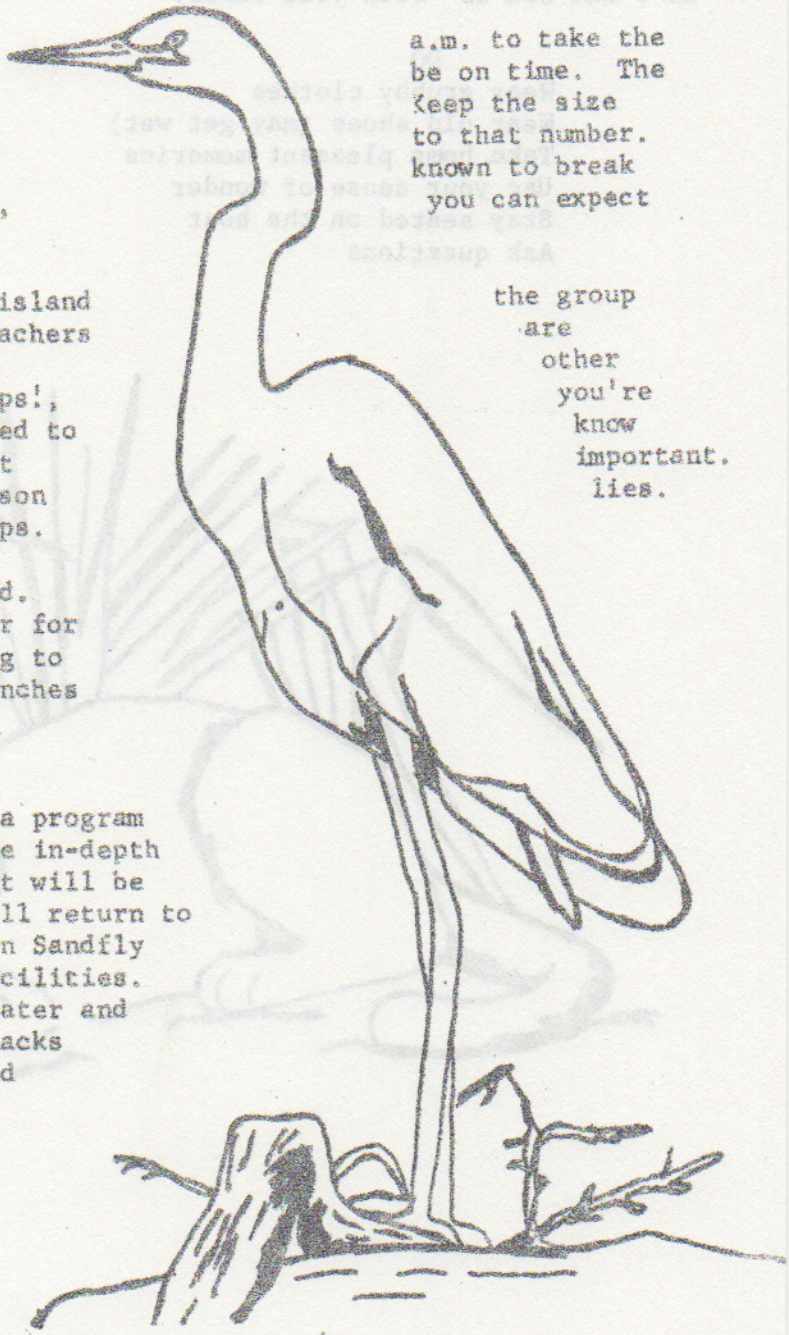
You and your class will be greeted by a Park Ranger who will explain the day's activities. Much of the day will be spent walking and there is a good possibility that you will get wet, so come prepared in old, comfortable shoes.

The boat leaves the dock at 10 a.m. to take the group to Sandfly Island. Please be on time. The boat's capacity is 37 people. Keep the size of your group, including chaperones, to that number. Boats are man-made machines and are known to break down from time to time, but generally, you can expect the boat trip.

After a twenty minute trip to the island the group will unload and begin to explore. Teachers are required to take half the group. The other half will be taken by the Ranger. Oops!, you're getting nervous--don't. You don't need to know the names of everything. Names aren't important. It's in the concept that the real lesson lies. Halfway down the trail we switch groups.

At noon we have lunch on the island. Remember to bring extra drinking water for the kids who forget to bring something to drink at lunch. It is best if the lunches are consolidated in one box and then distributed at lunch.

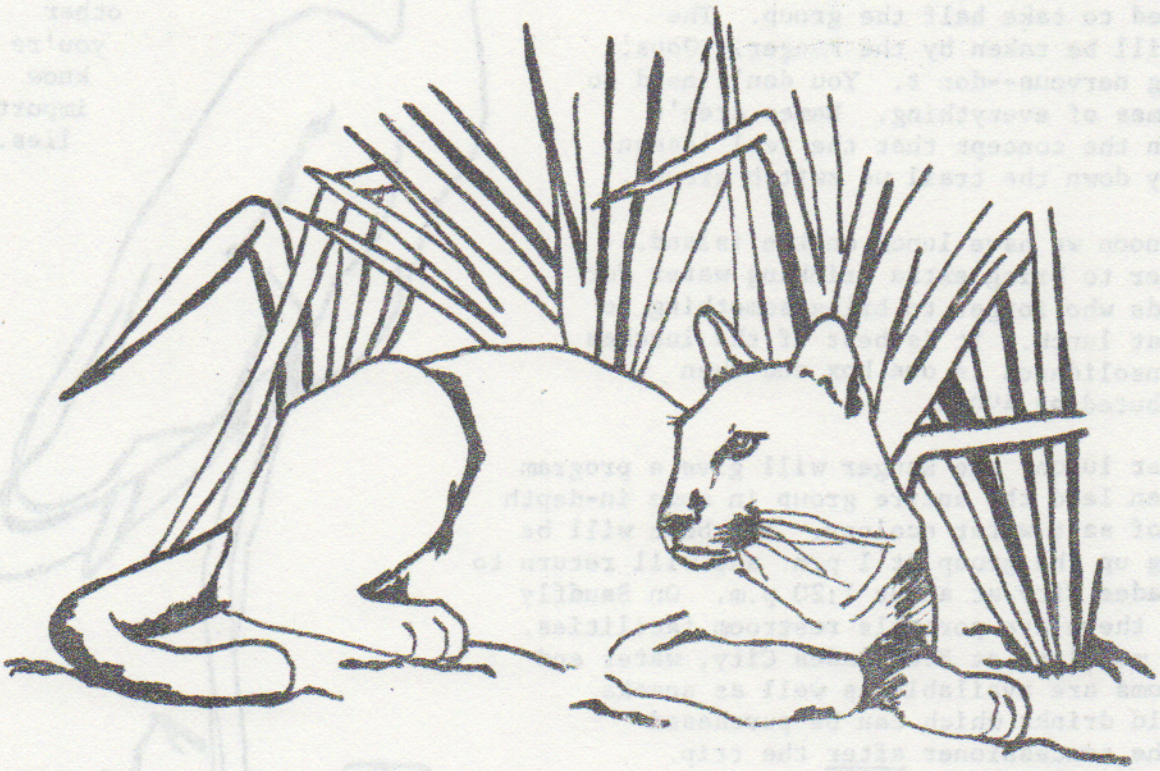
After lunch, the Ranger will give a program and then lead the entire group in some in-depth study of salt water ecology. The boat will be picking up the group at 1 p.m. and will return to Everglades City at about 1:20 p.m. On Sandfly Island there are portable restroom facilities. On the mainland at Everglades City, water and restrooms are available as well as snacks and cold drinks which can be purchased from the concessioner <u>after</u> the trip.



RULES AND REGULATIONS

Remember, we want your field trip to be the best ever, so we must make a few necessary rules. Teachers are expected to be the disciplinarians at all times. In order to help you, may we suggest a brief talk on the following "Do's and Don'ts" with your class.

DO	DON'T
Wear grubby clothes	Feed or molest any wildlife
Wear old shoes (may get wet)	Collect specimens
Take home pleasant memories	Pick any plants
Use your sense of wonder	Throw rocks or shells
Stay seated on the boat	Get off the boat until instructed to do so
Ask questions	



OVERVIEW OF NESA

Just what is a National Environmental Study Area (NESA)? At the beginning of the 1970's, a growing demand for Environmental Education (EE) programs surfaced in our nation's schools. To help meet this need, the National Park Service helped develop EE materials called the National Environmental Education Development (NEED). Physical sites were designated for using the curriculum materials and philosophy of NEED. These sites are known as NESA's.

Everglades National Park has several NESA's. Two of them are Royal Palm and Long Pine Key, areas only a few miles apart in the southern section of the park. They are designated as NESA's because of their excellent representation of everglades wildlife and plants, and the forces which govern them. In addition, these areas allow easy comparison and contrast with urban environments where most students live. The fact that most urban and agricultural areas in southern Florida were once part of the everglades wilderness is an important relationship which can be explored by students as they travel from their homes to these NESA areas.

By agreeing to be in the NESA program at Everglades National Park, a teacher makes a commitment: he or she will attend a park-sponsored workshop at least once every two years. The Park Service, in turn, makes a commitment: it will do all it can to make the field trip meaningful by providing coordination, resource materials like this guide, and a naturalist to assist the group. Teachers must prepare their students before coming to the park, and conduct follow-up activities on their own. They must also help conduct the field trip while in the park.

Because a half million students attend schools in immediate areas around the park, some controlling factors had to be employed for the NESA program. So, only sixth-grade teachers are permitted to attend the NESA workshops at Royal Palm/Long Pine Key. A similar restriction is placed on the Shark Valley NESA in the northern section of the park--only fourth-grade teachers are permitted there. This gives all students a chance to be in the park program if their fourth and sixth-grade teachers will simply commit themselves to a workshop. Other teachers can bring their students to the NESA areas, but they do so completely on their own.

A NESA, then, is a physical site where environmental education programs take place. This guide explores the NESA at the Everglades City entrance to the park, on Sandfly Island. The guide is primarily intended for sixth-grade teachers, but anyone who benefits from it is welcome to use it.

The NESA program has an element of risk, of course. Complete control of a class is impossible in an outdoor classroom. An alligator is exciting to students and they just may feel like shouting their exuberance. A teacher has to be flexible--there is just no way to predict what will happen on a field trip. You might worry that you do not know the name of every animal and plant. So what? Neither does anyone else, including park rangers. It is so much more important to make observations and share them than it is to know a name. Names are nice to know, but they are not necessary to appreciate what happens before your eyes.

Plan to take some risk, then, as you participate in NESA. Your students will perhaps view you in a new manner, and it is likely to be a positive one.

THE SPICE STRANDS

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 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 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. These concepts, or Strands, are:

SIMILARITIES 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 this 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 in both nature and in artistic design.

INTERACTION AND INTERDEPENDENCE: Nothing exists in isolation. Each individual is constantly interacting with living and nonliving things: his family, his belongings, his friends, his world. These people and things also depend on the individual in order to function properly. The process is continuous (as 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. Hereditary factors then preserve the continuing elements. The characteristics that enable the organism to adapt best (for example, the best food finder) are apt to be the traits passed on from generation to generation, thus ensuring survival of the species.

Similarities 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, (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 man's interactions with 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 discipline or to understand processes. 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 never to 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.

Similarity and Variety -- There are five projections on your hand that are so similar to each other, they are called fingers. But there is so much variety in them that no two are exactly alike. In fact, no two fingers in the world are exactly alike. Once this similarity and variety is observed, we can identify patterns.

Patterns -- There is a pattern on the end of every finger called finger prints. There is an endless variety of finger prints, though they all follow a similar pattern. There is a pattern in the way the blood flows through your hand, from the heart to arteries to tiny capillaries in the hand, and back to the heart through veins. These patterns lead directly to interaction and interdependence.

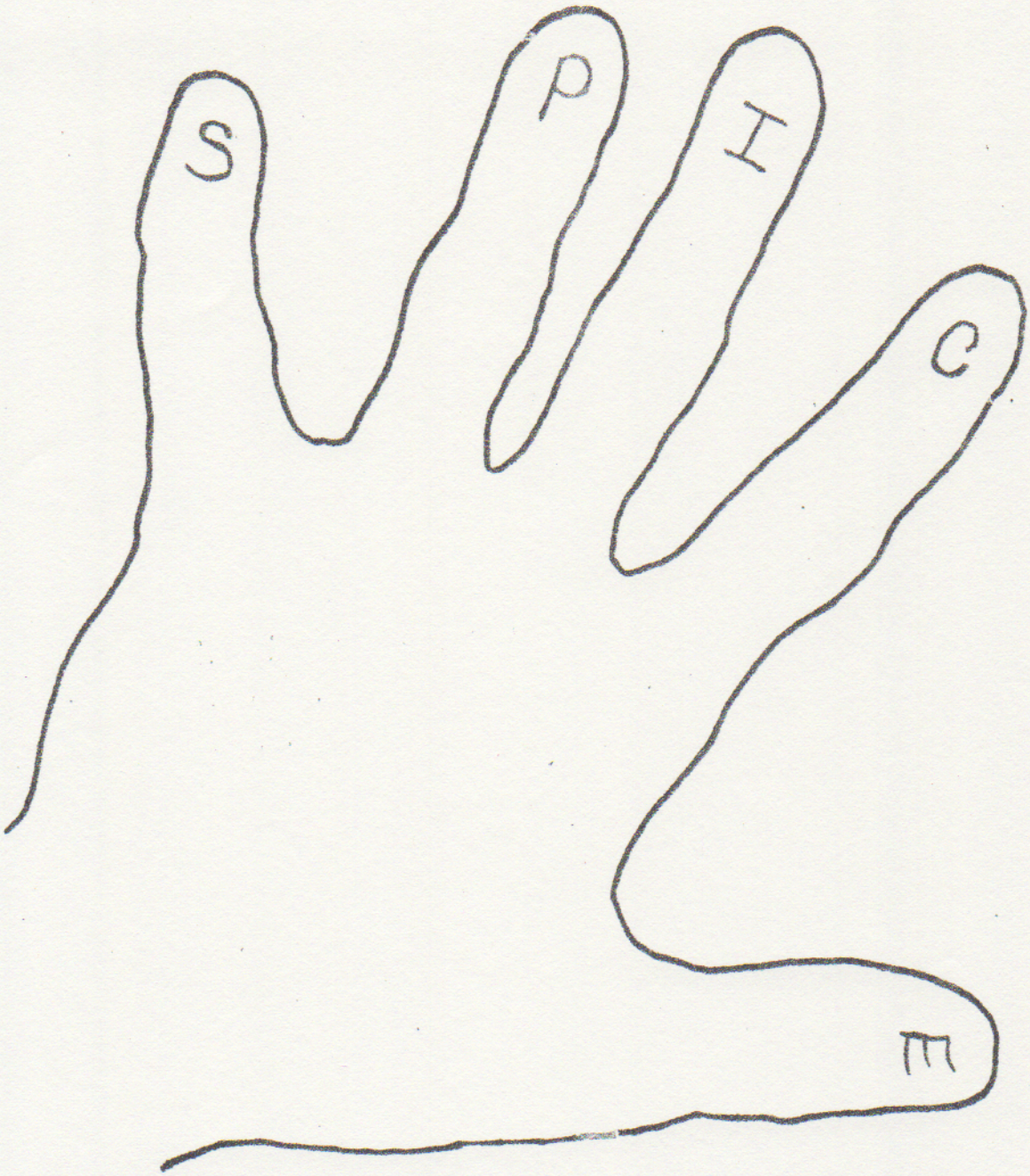
Interaction and Interdependence -- There is interaction when the blood in your hand delivers sugar to every tiny cell in exchange for waste material. Your fingers interact, though independently, when they are playing a guitar or holding a hamburger. Your hand interacts when it is cold and by perspiring when it is hot. Interaction and interdependence subjects our hands to continuity and change.

Continuity and Change -- The veins and arteries in your hand change as the temperature changes. The cells in your hand are constantly dying and being replaced by new cells. In fact, the hands you put in your pocket today are not the same hands you had six weeks ago. As your hands continue to change, they constantly undergo evolution and adaptation.

Evolution and Adaptation -- Over long periods of time, the human hand has adapted to new situations. The opposable thumb allows us to do marvelous things with our hands that most other animals cannot. Evolution is change over long periods of time. The hands of man a million years from today will look and function much different than these of today.

So, watch for the Strands in everything natural and man-made, and think of them as the "SPICE of life." And when you cannot remember what they are, you can find them all in your pocket.

Now that you are familiar with the Strands, you can apply them to everything you and your class will experience when you visit the Sandfly Island NESA. The following is an orientation to the NESA Trail in terms of SPICE.

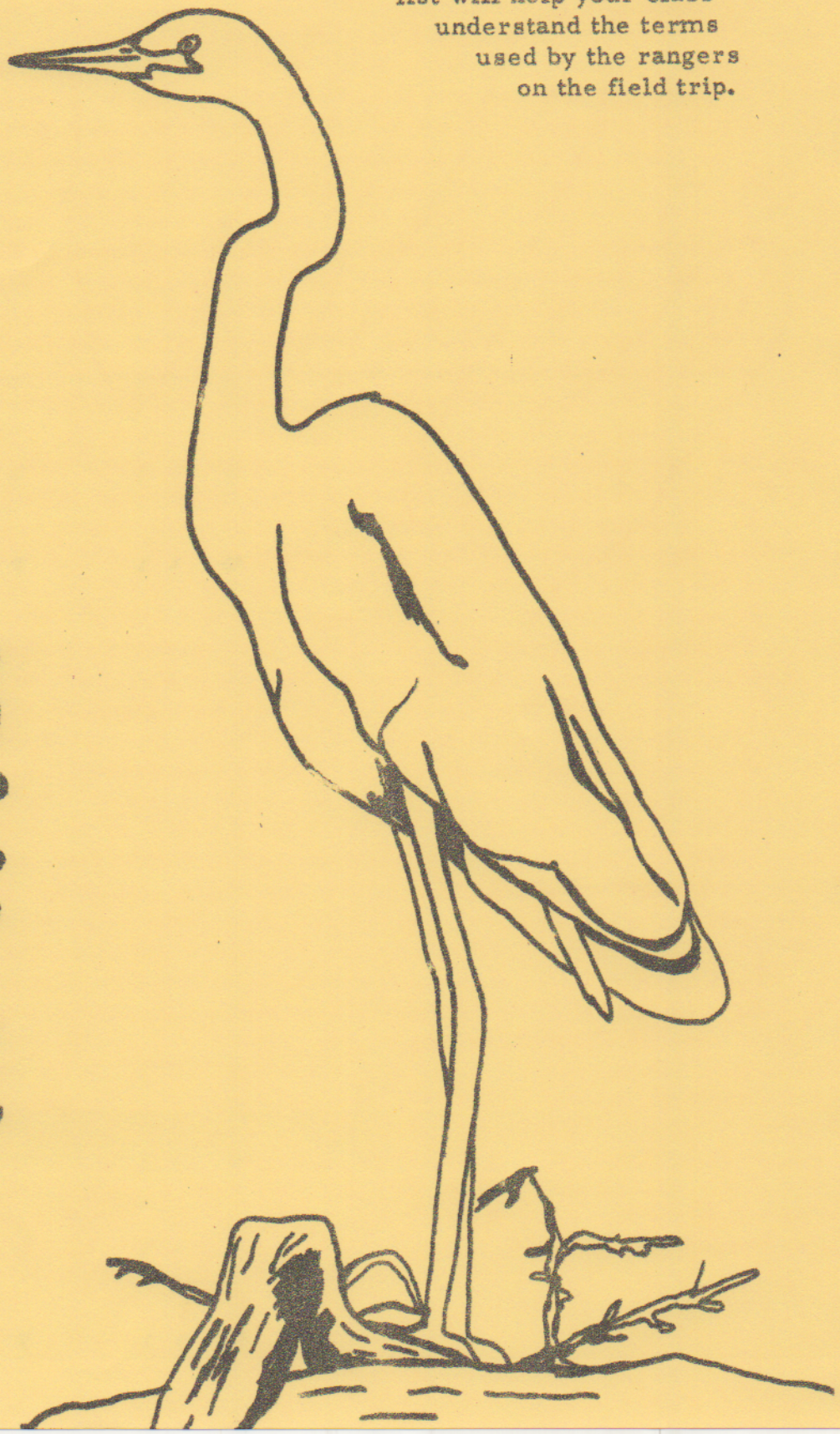


One easy way to remember the SPICE Strand framework is to examine the Strands Pocket Model. There are five fingers on your pocket model, one for each Strand:

S
P
H
C
M

PRE-SITE ACTIVITIES

This section of the booklet has activities for you to do with your class before your field trip. These activities can easily be removed from the booklet. Run off copies and distribute to your class. The vocabulary list will help your class understand the terms used by the rangers on the field trip.



ACTIVITIES

FIELD TRIP

PRE-SITE ACTIVITIES PACK

Vocabulary List -- all of the enclosed activities use these words. Go over them with the children before starting the following activities.

1. Guess what? Pass out 1 copy to each child. Give them 15 minutes to work on it.

2. Bingo -- There is a question and answer sheet for the teacher only. There are 3 different Bingo cards on 1 page. Cut them out and make copies of each; then give 1 to each child. Give out paper clips or small pieces of paper (colored) to use as chips. Teacher calls out questions. After "Bingo" is called, check to see if the answers are right. Next game start asking questions from the bottom of the answer sheet. This activity reinforces vocabulary.

3. Crossword Puzzle -- Teacher calls out questions; children fill in the blanks. This activity reinforces the vocabulary.

4. Food Chain Game -- playground activity. Need 1 tub or large container of water ('gator hole). Use the pictures in the Shark Valley Floor Plan - teacher's guide - or have the children draw their own. Each child has a description of what his animal eats and where he lives, etc.

   Rules: NO TALKING! You are only allowed to make the noises of your animal.

   Start activity by ringing a bell. Everyone starts doing their thing. For instance, if you are a raccoon, you crawl; an alligator, in the water, etc. This reinforces the vocabulary and shows interdependance.

5. Word Sleuth -- Find and circle words given. May be up and down or left to right. Make sure of the spelling!

VOCABULARY LIST

1. Barnacle --a tidal marine animal, immature is free-floating and adults are sessile.
2. Black Mangrove--coastal tree with breathing roots which stick up out of the soil around the base of the tree.
3. Brackish --water which has a low salt content.
4. Carnivore --an animal which feeds entirely on meat.
5. Detritus --bits of food; dead leaves, twigs, algae; remains of animals
6. Environment --everything around us; our surroundings.
7. Estuary --the part of a coastal area where a river meets ocean tides and salt water mixes with fresh water.
8. Evolution --a process of continuous change.
9. Food Chain --a relationship of organisms in which each is dependent upon another for survival.
10. Grass Flats --a salt water habitat characterized by marine grass in shallow water.
11. Habitat --the home of any organism.
12. Microscopic --too small to be seen without the use of magnification.
13. Mosquito --an insect; female sucks blood to assist in producing eggs.
14. Parasite --an organism that lives in or on another organism, taking food from its body, therefore harming it.
15. Park --an area maintained in its natural state; a public property for the benefit of all.
16. Phytoplankton --the plants occurring in plankton; like diatoms.
17. Plankton --usually small plants and animals in water that drift with the currents.
18. Predator --flesh eaters.
19. Red Mangrove --coastal tree recognized by their long prop roots which grow from the branches down into the water.

22. Wildlife - living creatures (animals, fish, birds, etc.) that are not domesticated (tamed or taken for pets).

23. Environment - our surroundings.

24. Evolution - a process of continuous change.

25. Habitat - the home of certain species.

GUESS WHAT ?

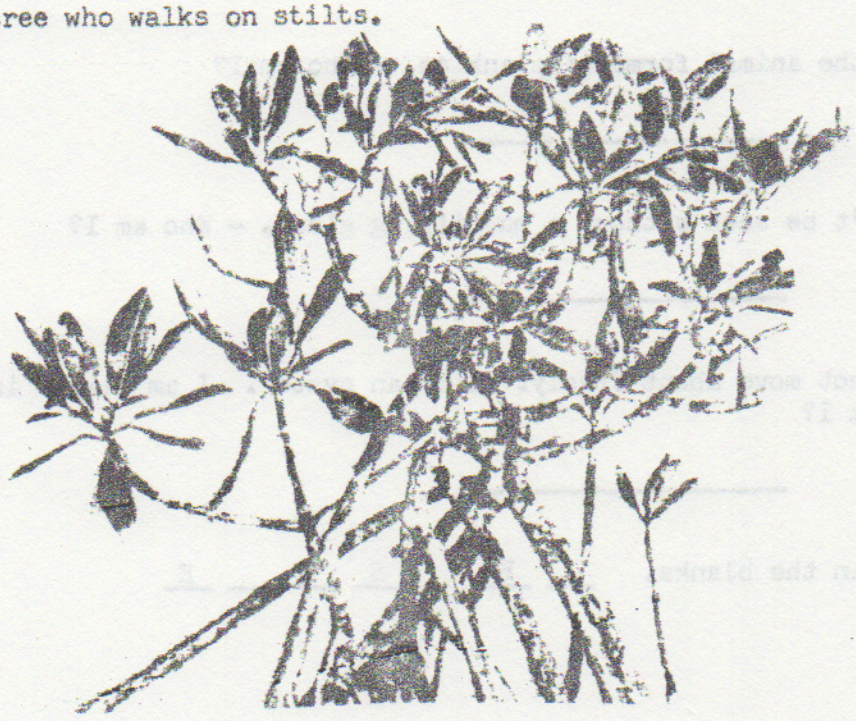
T N E M N O R I V N E

Can you unscramble this? _ _ _ _ _ _ _ _ _ _ _ _ _

What is your environment?

A. The river
B. Everything around you
C. A place where baby animals live

I am the tree who walks on stilts.



Fill in the blanks. _ _ D M _ _ G _ _ V _

I feed on lifeless forms of plants and animals. - Who am I?

_____

I show how the energy from the sun gets passed from plants to plant-eaters to meat-eaters. - Who am I?

_____

I am a flesh-eater. - Who am I?

_____

I fall from the sky and everything needs me in order to survive. - Who am I?

_____

I am microscopic plants and animals that drift with the currents. - Who am I?

_____

I am the animal forms of plankton. - Who am I?

_____

I can't be seen without a magnifying glass. - Who am I?

_____

I cannot move about freely. I am an oyster. I am always in one spot. - Who am I?

_____

Fill in the blanks. __ E __ S __ __ E

BINGO QUESTIONS AND ANSWERS

1. It is sessile - stuck in one place for life.

   answer Barnacle

2. It can drink salt water and excrete the salt from its leaves.

   answer Black Mangrove

3. A plant that lives in shallow water and is a good place for small critters to hide.

   answer Grassflats

4. I need your blood to lay my eggs.

   answer Mosquito

5. They wade in the water and eat fish.

   answer Wading Birds (Herons and Egrets)

6. They are caught in traps around Sandfly.

   answer Crabs

7. His bill can hold more than his belly can.

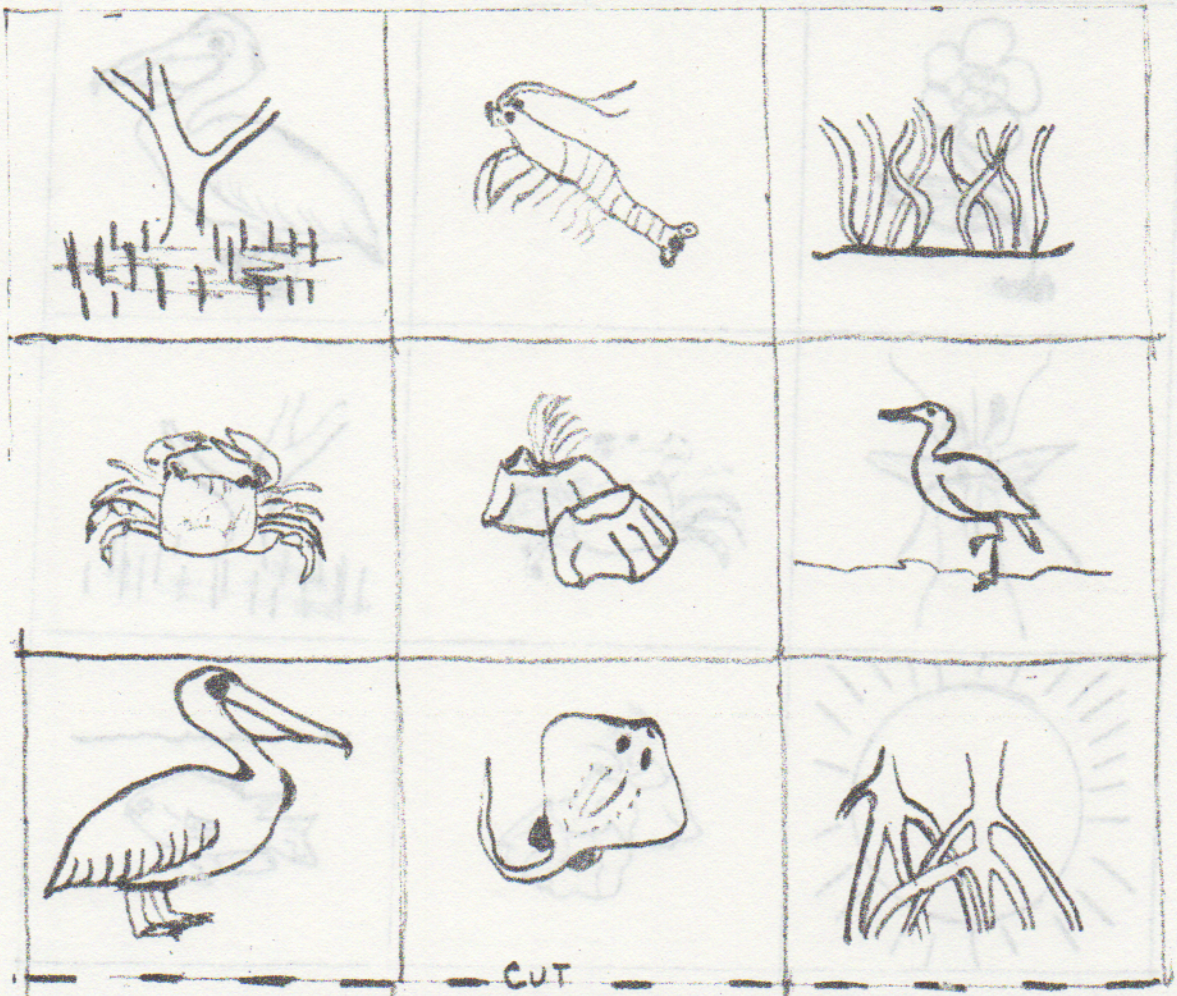
   answer Pelican

8. Everything needs it to grow.

   answer Sun

9. You need a microscope to see me.

   answer (Plankton) - Blank space on card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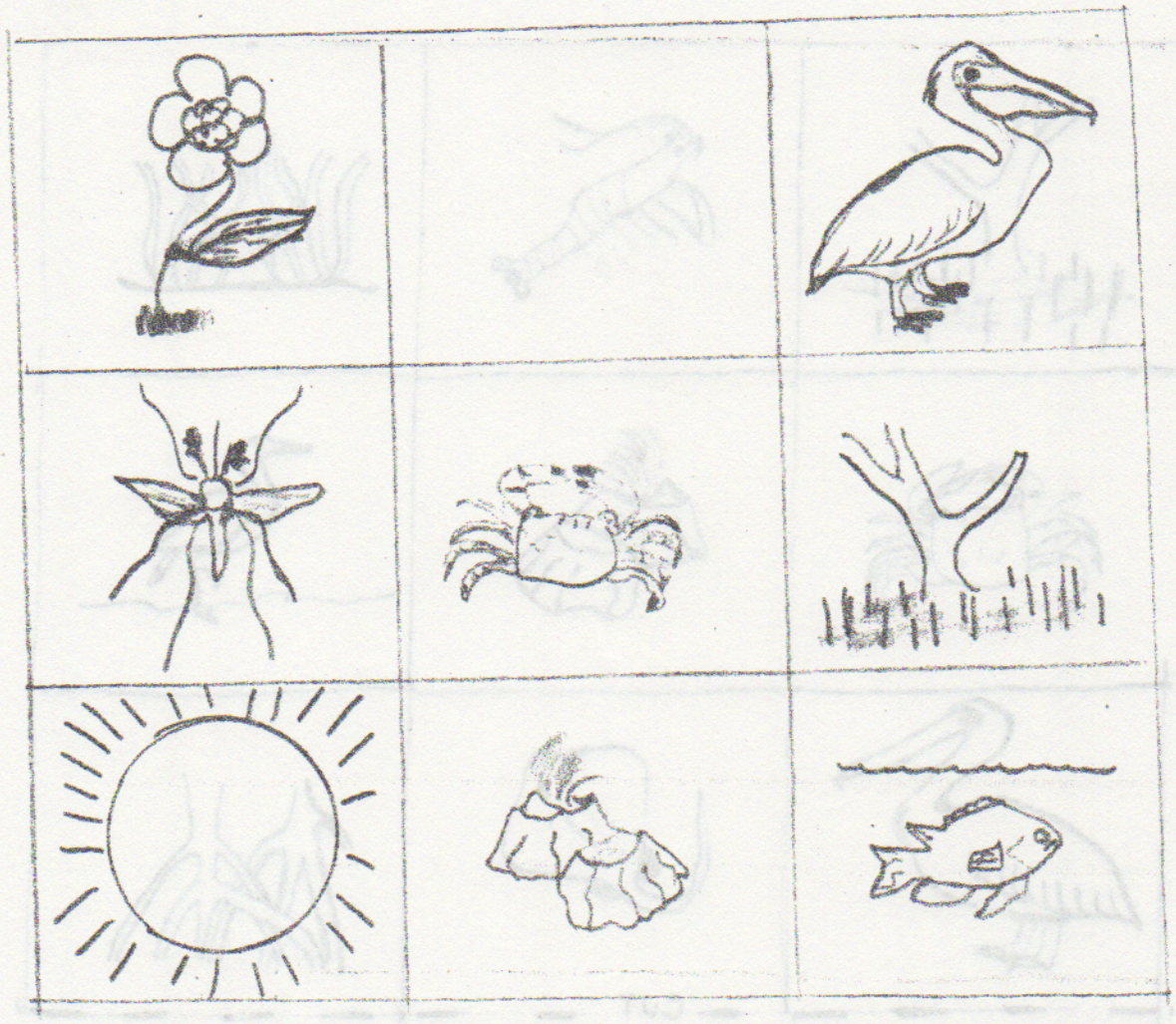
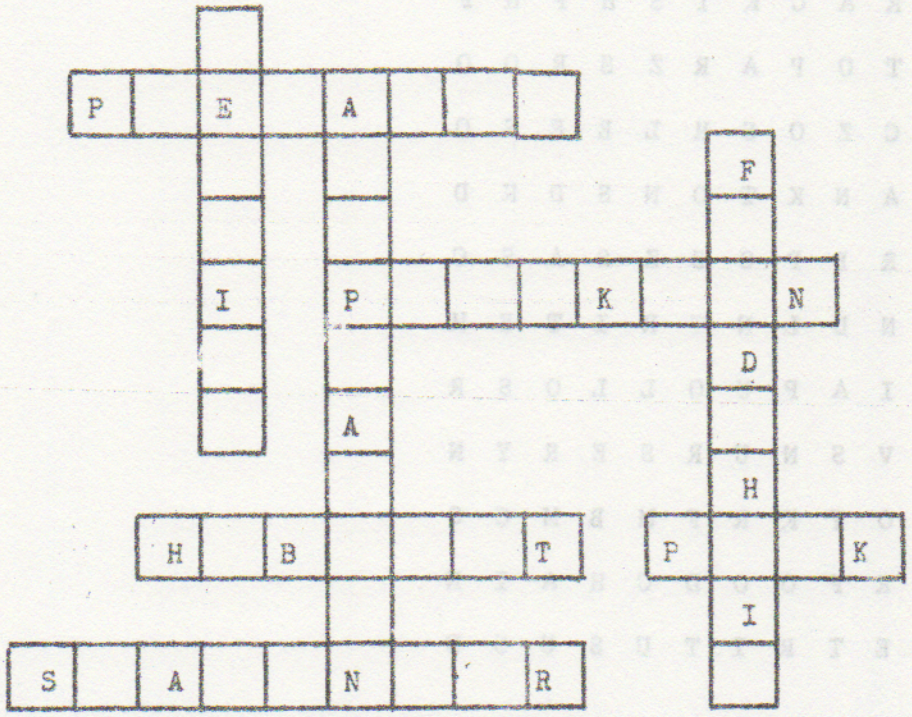


CROSSWORD PUZZLE



Find These:

1. Predator
2. Sessile
3. Plankton
4. Habitat
5. Adaptation
6. Food Chain
7. Park
8. Scavenger

Word Sleuth

Name: _____

B M R A C K I S H P H F

B L T O P A R Z S R O O

A P C Z O S H L E E S O

P L A N K T O N S D K D

A O R B P O S Z S A S C

R O N D L N T R I T E H

K D I A P U O L L O S R

N C V S N U R S E R Y N

T H O T K R F M B M C S

R A R F O O D C H A I N

P D E T R I T U S U S D

Find these in the above word sleuth:

1. Detritus
2. Host
3. Nursery
4. Plankton
5. Sessile
6. Parasite
7. Carnivore
8. Park
9. Food chain

CLASS INVENTORY

(This activity helps the children start looking around themselves.)

Have children take paper and pencil and write down what is in the classroom--blackboard, books, doors, windows, and the like. 20 items or more.

Then have them choose ten items from their list that they feel are essential to the operation of the classroom. Have a discussion after the children complete this second ten-item list.

Ask some key questions--
- --What is a particular item made of?
- --Where did the material for it come from?
- --Is it recyclable?
- --Can we live without the item comfortably?

Bus ride to Sandfly Island

Have children repeat the classroom activity, but on the bus as you travel to Sandfly Island. What do they see? Write it down--cars, trees, water, everything! Have the children write their name on their papers.

At Everglades City, ask the children to hand in their papers. Later, after lunch or back in the classroom, hand back the papers and ask the children to select ten items from their list they feel essential to keep the Everglades functioning.

Reactions to Things

1. Take the children out onto the school grounds.

2. Try to find a spider, insect, frog, or even a garden snake.

3. Discuss how they felt when they saw the object.

4. Find out if they want to touch it and why or why not.

5. Some students will like them and others will be frightened. Why?

6. Find out what things frighten the others.

7. Discuss why things frighten you. (Examples: Your parents might dislike the object; you have had an unpleasant experience with that object, i.e., someone put a frog in your bed; a spider in your shoe; an insect down your clothing, etc.)

8. Discuss fear and joy as reactions. You react to things around you; wild animals react in different ways.

9. Think of ways in which wild animals react to danger.

10. Follow through by having the children write about the feelings they have experienced in which they were frightened.

Aim: To show that there are many kinds of plants; they differ in their color, texture, shape, size and structured parts.

1. Consider just the plants found on your school ground, such as mosses, ferns, flowering plants, shrubs, trees.

2. Ask the children to bring a plant or part of a plant (no previous discussions).

3. Teacher provides a "whole" plant in which the parts are easily seen.

4. Discuss and label the parts: roots, stems, etc.

5. Look for these parts in the plants found on the school ground. Which parts are easily seen? Which are not?

6. Compare and contrast the sizes of different plants.

7. Make leaf rubbing of different plants (place a clean sheet of paper over the leaf and blacken the area).

What Do You See?

1. Have your class draw what they see from the schoolground or on the school ground.

2. Discuss the following questions:

   a. Is it beautiful?

   b. Is it worth caring for?

   c. Could it be improved?

3. Have them draw what might be changed.

4. Let them suggest what activities they could originate. (Example: a clean-up campaign; personal responsibility; window boxes)

Communicating to Art Objects

Have students collect materials from their environment to make art objects. Each piece of art should show one of the following:

1. How beautiful their environment is.
2. How it makes them feel.
3. How time changes their environment.
4. The ugliness or sadness of their environment.

THE WEB OF LIFE

Purpose: To illustrate how plants and animals (including man) are dependent upon each other and upon the environment (sun, air, water, and soil) for survival through a "web" of inter-relationships, and what happens if the web is damaged

Materials: ball of string
magic marker
"name" cards (or buttons)

Description: Players form a circle. Each player is given a "name" card which identifies him as some part of the environment, such as the sun, air, water, soil, different types of plants and animals. Be sure to include the four basics (above). The participants should keep their cards face down until the web is made. The leader unwinds the string from player to player, crisscrossing back and forth across the circle. When each player is connected, the leader begins by turning over his card and explaining why his connection with the next person is important. After all the participants have explained their importance in the web, the leader lets his end of the string go, resulting in an unraveled web.

A discussion follows concerning the interrelatedness of all things in the web, and what happens when the web is upset.

THE CHAIN GANG

The aim of this game is to illustrate a food chain or food chains, using the food chains above, or a more complex one, involving more animals. Before the game begins, write the names of the plants and animals involved in your food chain on index cards.

1. Start the chain with yourself as one of the four basic elements.

2. Ask for a show of hands, recognizing the one you see first as to what the next link in the chain should be.

3. If the person is correct, he is given the card with the name of that element on it.

4. Once you've completed the elements, the game continues by naming all the plants and animals involved in your food chain.

5. Whenever someone joins the chain, he takes the hand of the person preceding him.

6. The chain gang should result in a circle (linked).

7. Explore the possibilities of what would happen if for some reason one of the links in the chain was destroyed.

The aim of this game is to show man's dependence on nature, and why it is important to preserve and protect our natural resources.

THE "IT" GAME

The aim of the lesson is to familiarize the students with the animals of Everglades National Park.

1. Make a list consisting of animals in the Everglades family, corresponding with the number of students in your class.

2. Cut the list up and put the names in a box.

3. Each student pulls a name from the box.

4. The student is to learn as much about his animal as possible.

5. Form a circle with the group.

6. Choose a student at random; blindfold him; spin him around; have him point to someone.

7. The person he points to is "it". The person selected "it" has to tell about his animal, as well as act like the animal.

8. The members of the circle are given three chances to guess the name of the animal. If no one guesses it, the "it" person is blindfolded and given a chance to select someone. Whoever guesses is the "it" person.

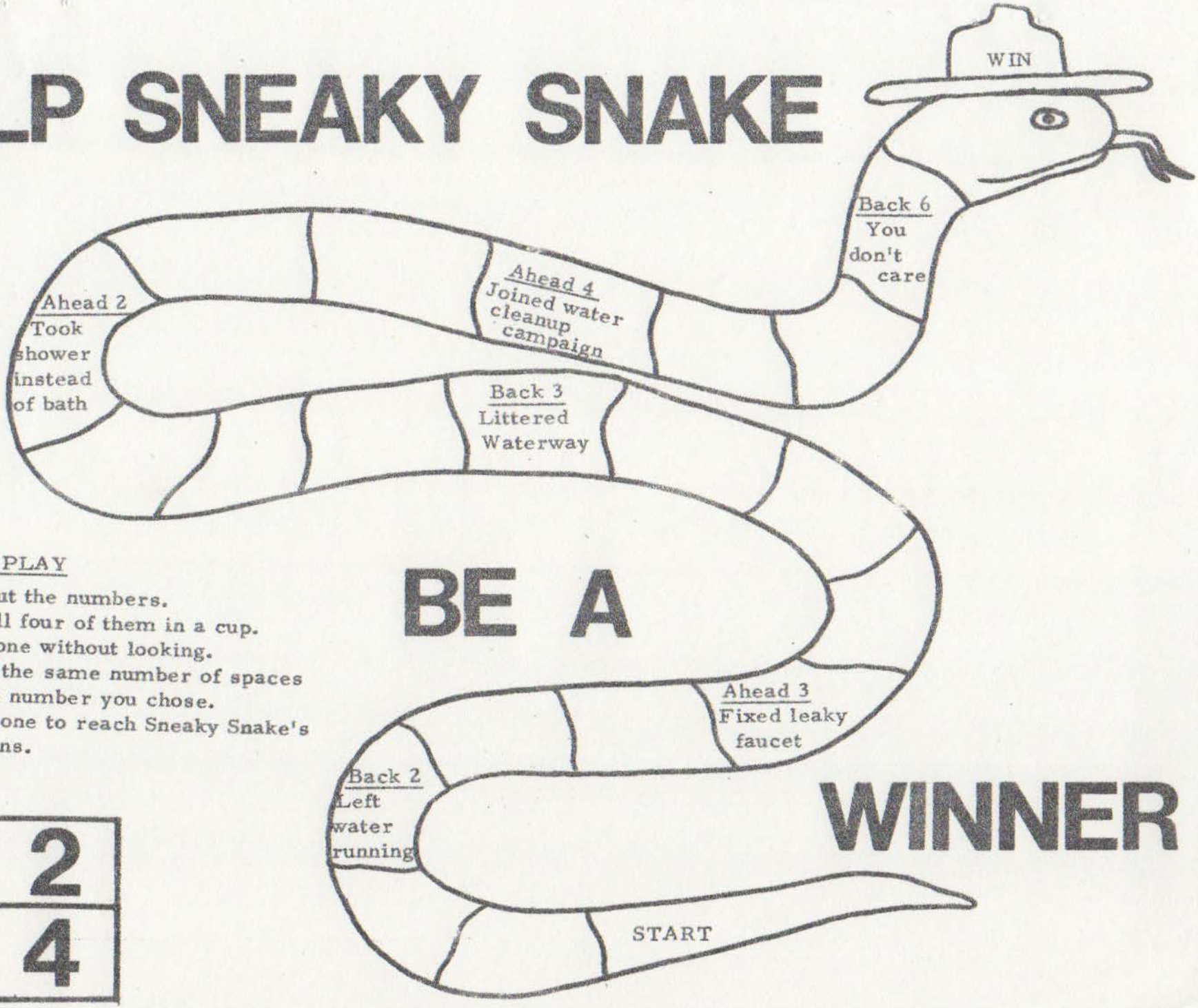
9. The game continues until everyone tells about his animal.

Every organism is a part of a link in the complex array of interconnecting food chains. Each member of the chain is dependent (in part) on the member before it.

Example: Mosquitoes--minnows--garfish--alligators
Algae--minnows--sunfish--wading birds

Plants make food from nature's raw materials. They must have just the right combination of weather, water conditions, minerals, and topography. Change the combinations and you will alter every link of the chains that depend on them, thus altering the entire web of life itself.

HELP SNEAKY SNAKE



HOW TO PLAY

1. Cut out the numbers.
2. Put all four of them in a cup.
3. Pick one without looking.
4. Move the same number of spaces as the number you chose.
5. First one to reach Sneaky Snake's hat wins.

1	2
3	4

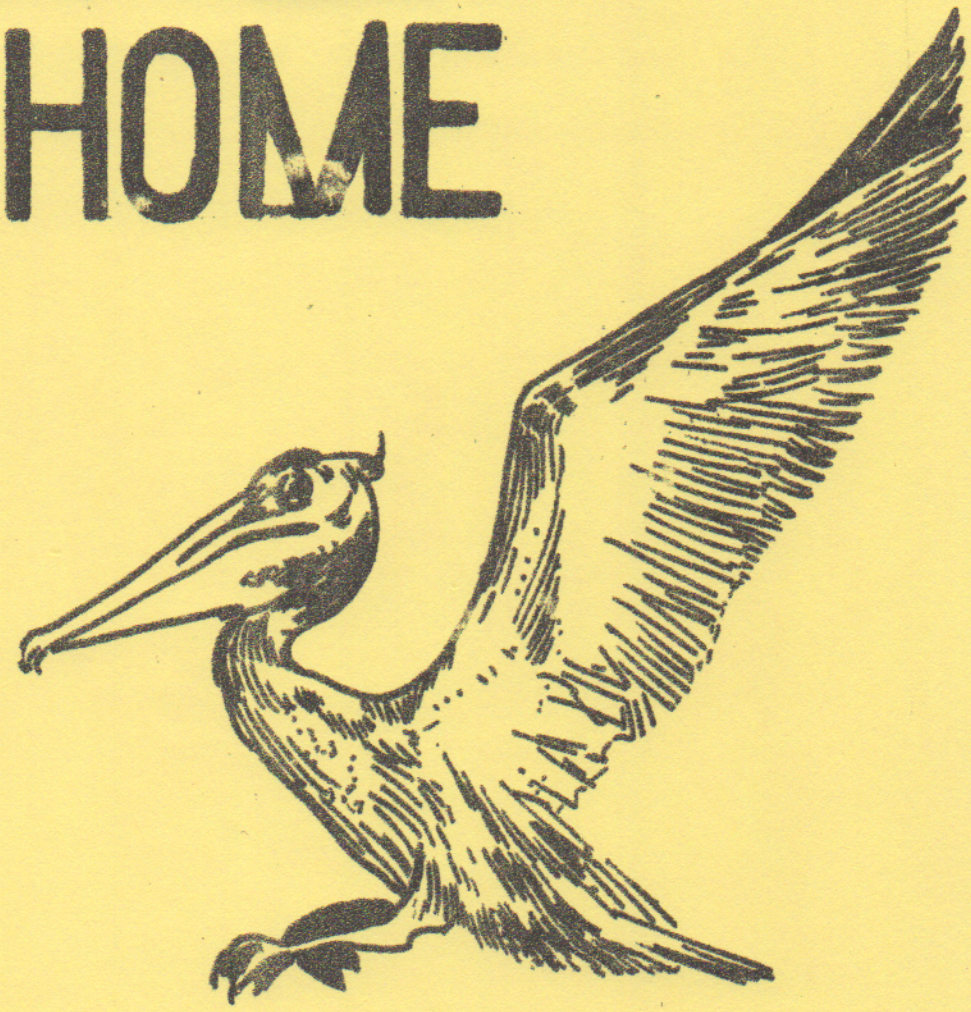
BE A WINNER

HELP SNEAKY SNAKE

BE A WINNER

3	4
1	2

HOME SWEET HOME



This next section of the booklet is devoted to helping you relate Sandfly Island to your students. It is an on-site resource for you to teach from. "Homes" is a thematic approach to environmental teaching. Encourage your students to take on the challenge of finding homes and their relationships. It can be a rewarding experience.

HOME SWEET HOME

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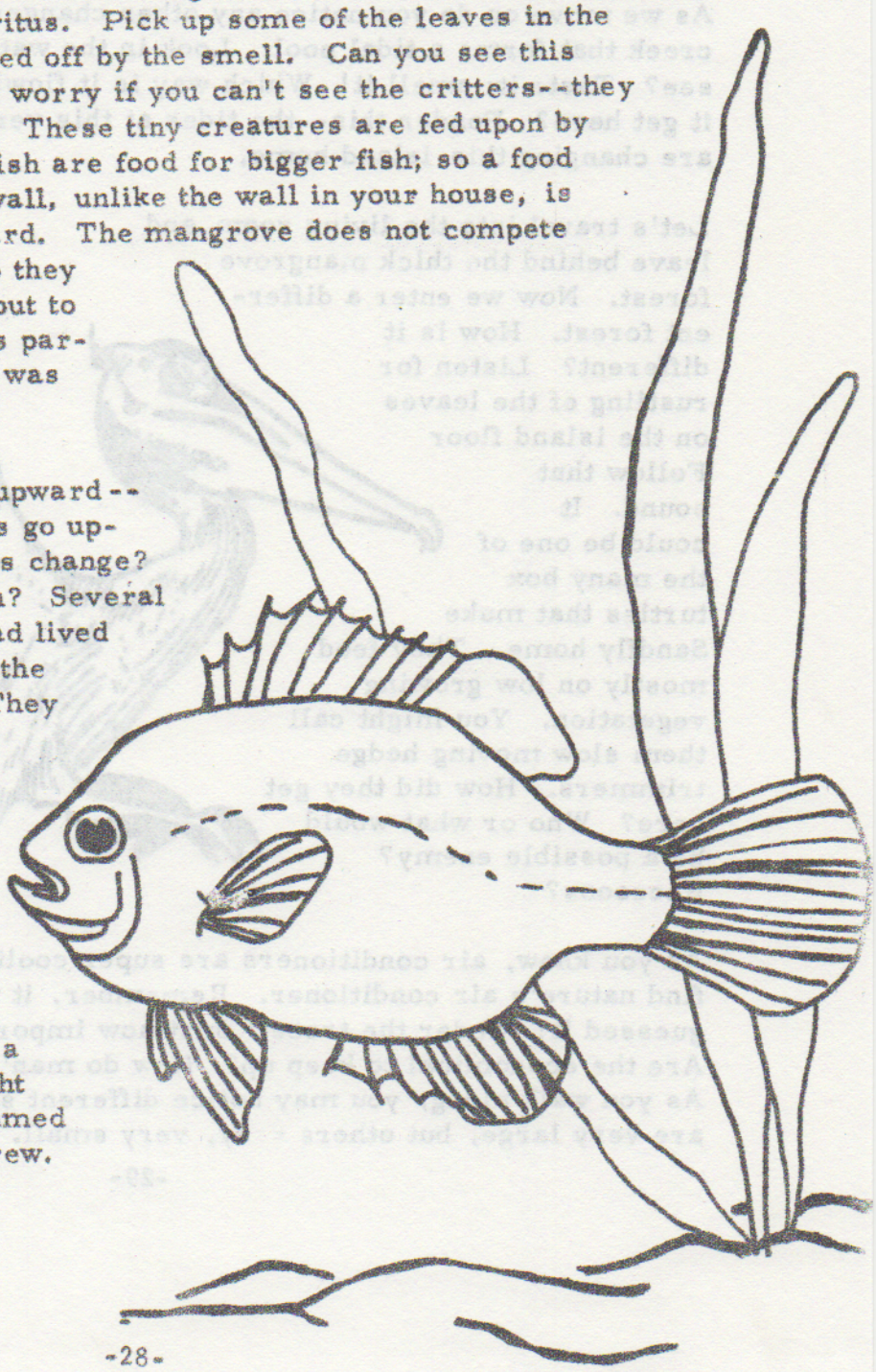
We all have homes of one kind or another--big, small, old and new. Some critters like the hermit crab carry their homes around with them from place to place. Our field trip will be spent on an island home--Sandfly Island.

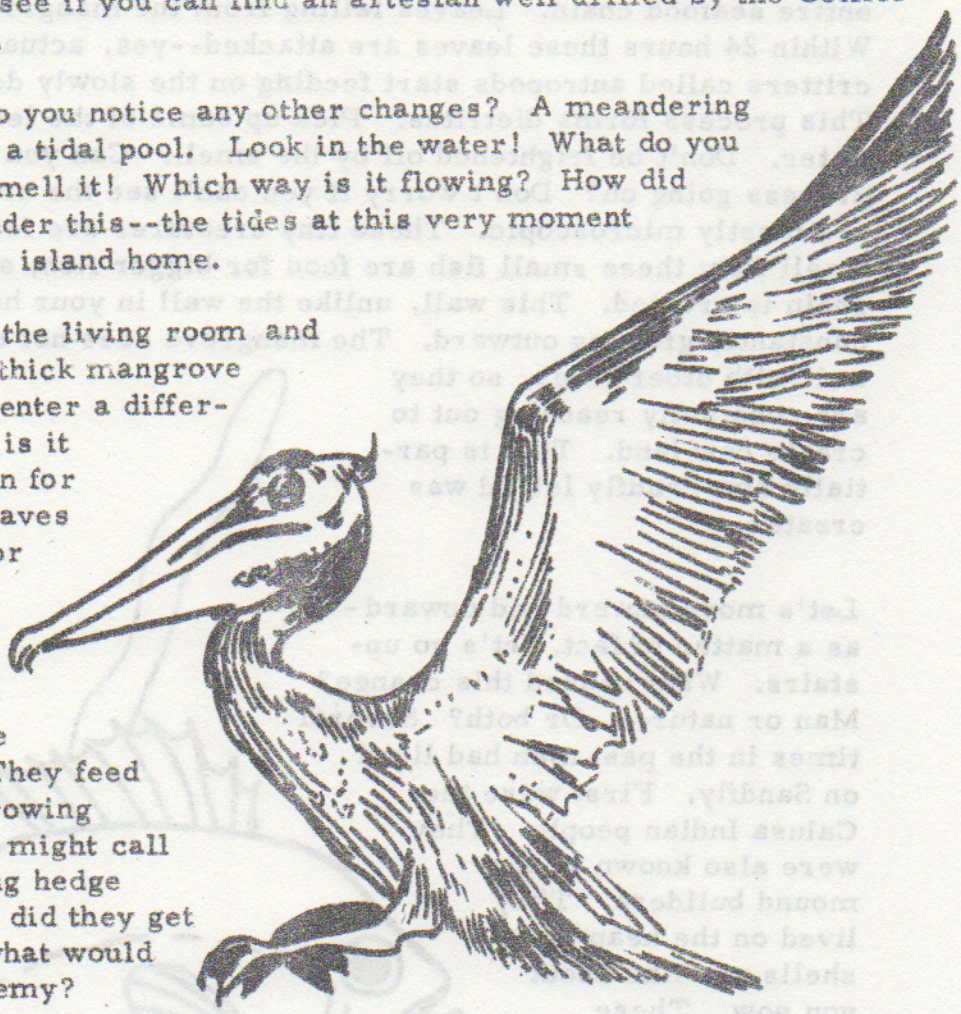
The outer wall of our island home is made up mostly of mangrove trees--they really should be called the tree of life for they are the basis of the entire seafood chain. Leaves falling from the mangrove land in the water. Within 24 hours these leaves are attacked--yes, actually attacked. Tiny critters called antropods start feeding on the slowly decomposing leaves. This process forms dietritus. Pick up some of the leaves in the water. Don't be frightened off by the smell. Can you see this process going on? Don't worry if you can't see the critters--they are mostly microscopic. These tiny creatures are fed upon by small fish; these small fish are food for bigger fish; so a food chain is created. This wall, unlike the wall in your house, is constantly growing outward. The mangrove does not compete well with other trees, so they are constantly reaching out to create new land. This is partially how Sandfly Island was created.

Let's move onward and upward--as a matter of fact, let's go upstairs. What caused this change? Man or nature? Or both? Several times in the past man had lived on Sandfly. First were the Calusa Indian people. They were also known as the mound builders. They lived on the heap of shells you find about you now. These mound builders were fishermen and lived on the gifts from the sea. The mounds we stand on now were once a garbage heap. You might say the more they consumed the more their island grew.



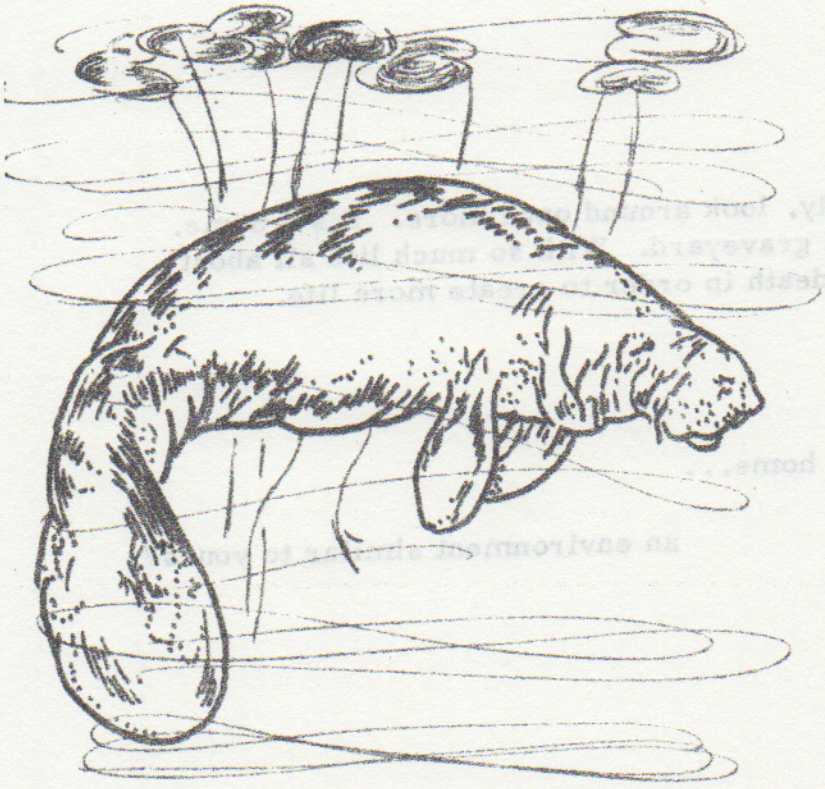
No one is really sure what happened to these ancient people who lived here 3,000 years ago. Maybe they died of European man's diseases, were sold into slavery, or escaped to the islands to the south. As time passed, early European settlers took advantage of these Calusa mounds, since they often represented the only high ground available. These settlers built homes and planted crops of sugar cane and vegetables. Evidence of those settlers remain today. Can you find any? Look for cisterns, house foundations, and see if you can find an artesian well drilled by the Collier Company in 1922.

As we move on do you notice any other changes? A meandering creek that forms a tidal pool. Look in the water! What do you see? Taste it; smell it! Which way is it flowing? How did it get here? Ponder this--the tides at this very moment are changing this island home.



Let's travel into the living room and leave behind the thick mangrove forest. Now we enter a different forest. How is it different? Listen for rustling of the leaves on the island floor Follow that sound. It could be one of the many box turtles that make Sandfly home. They feed mostly on low growing vegetation. You might call them slow moving hedge trimmers. How did they get here? Who or what would be a possible enemy? Raccoons?

As you know, air conditioners are super cooling machines. See if you can find nature's air conditioner. Remember, it will be where it's cool. You guessed it! Under the trees. Just how important are air conditioners? Are the economical to keep up? How do man's air conditioners use energy? As you walk along, you may notice different size air conditioners. Some are very large, but others very, very small.



Have you ever skinned a knee? Did the skin come off? Well, if so, you have something in common with the Gumbo Limbo tree. See if you can't find it. It's losing its red skin, too. In other countries this tree is chopped into small sections and used as fence posts. These fence posts sprout and grow, so another name is living fence tree. What would you call it?

What are our basic needs? Let's take food first. Seems pretty easy, huh? Remember, a balanced diet! Fish, maybe bird eggs, sea purslane (a little salty), raccoon...what else?

Night is coming on fast...shelter is next! What would you use for a roof? What about string or rope to tie it together?

Clothes? Fur skins--raccoon, or maybe bobcat?

How would you travel about? Of what benefit would travel be? Have you thought about mosquitoes? Who hasn't, huh? How are you going to protect yourself from the little devils?

As you leave Sandfly, look around once more. It's a home, yes, but it's also a graveyard. With so much life all about us, there must be death in order to create more life.

Sandfly...

a home...

an environment similar to yours?

FACTS, facts,

And

MORE

Facts!

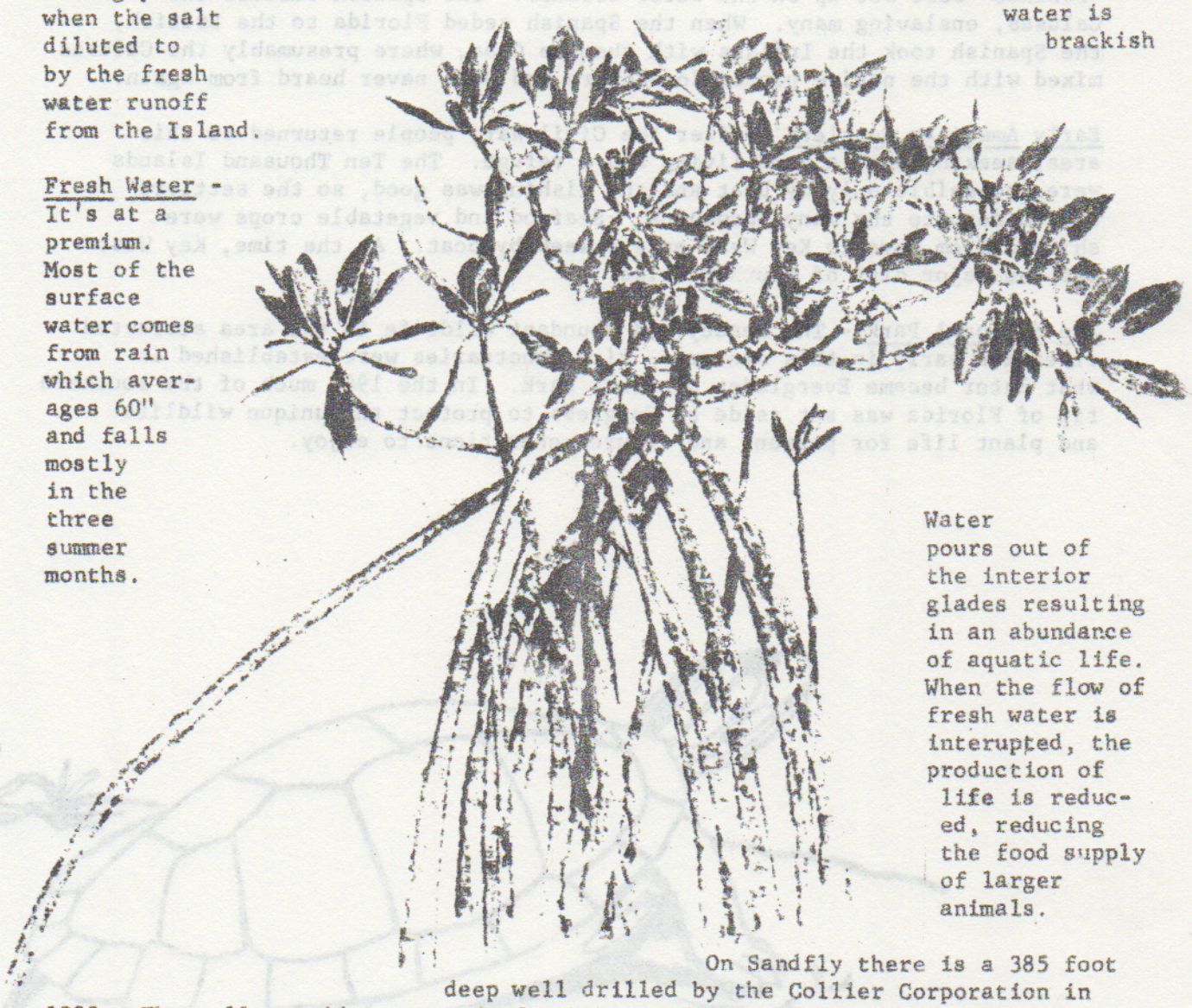
FACTS
Facts.
MORE
Facts!

THE CREATION OF A LAND AND ITS PEOPLE

Soil - You may notice there isn't much soil. Shells provide little nourishment for plants. So most of the plants found here are those which can survive on very little water or soil. The soil that does exist is derived from decaying leaves. Soil building is a long process.

Water - Salt water surrounds Sandfly Island except during periods of heavy rainfall when the salt water is diluted to brackish by the fresh water runoff from the Island.

Fresh Water - It's at a premium. Most of the surface water comes from rain which averages 60" and falls mostly in the three summer months.



Water pours out of the interior glades resulting in an abundance of aquatic life. When the flow of fresh water is interupted, the production of life is reduced, reducing the food supply of larger animals.

On Sandfly there is a 385 foot deep well drilled by the Collier Corporation in 1923. The well provides a steady fresh water flow the year round, benefitting the island's animals.

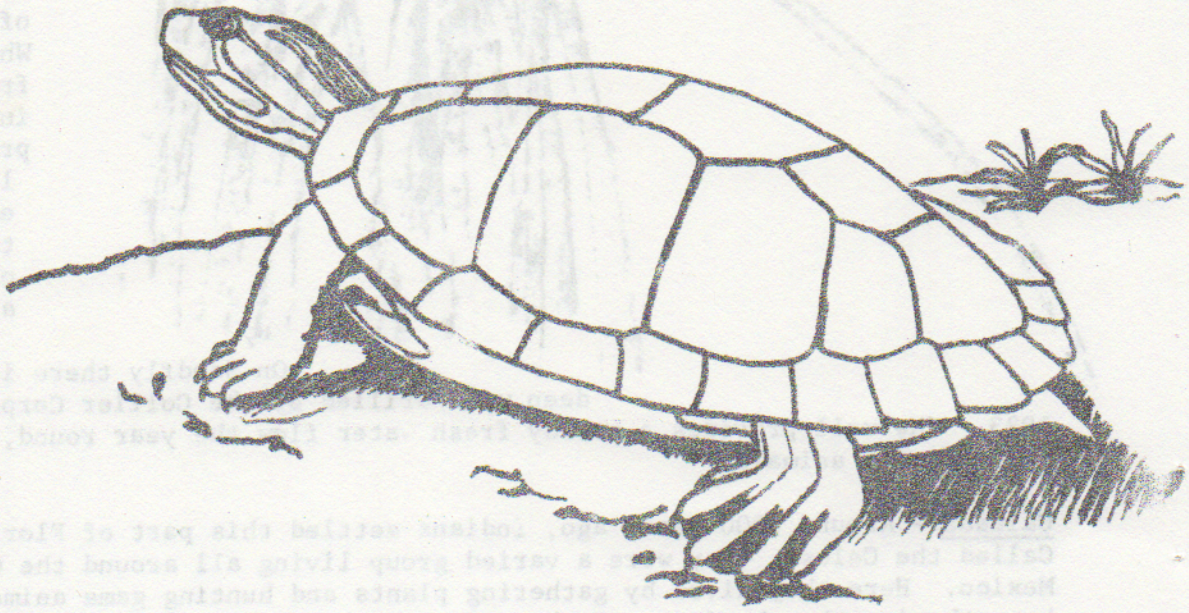
Calusas - Around 3000 years ago, Indians settled this part of Florida. Called the Calusa, they were a varied group living all around the Gulf of Mexico. Here they lived by gathering plants and hunting game animals and by gathering the abundance of the sea. Many of the shells beneath our feet on the island were brought here by the Indians who used them for food and tools.

Shell Mounds - Sandfly Island is different from most mangrove islands in that it has large shell mounds on it. The shell mounds form the only high ground in the Ten Thousand Islands. The mounds were probably created by hurricane tides and later added to by the Calusa Indians.

Spanish - In the early 1500's Spanish explorers visited the Ten Thousand Islands of which Sandfly Island is a part. In later years Spanish fishing "ranchos" were set up on the outer islands. The Spanish subdued the Calusas, enslaving many. When the Spanish ceded Florida to the British, the Spanish took the Indians with them to Cuba, where presumably the Calusas mixed with the native populations there and were never heard from again.

Early American Settlers - After the Civil War, people returned to this area, seeking both a good living and a refuge. The Ten Thousand Islands were accessible only by boat and the fishing was good, so the settlers stayed despite the many hardships. Seafood and vegetable crops were shipped from here to Key West once a week by boat. At the time, Key West was the major city of South Florida.

The National Park - The beauty and abundant wildlife in the area attracted attention early in this century. Bird sanctuaries were established in what later became Everglades National Park. In the 1947 much of the southern tip of Florida was set aside by Congress to protect the unique wildlife and plant life for present and future generationa to enjoy.



BIRDS, BIRDS, BIRDS

Vulture - Look alive and look up. A large black bird circling effortlessly above you in the sky is the Vulture. He spends much of his day searching for dead things to eat. Vultures have fantastic eyesight as well as a good sense of smell. There are two kinds of vultures to be found soaring over Sandfly Island. The Black Vulture has a solid black head and the Turkey Vulture has a red head. Both birds have featherless heads, which is to their advantage, for vultures often stick their heads into carcasses. A feathered head would be hard to keep clean. One dip in the water cleans the featherless head.

White Ibis - a long-legged, long-necked bird with a pink, curved bill. The white ibis is one of the birds we call a wader. Ibis spend most of their day wading in the water searching for food. They are also known as grope feeders. This means they can't see what they eat, but rather they move their open bills back and forth in the shallow water until something (a fish, frog, or crayfish) runs into the bill and gets clamped by the bird's bill and eaten.

Herons & Egrets - long-legged, long-necked like the Ibis, but with straight bills. Herons & Egrets are also called waders. There are many members of this family of birds, in a wide range of colors sizes. The biggest is the Great Blue Heron, which is blue-gray and has a six-foot wingspan. Herons and Egrets are fishermen, but they also feed on bugs, frogs, and crayfish as well. At night herons and egrets roost in large flocks. During the breeding season (January through March), these birds grow special plume feathers. In the early 1900's, plume hunters slaughtered herons and egrets for those special feathers. Adult birds were killed, leaving the young to starve on the nest. The feathers meanwhile were used to adorn ladies hats. Today, thanks to strong laws, herons and egrets are protected from hunting. Declining water levels, however, are once again threatening their populations.

Pelicans - are frequent visitors around Sandfly Island. Both the Brown and White Pelicans feed on fish they catch by diving into the sea. Brown Pelicans nest in the summer on small clumps of mangrove in Chowder Bay.

Cormorant - a favored bird of Japanese fishermen, used to catch fish for them--no fishing pots required. Cormorants are black and if you look hard you might see a small hook on their yellowish beaks.

Anhinga - pictured here is the Snake Bird or Water Turkey as the Anhinga is also called. Easier to identify than most, the Anhinga is found "posing" with its wings stretched out drying in the sun. A relative of the cormorant, the Anhinga catches its food by diving under water and spearing a fish with its sharp beak. After the Anhinga catches its meal, it returns to the surface, tosses the fish into the air and swallows it head first. If, by chance, you see an Anhinga fishing, you will see why it is also called the Snake Bird.

American Wood Stork - a very large black and white wading bird with a solid black featherless head. There is no other bird like this one. The stork, with its down-curved bill is also a grope feeder. Wood stork populations have been declining over the recent years because the bird needs high concentrations of food during nesting season. Man's controlling of South Florida water levels has made food harder and harder to find for the wood stork, the only stork native to North America.

Osprey - a large, hawk-like bird, black and white in color. Osprey build their large nests on tall trees in the mangroves. Also known as "fish hawk", guess what they eat?! After building a nest, osprey will continue to use it year after year.

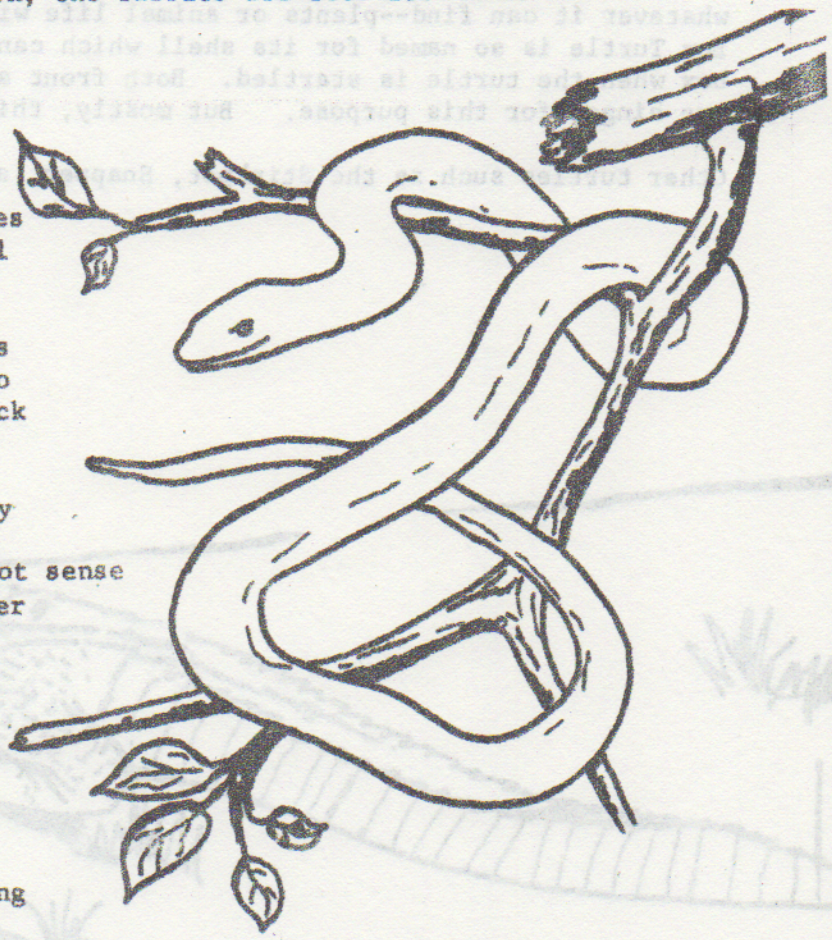
Terns - great fun to watch as they fly above the water and skim along its surface in search of fish. Several kinds of terns live around Sandfly and many of them have a distinctive orange bill.

MAMMALS

Bobcat - one of the larger fur-bearing animals found on Sandfly Island. Bobcats' primary food are some of smaller animals found on the island--racoons, snakes, birds, and rodents. Bobcats are normally nocturnal, so chances of seeing one are slim.

Racoons - are everyone's favorite. Racoons eat birds, snakes, fishes, and oysters. This masked bandit does most of his hunting at night but, occasionally, if you look hard you may see one snoozing in a tree along the trail.

Marsh Rabbits - are in abundance on the island and help maintain the vegetation they feed on. In turn, the rabbits are food for hawks and owls that frequent the island.



SNAKES

There are some 26 kinds of snakes found in the Everglades National Park, each having a different habitat--in trees, under rocks, on dry land, or near the water's edge. It would take too long to describe them all, so let's stick to a few basic facts.

To a snake, man is neither enemy nor food, and a snake attacks a human being only when it does not sense human presence in time to slither away. The forked tongue that gives such dangerous appearance is a harmless organ. Since snakes have poor eyesight, they must constantly flick their tongues in order to smell what they cannot see. The base of the tongue is connected to a smelling organ in the roof of the mouth. Snakes are not slimy--they are cool, dry, and smooth. Their long bodies are covered with scales that move when muscles contract, allowing the snake to move foward.

When snakes eat, they unhinge their jaws. This allows them to swallow some fairly large prey. Snakes grasp their prey with their teeth and loop their bodies in coils around the victim (constrictors especially).

In Everglades National Park there are four poisonous snakes--the Diamondback Rattlesnake, Pigmy Rattlesnake, Coral Snake, and Cottonmouth Water Moccasin. Although many people don't think much of these snakes, they are in fact,

friends of man. Certain snake venom is useful in the treatment of medical problems.

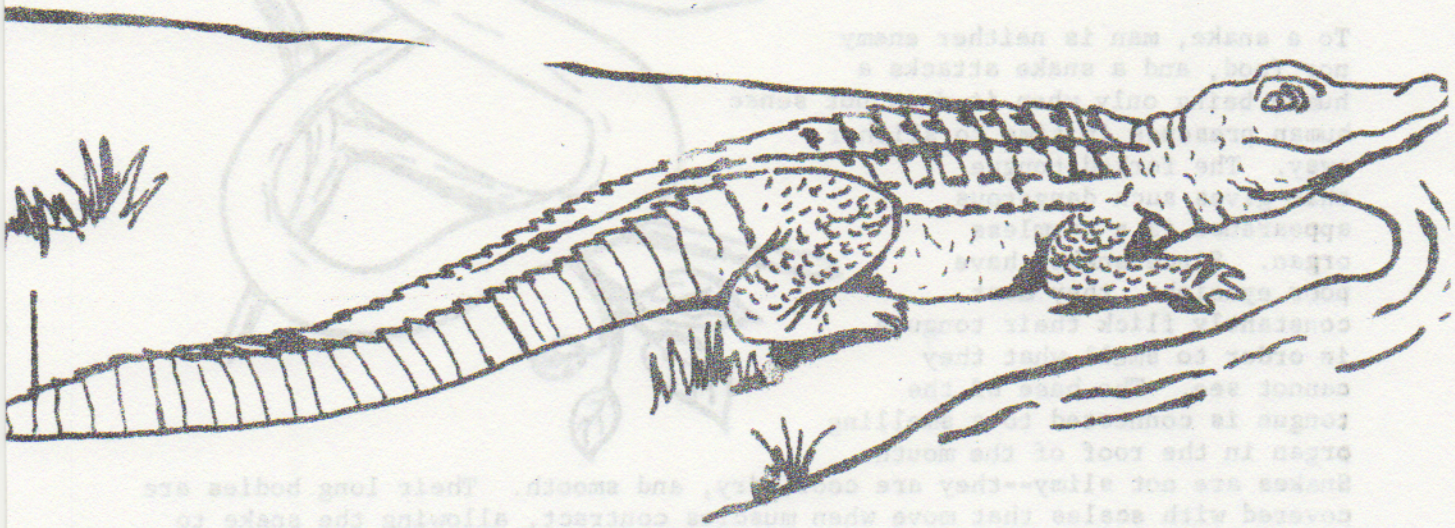
But, REMEMBER . . . don't pick up any snake. View them from a safe distance!

TURTLES

Red Bellied Turtle - is as the name implies, exeept the red belly is often more orange than red! A hard-shelled turtle, the red bellied turtle feeds on vegetation. If you can't see the turtle's belly, look at its head. If there are yellow and black stipes, you've got a red belly. It spends most of its time under water feeding or on land basking in the warm sun.

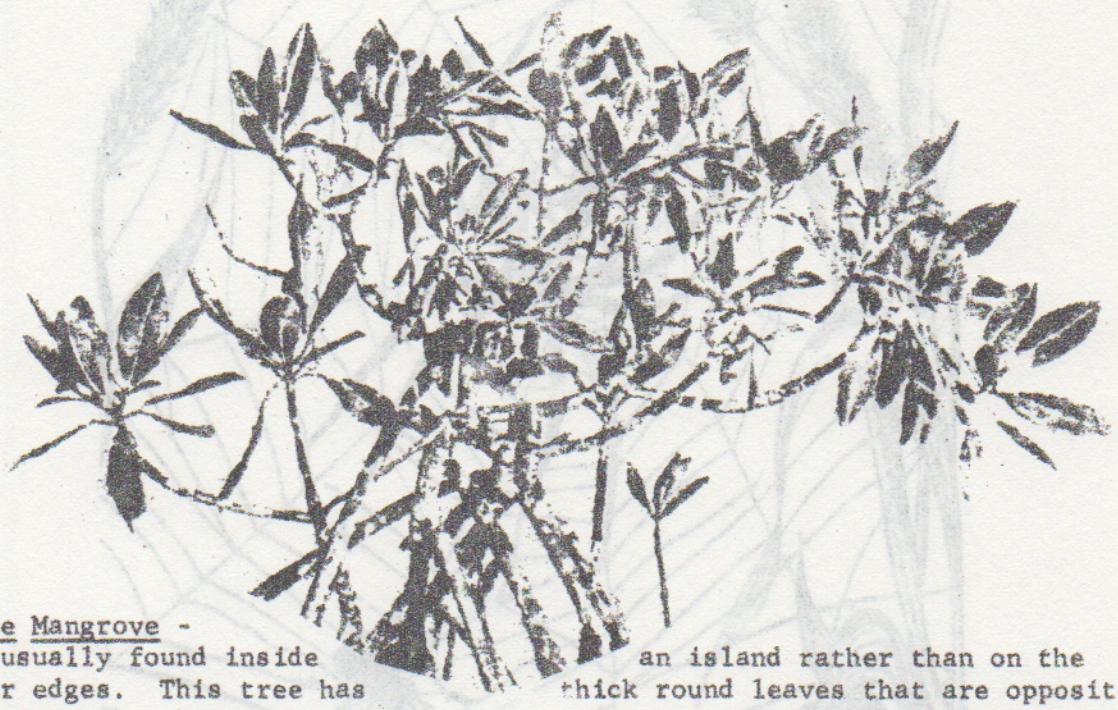
Everyone knows the Box Turtle. Ambling along a roadway, it searches out whatever it can find--plants or animal life will do equally well. The Box Turtle is so named for its shell which can be tightly closed like a box when the turtle is startled. Both front and rear sections of the shell are hinged for this purpose. But mostly, this is a land-loving turtle!

Other turtles such as the Stinkpot, Snapper, and Musk are seen less frequently.



Red Mangrove - This is a strange-looking tree that looks like it's walking around on its tip-toes. It's actually standing on special prop roots. Wildlife in the area are dependent on fish and shellfish for food, and these in turn depend on the mangrove. Mangrove leaves fall from the trees and are broken down by snails, crabs, and arphipods which in turn are fed on by other shellfish and fish.

Black Mangrove - is the tree you see with hundreds of straw-like roots coming up all around it. The black mangrove is unique because it takes in salt water and separates the water and the salt, excreting the salt on the back side of its leaves. Red and White Mangroves are able to exclude salt when absorbing water.



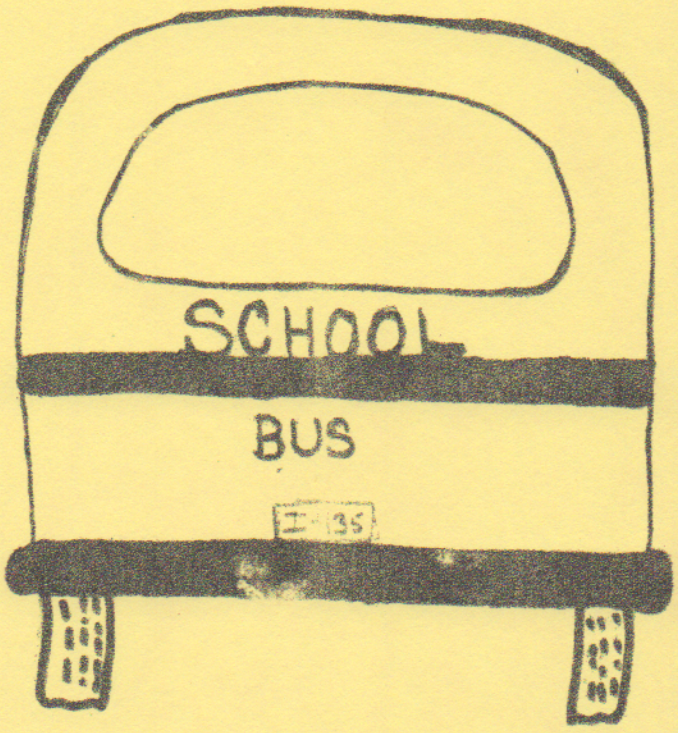
White Mangrove - are usually found inside an island rather than on the outer edges. This tree has thick round leaves that are opposite each other on the stem.

Air Plants - live off what they can "catch" in the air. They are members of the pineapple family and are sometimes called wild pines. Since the soil here was so poor, some plants survived better if they "gave up" the soil entirely. Lichens, mosses, ferns, orchids, and pineapple air plants live off the gases dissolved in the rain water than falls on them. Their roots simply hold on to the bark of the trees. They take no food from the tree as does a parasite.

Cactus and desert plants - can be found throughout the island. They have

adapted well to an environment without much water as they did in western deserts. Look closely at the spines and fleshy stems and leaves and storage roots. Most of the cactus are within the prickly pear or air plant groups, and look like the agave or century plant. These cacti were probably carried to the Ten Thousand Islands from Mexico or the West Indies. In the Ten Thousand Islands the abundance of salt water, the porous soil, and seasonal rain provided a desert-like climate suitable for the cacti. The agave was introduced into Florida in an attempt to use it for fiber for rope.

POST SITE



WHEW!!! Your field trip is over. We hope it has been an enjoyable learning experience. The park also hopes that the experience is reinforced throughout the remainder of the school year. In order to help you do this we have prepared a few post-site activities. Happy learning!

POST SITE

ACTIVITIES FOR SELF-EXPRESSION

Haiku and Cinquain Poetry

Poetry forms or other self-expression activities are used most effectively in the middle or near the end of a hike. Ask the participants to write about something they have experienced up that point (a sound, a smell, an object, a thought, a feeling, etc.). Let those who wish to do so share their poetry with the others. (See the formats for Haiku and Cinquain)

Group Story

At a spot that particularly sparks the imagination, let the group make up a story. You could start it off, then let each person add something to the story.

Group Poetry

Group poetry can be done by letting each person write a line or two as part of one whole poem.

Wishful Thinking

Pick a good spot where everyone can sit or lie down and be quiet for a few moments. Then ask each person, "If you could be anything other than a human being, what would you like to be out here and why?"

"Word" Cinquain

1. _____

2. _____ _____

3. _____ _____ _____

4. _____ _____ _____ _____

5. _____

1. Use 1 word to name the subject you are writing about.

2. Use 2 words to describe #1.

3. Use 3 words about what #1 is doing.

4. Use 4 words to tell how you feel about #1.

5. Use a word that means the same as #1.

In the strict poetic sense, cinquain poetry (pronuonced san (d) cano) has few lines with a certain number of syllables per line.

2
4
6
8
2

instead of a number of words. You might try to get fancy as you go on with poetry. Look at Haiku next. Form is not the important factor, the expression of feelings is. Poetic license allowed and encouraged!

Haiku is a three line verse form which originated in thirteenth century Japan. Characteristics of authentic Haiku are:

--Three lines: Line 1 contains 5 syllables; Line 2 contains 7 syllables; Line 3 contains 5--17 syllables in all.
English translations do not always follow this pattern.
--Each poem includes the season, location, reference to nature.
--No subject matter deals with simple ordinary things.
--No rhyme (Japanese words end in vowels or "n" sounds).
--Few articles or pronouns--syllables can be used for better purpose.
--Thought comes first; then the syllables are adjusted to fit the form.

Examples of Haiku for inspiration and demonstration by the Japanese masters.

Departing spring
Hesitates
In the late cherry blossoms.
--Buson

Simply trust:
Do not the petals flutter down
Just like that?
--Issa

The old pond;
A frog jumps in, --
The sound of the water.
--Basho

Some student expressions--

EARTHQUAKE
A monster trying
To escape from his dungeon
Beneath the earth's crust.
--Bob Thompson

THE SEA
The sea is like life --
Mighty, big, and beautiful
At dawn and at dusk.
--Jimmy Farnsworth

MOTHER TREE
Stretching out her arms
To protect the world from the
Fury of the skies.

SADNESS
The dying of the flowers,
The turning of the grass,
The autumn breeze.
--Jean Gregory

TEN LITTLE INDIANS

(adapted tune)

Who eats who out in the Everglades?
Who eats who out in the Everglades?
Who eats who out in the Everglades?
Bet you can't guess who eats who.

First the mosquitoes eat on you (ouch).
First the mosquitoes eat on you (ouch).
First the mosquitoes eat on you (ouch).
Way down yonder in the Everglades swamp.

Then the skeeter fish eat the skeeter babies (gulp).
Then the skeeter fish eat the skeeter babies (gulp).
Then the skeeter fish eat the skeeter babies (gulp).
Way down yonder in the Everglades swamp.

Great big fish come gobble up the skeeter fish.
Great big fish come gobble up the skeeter fish.
Great big fish come gobble up the skeeter fish.
Way down yonder in the Everglades swamp.

Then the birds and gators eat the big fish (snap).
Then the birds and gators eat the big fish (snap).
Then the birds and gators eat the big fish (snap).
Way down yonder in the Everglades swamp.

Man gets in on the big fun, too.
Man gets in on the big fun, too.
Man gets in on the big fun, too.
Brings his gun and shoots them thru (pow).

Gators ain't king in the Everglades swamp.
Gators ain't king in the Everglades swamp.
Gators ain't king in the Everglades swamp.
Ain't no king in the Everglades swamp.

But there's old man bleeding from the skeeter.
But there's old man bleeding from the skeeter.
But there's old man bleeding from the skeeter.
Ain't no king in the Everglades swamp.

"THE FRIEND"

Once upon a time there was an alligator.

He was an enormously large alligator.

And he had this very special friend. A small boy.

The boy would come every day to the 'gator hole to visit his friend.

This made the alligator very happy.

Each day the boy would come and bring a book to read to his very special friend.

The boy trusted the alligator and the alligator trusted the boy.

Why, the alligator even let the boy take things from his pond.

Things like shells, and flowers growing in the muddy bank.

Things went this way for a long, long time (about two years).

But then the boy went away for a long time, and the alligator was alone much of the time.

It was the dry season and the old alligator decided it was time to spruce up the ol' pond, so he set about his cleaning and digging.

It was hard work, but he didn't mind because he knew that pretty soon his friend would return and when he saw how good things looked, the boy would be proud.

And the 'gator would be happy.

When the boy finally did come back, he somehow looked different--older.

The boy spoke. "Alligator, I'm unhappy. I need some money."

"I have no money," said the alligator. "But you can take some of my food--the garfish--and you can sell them and make money. Then you will be happy."

So the boy did.

The boy went away.

This time he was gone a long time.

When the boy returned, the alligator roared with joy at the sight of his friend.

"Hi, boy. Come sit by the bank and read me a story like long ago," said the alligator.

"I haven't the time," said the boy. "I have a wife and family now, and they want a lot of new things."

"Oh," said the alligator. "I haven't got new things or I would give them to you. Wait a minute! I have an idea. Catch those frogs over there and take them to the city to sell and you will have money to buy those things for your family."

The boy didn't like the idea of getting wet, but he did, grumbling all the way.

And, of course, this all made the alligator happy to help his friend, even if that was his food.

It was a bad dry season, and the alligator suffered. Not much food, especially with no garfish or frogs.

The alligator anxiously awaited his friend.

This time when the boy returned he had a long, gray beard. He was getting old.

"I hear I can make good money from your hide, my friend," said the boy.

"I've heard of such things, but they say it is very painful," said the alligator.

"If you are still my friend," said the boy, "you will let me have it."

"My hide is in poor shape from lack of food. I'm afraid it won't bring much money, but yes, I will always be your friend. You can take my hide."

And so the boy did.

And the 'gator was happy, but not really.

When the boy returned to the alligator hole, his friend was gone.

The hole had dried up and all the birds were gone.

The snakes, frogs, garfish, the cute little mosquitoes, the dragonflies, turtles, raccoons, and deer.

All were gone and the boy left, alone and unhappy.

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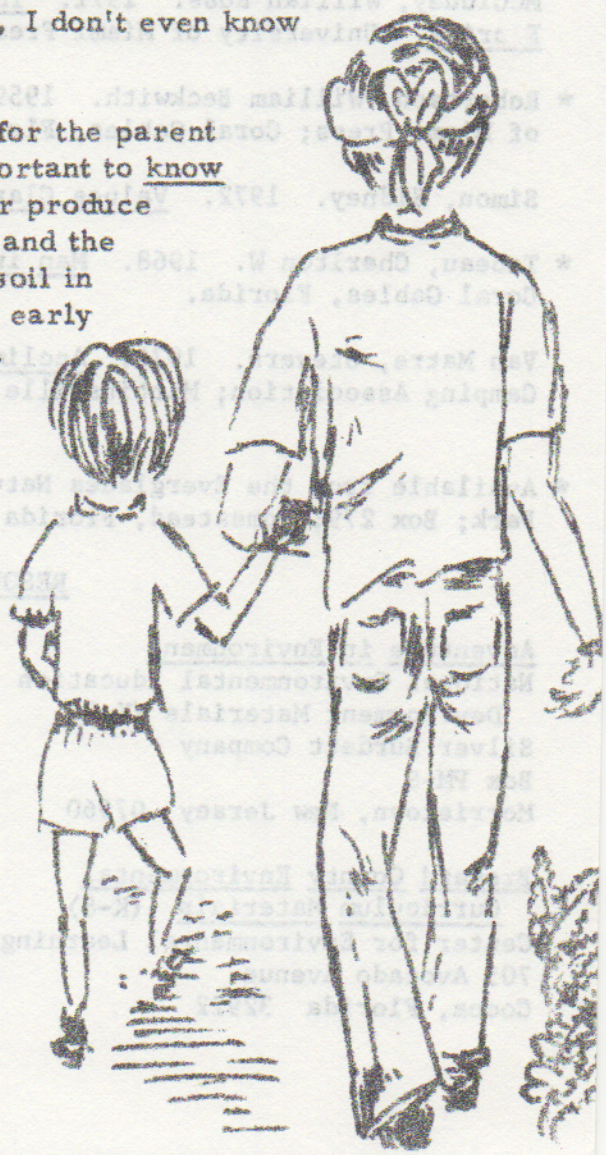
A child's world is fresh and new and beautiful, full of wonder and excitement. It is our misfortune that for most of us that clear-eyed vision, that true instinct for what is beautiful and awe-inspiring, is dimmed and even lost before we reach adulthood. If I had influence with the good fairy who is supposed to preside over christening of all children I should ask that her gift to each child in the world be a sense of wonder so indestructible that it would last throughout life, as an unfailing antidote against the boredom and disenchantments of later years, the sterile preoccupation with things that are artificial, the alienation from sources of our strength.

If a child is to keep alive his inborn sense of wonder without any such gift from the fairies, he needs the companionship of at least one adult who can share it, rediscovering with him the joy, excitement, and mystery of the world we life in, Parents often have a sense of inadequacy when confronted on the one hand with the eager, sensitive mind of a child and on the other hand with a world of complex physical nature, inhabited by a life so various and unfamiliar that it seems hopeless to reduce it to order and knowledge. In a mood of self defeat, they exclaim, "How can I possibly teach my child about nature--why, I don't even know one bird from another!"

I sincerely believe that for the child, and for the parent seeking to guide him, it is not half so important to know as to feel. If facts are the seeds that later produce knowledge and wisdom, then the emotions and the impressions of the senses are the fertile soil in which the seeds must grow. The years of early childhood are the time to prepare the soil. Once the emotions have been aroused--a sense of the beautiful, the excitement of the new and the unknown, a feeling of sympathy, pity, admiration or love--then we wish for knowledge about the object of our emotional response. Once found, it has lasting meaning. It is more important to pave the way for the child to know than to put him on a diet of facts he is not ready to assimilate.

--Rachel Carson
A Sense of Wonder



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* Available from the Everglades Natural History Association; Everglades National Park; Box 279; Homestead, Florida 33030.

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 Studies Center
2900 NE Indian Drive
Jensen Beach, Florida 33457

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

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