EVERGLADES NATIONAL PARK

LONG PINE KEY

NATIONAL ENVIRONMENTAL STUDY AREA

A TEACHER'S GUIDE

PREPARED BY
O. FRANK WILSON, Jr.
ENVIRONMENTAL EDUCATION COORDINATOR

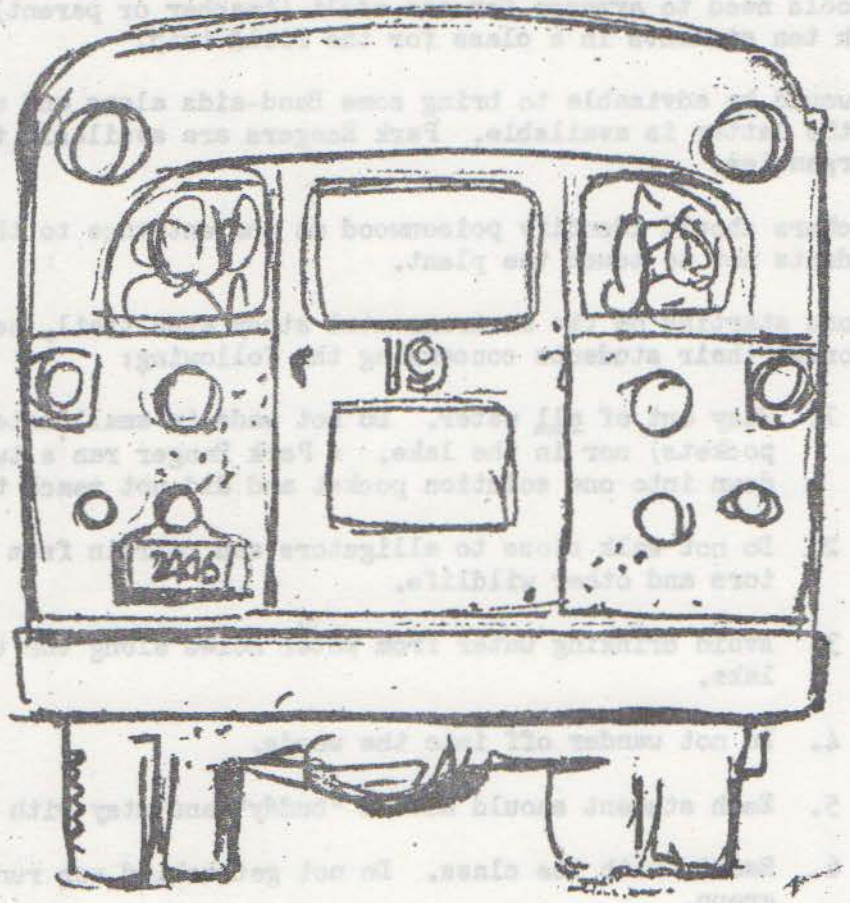
EVERGLADES NATIONAL PARK

LONG PINE KEY

NATIONAL ENVIRONMENTAL STUDY AREA

A TEACHER'S GUIDE

PREPARED BY
O. FRANK WILSON, JR.
ENVIRONMENTAL EDUCATION COORDINATOR



Safety is essential to the continuation of this program. Teachers should be familiar with the school safety requirements for field trips in the county, before they bring their class. Good planning and discipline promote good safety.

-- BEFORE YOUR FIELD TRIP --

SAFETY

Schools need to arrange for one adult (teacher or parent) to accompany each ten students in a class for the field trip.

It would be advisable to bring some Band-aids along and a first-aid kit, if the latter is available. Park Rangers are available to help in real emergencies.

Teachers should identify poisonwood at the entrance to the trail and warn students not to touch the plant.

Before starting on the environmental study area trail, teachers need to admonish their students concerning the following:

1. Stay out of all water. Do not wade in small water holes (solution pockets) nor in the lake. A Park Ranger ran a twenty foot line down into one solution pocket and did not reach the bottom of it!
2. Do not walk close to alligators and refrain from feeding alligators and other wildlife.
3. Avoid drinking water from water holes along the trail and from the lake.
4. Do not wander off into the woods.
5. Each student should have a "buddy" and stay with his or her buddy.
6. Remain with the class. Do not get behind nor run ahead of the group.
7. Do not climb trees.
8. The trail is about one-half mile in length and fairly level walking; however, everyone in the group should be informed of the distance that he or she will have to traverse as someone might have difficulty in walking, breathing, or other physical impairment which could prevent their completing the walk.

SUGGESTIONS

1. Bring enough blindfolds for half of the class, and each student should have a pencil and paper.

2. We recommend letting the students run around the lake, across from the entrance to the Long Pine Key National Environmental Study Area (NESA), several times to "work off steam" before they start over the NESA. When they finish running around the lake, they should be told not to run on the trail.

3. Admonish the class against pulling leaves and flowers and against collecting any material from the area as it violates park regulations.

4. No carbonated beverage dispensers or food is available at Long Pine Key. If you should take your pupils to Royal Palm, we discourage permitting them to buy "soda pop" there. We do not keep enough coin money available to make change for all students who need it.

BUS CAPACITY

The bus capacity is 66 persons, including students and teachers. If any additional parents want to come, they should drive their own cars.

--BEFORE COMING TO LONG PINE KEY--

You might consider introducing the pupils to some of the animals of the Everglades by means of a food chain game.

FOOD CHAIN GAME

PURPOSE: To reveal to the class that man, plants, and animals are interdependent and interrelated.

NUMBER OF PARTICIPANTS: Fifteen. Select fifteen volunteers from the class to be the "plants" and "animals" and let the rest help answer questions.

TIME REQUIRED: About 40 minutes.

MATERIALS NEEDED: 15 blank 4" x 6" cards or white pieces of paper; 15 straight pins by which to secure the cards on the students' blouses or shirts; a felt-tipped pen with dark-colored ink; a spool of string.

WHERE APPLICABLE: On the school grounds, in the gym, or in any classroom where there is enough room for 15 students to form a circle and for the rest of the class to gather around and reply to questions and observe the game.

PROCEDURE: Print the names of the following with the felt-tipped pen in large letters on the white cards or blank pieces of paper (one name to a card):

Minnow	Alligator	Crayfish
Bream	Man	Dragon Fly
Bass	Grass	Raccoon
Heron	Mosquito	Damsel Fly
Gar	Frog	Grasshopper

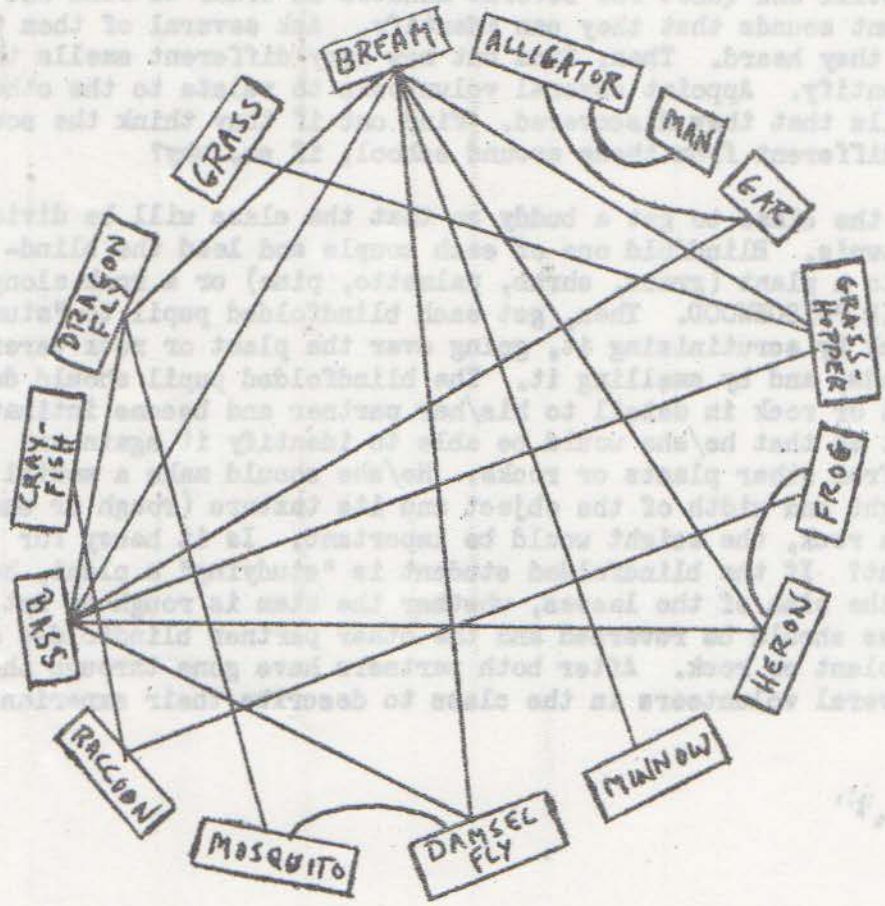
Ask each one of the 15 volunteers to select a card with a name on it and pin it to his/her shirt or blouse. Cut about 5 feet of string off the spool for each pupil.

Next, tell the students to form a circle and to connect their string to any other plant, animal, or human on which they are dependent, or to whom they are related. For example: the Grasshopper and Grass would hold opposite ends of the same string, as the Grasshopper needs the Grass for food. LET THE STUDENTS FIGURE OUT THE COMBINATIONS. DO NOT COACH OR TELL THEM ANYTHING, UNLESS ABSOLUTELY NECESSARY.

On the next page is a drawing showing some of the possible food chain combinations. When the students get as many combinations connected as they can think of, let them start disconnecting the strings, beginning with the smallest plants and animals first, and gradually coming up to the larger ones. For example: the Bream eats the Minnow, so these two animals would drop the string that connected them and then pull out of the circle. The Bass eats the Grasshopper and then eats Bream (see drawing on next page). The Bream and Grasshopper drop their strings attached to the Bass and drop out of the circle. The game continues on up the food chain. A large Gar eats the Bass, and the Gar is eaten by the Alligator, and a Man poacher kills the Alligator.

The Food Chain Game should convince the pupils that plants, animals, and humans are intimately interrelated and that if something happens to one link in the chain, the others probably will be affected. They also undoubtedly will realize that since the dragon fly and damsel fly feed on the mosquito, they help to control its population.

FOOD CHAIN COMBINATIONS



INTRODUCTION

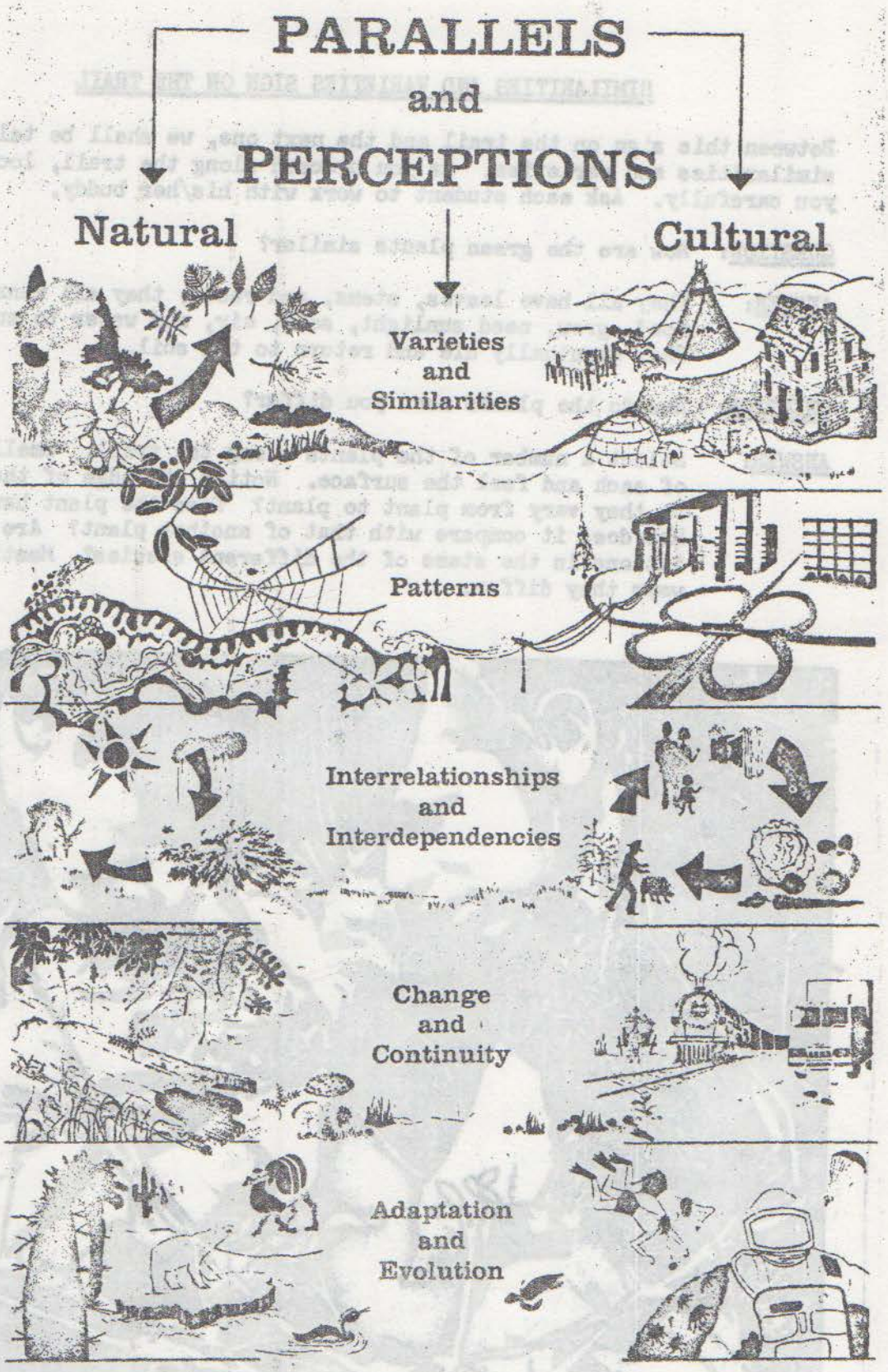
On the Long Pine Key National Environmental Study Area (NESA) Trail, we shall be considering some practical field examples of each of the five strands; the five strands used in teaching environmental education are:

Similarities and Varieties
Patterns
Interaction and Interdependence
Continuity and Change
Evolution and Adaptation

The acronym, "SPICE", should help us to remember the five strands.

Before reaching the first strand sign on the trail, try an exercise which will heighten the awareness of the other senses besides sight. Tell the students to be still and quiet for several minutes in order to find out how many different sounds that they can identify. Ask several of them to comment on what they heard. Then, find out how many different smells the students can identify. Appoint several volunteers to relate to the others the various smells that they discovered. Find out if they think the sounds and smells are different from those around school; if so, why?

Ask everyone in the class to get a buddy so that the class will be divided into groups of two's. Blindfold one of each couple and lead the blindfolded partner to a plant (grass, shrub, palmetto, pine) or a rock along the trail. AVOID POISONWOOD. Then, get each blindfolded pupil to "study" the plant or rock by scrutinizing it, going over the plant or rock carefully with his/her hands, and by smelling it. The blindfolded pupil should describe the plant or rock in detail to his/her partner and become intimately familiar with it so that he/she would be able to identify it again and distinguish it from other plants or rocks. He/she should make a mental note of the height and width of the object and its texture (rough or smooth). In the case of a rock, the weight would be important. Is it heavy for its size or light? If the blindfolded student is "studying" a plant, he/she might consider the size of the leaves, whether the stem is rough or not, etc. The process should be reversed and the other partner blindfolded and led to another plant or rock. After both partners have gone through the process, ask several volunteers in the class to describe their experiences.



ADVENTURES IN ENVIRONMENT

Silver Burdett General Learning Corp., Morristown, New Jersey

SIMILARITIES AND VARIETIES SIGN ON THE TRAIL

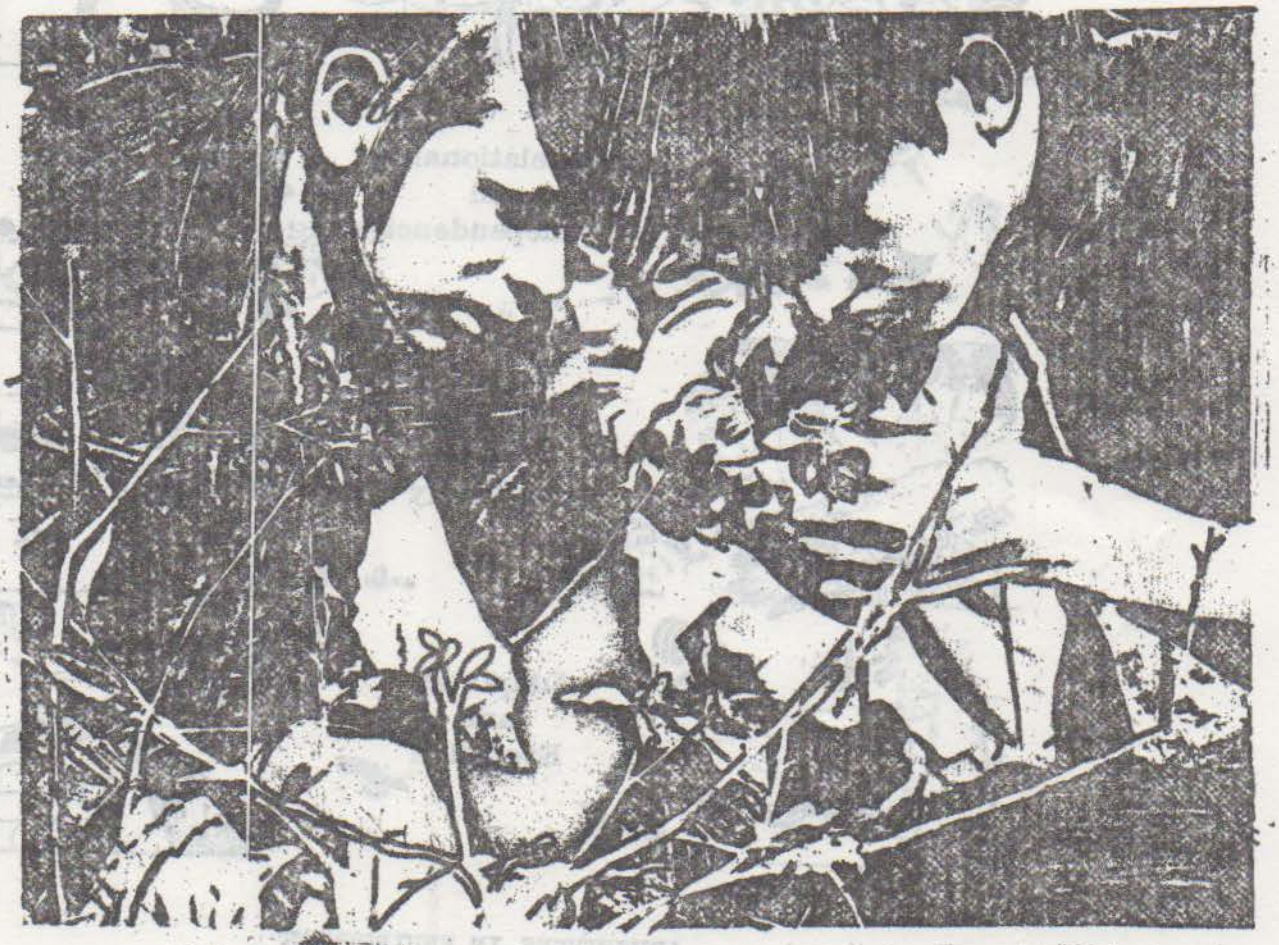
Between this sign on the trail and the next one, we shall be talking about similarities and varieties. As you proceed along the trail, look around you carefully. Ask each student to work with his/her buddy.

QUESTION: How are the green plants similar?

ANSWER: They all have leaves, stems, and roots; they all manufacture food, grow, need sunlight, soil, air, and water to sustain them. They eventually die and return to the soil.

QUESTION: How do the plants near you differ?

ANSWER: Select a number of the plants along the trail. Smell the leaves of each and feel the surface. Notice the edge of the leaves. Do they vary from plant to plant? Does the plant have any fruit? How does it compare with that of another plant? Are there variations in the stems of the different species? Mention other ways they differ.



There are two types of soil along the trail. One is on the trail itself and the other is just off the trail. Take small samples (put them back where you got them when you are through). Smell each soil sample and feel the soil particles.

QUESTION: What similarities are there between the two soils?

ANSWER: Plants will grow in each. Humans and animals can walk on both. Each will absorb some moisture when it rains. The two samples contain soil particles.

QUESTION: How are the two soils physically different?

ANSWER: Take a very small sample of the trail soil and spread it out in your hand. Notice the size of the individual soil particles. Now, get a very small sample of the other type soil just off the trail, spread it out in your hand and observe the size of the particles. Which sample has the largest particles and why? If both samples are dry, the trail should have larger particles. Where do you think that the trail soil came from? It probably was brought here from a gravel pit, located well below the surface.

QUESTION: Which soil sample do you think is the most fertile and why?

ANSWER: Compare the color of the two. Why is the one from off the trail darker? It consists primarily of decayed leaves, branches, stems, and other organic matter, rich in nutrients, which originally were absorbed by the living plants, but now have been returned to the soil through decay. The trail soil consists mostly of various-sized rock particles which are less fertile. In addition, since the particles in the dark soil, off the trail, are smaller, they absorb more water which enables plants to grow better.

QUESTION: Mention some similarities and varieties that you will find in the city among office buildings and among students in school.

ANSWER: Office buildings are similar in that they all are divided into a certain number of offices; they afford protection and a place to work for employees; they usually are air-conditioned and have elevators and generally are made of concrete and steel.

They are different in that they vary in size, cost, number of offices, architectural design, and age.

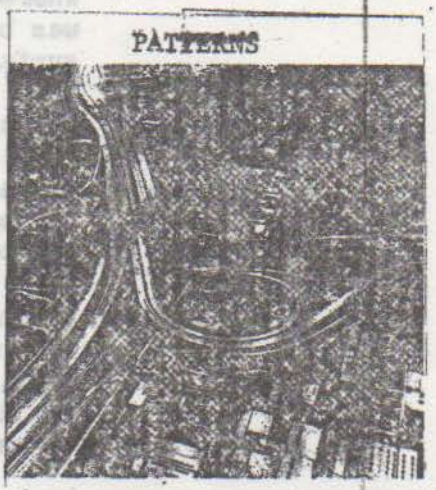
Students are similar as they all have arms, legs, hands, feet, eat, sleep, play, study, etc.

Variations among pupils occur in height, weight, sex, interests, style of clothing, intelligence, hair style, etc.

PATTERNS SIGN ON THE TRAIL

From this sign until the next one on the trail, we shall be discussing patterns. Get your partner and look around you along the trail.

QUESTION: What patterns do you see among the stones and larger rocks?



ANSWER: Pick up several stones and larger rocks and examine them. Some have crystal patterns in them; others have color patterns. There is a pattern in the texture as some are rough and others are smooth. There is even a pattern in size as some are small, others larger, and a third group would even be larger.

QUESTION: Can you find any patterns among leaves, stems, fruits of the plants along the trail?

ANSWER: Look at the edges and surfaces of several different leaves. Some leaf edges have a toothed pattern, others have a smooth edge, still others may be smooth but have deep indentations. Notice the veins on the surface of the leaves; they, too, form patterns. On some leaves they extend straight out and parallel to each other. On other leaf surfaces, they branch out. The bark on the trunk of the pine trees has a definite pattern to it. There is a pattern to the way the fruit grows on a particular plant.

If you see any spiders or butterflies, look for patterns in their color and in the lines on their bodies. If you see a spider web, consider the geometric pattern in the design of it.

QUESTION: What patterns would you find in an urban street system and in a school building?

ANSWER: Streets usually radiate from the center of a city to the suburbs like spokes of a wheel. Streets often run parallel to each other, and others cross them at intervals to form rectangles; still others traverse them to form triangular patterns. There are circular streets and some which form still different patterns.

In a school building, the halls are laid out in a definite pattern. The rooms are built according to pattern. They usually are rectangular in shape, but some may be square or have other shapes. The windows and doors, also, are built according to pattern and, generally, are rectangular in shape. Even the seats in school auditoriums are laid out in a geometric pattern.

INTERACTION AND INTERDEPENDENCE SIGN ON TRAIL

From the above-indicated sign until the next one, we shall be discussing interaction and interdependence. Check along the trail for examples. See if you can find more than your partner.

QUESTION: How are the root, trunk, and needles of the pine tree related to each other?

ANSWER: The roots anchor the tree and they absorb minerals and water for the rest of it. The trunk connects the roots to the crown, and minerals and water are conducted from the roots, through it, to the needles. Needles use the water and minerals from the soil with sunlight to manufacture food for the tree so it can continue to grow. When the tree dies, it decays and the nutrients are returned to the soil so they can be used by other trees and plants.

Look to the left side of the trail before entering the hammock. Notice the large holes in the trunk of the dead tree.

QUESTION: What made the large holes in the tree and why?

ANSWER: Probably a pileated woodpecker which is about the size of a crow. He undoubtedly dug the holes looking for harmful insects, which were attacking the tree before it died.

QUESTION: What would happen if all the boys got rifles and killed all the woodpeckers?

ANSWER: There may be too many harmful insects and they might soon destroy all of our trees.

Notice the poison ivy on the right side of the trail around the solution pocket of water just before entering the hammock.

As we enter the hammock, everyone stop and be quiet for a minute and get the "feel" of the area.

QUESTION: Do you feel any difference between the temperature in the hammock and that on the outside?

ANSWER: Yes, it is cooler and more moist in the hammock. There is less circulation of air to cause evaporation.

QUESTION: How does this difference in climate affect the amount and type of vegetation?

ANSWER: The higher humidity means more plants and more plants result in greater shade. So we find plants that are tolerant to shade. Notice the absence of pines, grass, and palmetto, all of which do not tolerate heavy shade.

Pick up some dead leaves from the ground in the hammock and pulverize them between the palms of your hand. Then, look at the soil.

QUESTION: Do you think it will take the leaves long to decay in the hammock and why?

ANSWER: No, the high humidity in the hammock encourages the growth of the fungi which cause the leaves to decay.

Dig into the dead leaves and soil. See if you can find a white stringy substance. This is a fungus which aids in the decomposition of the leaves.

Search for snails on the trees along the trail. DO NOT REMOVE THEM FROM THE TREES.

QUESTION: Do they usually crawl on smooth-bark or rough-barked trees and why?

ANSWER: Generally, they are found on smooth-bark trees as they can climb them more easily.

QUESTION: Why are the snails on the trees?

ANSWER: They feed on the lichen on the trunk. Get the students to find some lichen growing on the tree. The lichen consists of algae and fungi growing together. The algae manufactures the food and the fungi absorbs the water and nutrients. So they are dependent on each other and on the tree for a place to grow. The snails, in turn, are dependent on the tree as they have to climb it to reach the lichen and they are, of course, dependent on the lichen for food.

You probably have noticed the numerous solution pockets or rocky holes full of water along the trail.

QUESTION: Does anyone know what caused them?

ANSWER: The rock in which the water holes are located is limestone. When rainwater unites with the limestone rock, it makes a weak acid which gradually eats out holes in the rock.

QUESTION: Where does the soil in which the plants grow in the solution pocket come from?

ANSWER: The dead leaves from the trees and other plants fall into the holes, decay, and form soil.

Let us consider some "non-field" applications of the interaction and interdependence strand.

QUESTION: How are students, teachers, and principals interrelated and interdependent?

ANSWER: The students depend on the teacher for instruction. The teachers are dependent on the principal to make administrative decisions and to represent them before the superintendent of schools. Both the principal and teachers are dependent on the students as, without them, there would be no school.

QUESTION: How are the school and community interrelated and interdependent?

ANSWER: The students are dependent on their parents for support. The parents, in turn, are dependent on the community for their jobs, food, public services, etc. The school serves as a source of employees for the community.. Some of the students work in the community after school, on weekends, and during the summer.

The community is dependent on the school for training its future leaders and citizens. The school is dependent on the community to provide food for its lunchroom, electricity, water, and other public services.

CONTINUITY AND CHANGE SIGN ON TRAIL

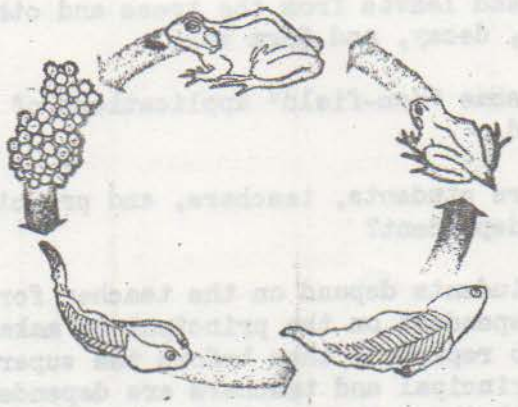
QUESTION: Can you find some examples of continuity and change along the trail?

ANSWER: The tree affords us a good example. It continues from year to year but it also changes as the tree gradually grows larger. Finally, it dies, decays, and continues, but as soil.

The soil that we are standing on continues, but it changes. If we were to return to this same area a year later, the soil probably would be a little deeper due to additional decaying of leaves; however, a hurricane could cause torrential rains which could erode some of the soil and make it more shallow.

Plant and animal communities in this hammock continue but they change. A casual examination probably would not disclose any appreciable change, but a detailed census from year to year would reveal a change in the number of plants and animals and some change in species over a period of time.

CONTINUITY AND CHANGE

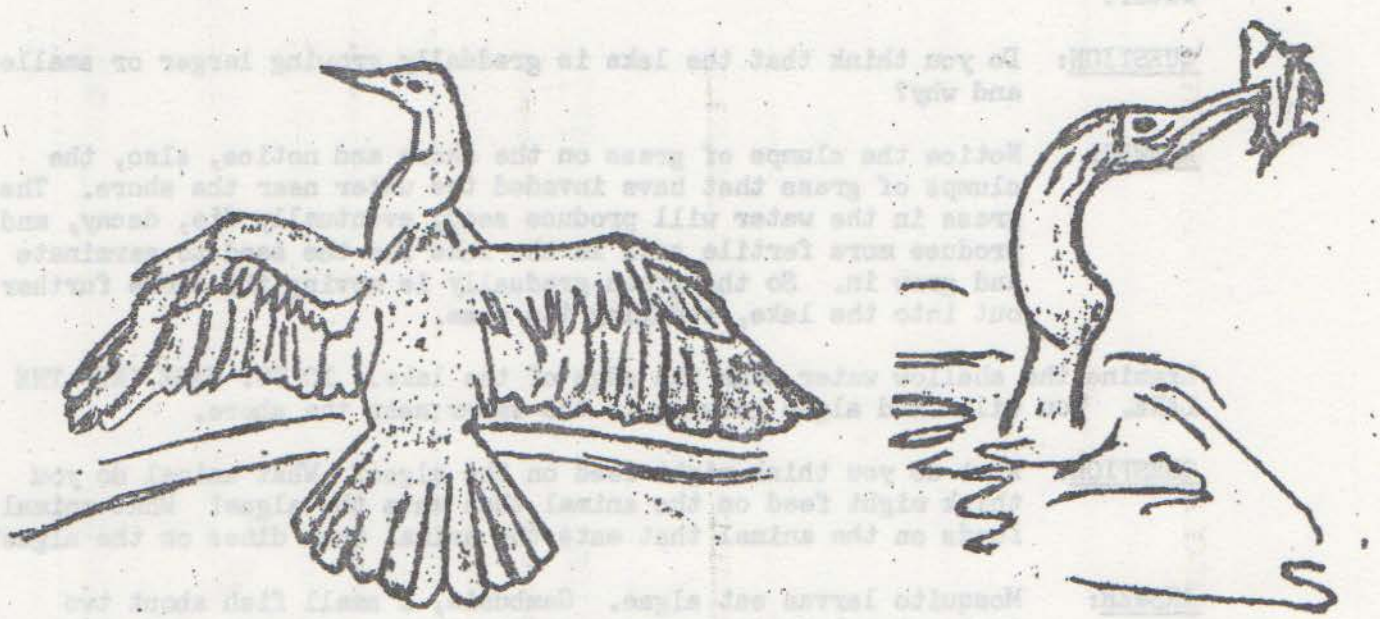


QUESTION: Can you cite some examples of continuity and change among students and school buildings?

ANSWER: Students continue in school but they change as they grow older, change from grade to grade, increase in knowledge, and may change their hair and clothing styles.

A school building continues to be used but it changes as new rooms may be added, some existing rooms may be used for different purposes. When the building gets old, it may be utilized for storage.

EVOLUTION AND ADAPTATION SIGN ON THE TRAIL



QUESTION: What evidence of adaptation do you see along the trail?

ANSWER: The airplants are good examples. Competition among plants for growing space on the hammock floor is intense. So the airplants have adapted themselves to growing in trees. They also receive more sunlight there. The airplants only use the trees for support. The roots anchor it to the tree and the leaves absorb the minerals and water from the moist air in the hammock.

Certain plants, such as the gumbo-limbo and live oak, have adapted themselves to growing in the hammock. Their seedlings are adapted to tolerating shade.

QUESTION: Cite some examples of adapting that students at various levels and folk in the business world experience.

ANSWER: When students first enter school, they have to adapt themselves to a completely different environment. When they transfer from elementary school to junior high, from junior high to senior high, they have to adapt themselves. If the student enters college he/she again has to adapt to a new environment. The student likely will evolve a new life style. When the former student enters the business world, he/she must adapt to still another environment.

TRAIL ALONG THE LAKESHORE

Look along the lakeshore, into the edge of the lake, and on out into the water.

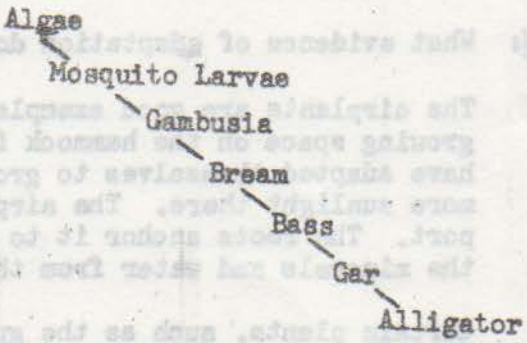
QUESTION: Do you think that the lake is gradually growing larger or smaller and why?

ANSWER: Notice the clumps of grass on the shore and notice, also, the clumps of grass that have invaded the water near the shore. The grass in the water will produce seed, eventually die, decay, and produce more fertile soil in the lake for the seed to germinate and grow in. So the grass gradually is moving the shore further out into the lake, reducing its size.

Examine the shallow water near the edge of the lake. DO NOT WADE INTO THE LAKE. You will find algae growing in the water near the shore.

QUESTION: What do you think might feed on the algae? What animal do you think might feed on the animal that eats the algae? What animal feeds on the animal that eats the animal that dines on the algae?

ANSWER: Mosquito larvae eat algae. Gambusia, a small fish about two inches long, feeds on the mosquito larvae. Bream eat Gambusia and Bass eat Bream. Large Gars in the lake consume Bass and one of the Alligator's favorite delicacies is the gar.



--AFTER YOU RETURN TO SCHOOL--

Plan on using the concepts over and over throughout the school year. This is the way to make a lasting impression and help students make decisions later on. When you get back to school, you might consider asking the students to play "The Seed Game".

THE SEED GAME

PURPOSE: To demonstrate to the pupils that there are similarities and differences among seeds and that these similarities and differences can be used as a means of classifying them into various groups.

NUMBER OF PARTICIPANTS: Entire class can play but divide into groups of five (or four, if there is an even number). In case the class or group is small, they can be divided into groups of two or three.

TIME REQUIRED: 30 minutes.

MATERIALS NEEDED: None

WHERE APPLICABLE: It can be played not only in a field or woods, but it also can be played on most school grounds.

PROCEDURE: Tell all of the groups of five that they will have 10 minutes to find as many seeds as possible. They can include seeds of flowers and grasses, berries, acorns, pecans, acorn-like fruit of the royal palm, fruit of the other palms, apple seed, a pine cone or a single-winged seed from the pine cone, a winged seed from the ash tree, a seed pod from the royal poinciana tree, etc.

When the pupils bring in their harvest of seeds at the expiration of ten minutes, tell each group of five to put their collection of seeds together. Then ask each group to sort their seeds into different piles based on differences between them. For example, if there are any acorns, the pupils probably will put them in one pile, the fleshy berries in another, the winged seeds of the pine in a third and so on.