

Savannas Friendship Guide

Teacher's Notes

Dear Educator,

The Savannas ecosystem, like most natural systems in Florida, is in trouble. This unique mix of biological communities is being stressed to the brink of extinction by the surrounding human activities. The Savannas needs friends, young and old, who will express their friendship in “deeds.” The purpose of the Guide is to provide middle school students with the knowledge and the skills they can enjoy and use if they choose to become active “Friends of the Savannas.”

The Friends of the Savannas program is an opportunity for young teens to take another step into adulthood by learning about responsible ecological behavior. The teens who develop a friendship with the Savannas will be good role models not only for their peers, but also adults.

The learning objectives addressed in the Friends of the Savannas program meet 24 of 74 St. Lucie County School District Student Performance Standards for seventh grade science. These are listed before each section.

The Guide is divided into three sections. **Part One, “Why Bother to become a Friend of the Savannas?”** and **“Savvying the Savannas,”** are readings classroom activities and home assignments. Part One will develop a greater understanding (**savvy**) of the Savannas’ ecology and the human impact on it.

Part Two, “Savoring the Savannas,” involves a full day field trip to the Savannas Preserve State Park. The day’s activities in the Preserve are focused on providing opportunities for the student to appreciate (**savor**) this natural area. Affection and a feeling of connectedness for the Savannas may lead to a responsible, ecological relationship with nature.

Part Three, “Saving the Savannas,” models practical activities and lifestyle changes which promote care of the Savannas. These “Earth friendly” deeds could help protect (**save**) this unique, fragile ecosystem and other natural ecosystem. Student participation, whether it be verbal, written, or a demonstration is highlighted in the Guide as a **PAUSE button** (the word **“PAUSE”** is used in these notes). Student responses could be discussed in class. The PAUSE activities are used mostly in Part 1. Even though the Guide is given to the student, it is suggested that the student use a pencil when they fill out answers so a friend, sibling or parent could reuse the booklet

Part 1- Why Bother to Become a Friend of the Savannas? And Savvying the Savannas

St. Lucie County Performance Standards: 1.08, 1.09, 1.10, 1.12, 2.02, 14.01, 15.01, 15.02, 15.03, 16.04

Why Bother?

Reading assignments suggest reasons why bothering to care about the health of the Savannas is in the best interest of all people in St. Lucie and Martin counties.

PAUSE: *What do you feel is the most important reason for caring about the Savannas? Please explain your reasons.*

Facilitate a discussion in class or ask for a written response. Encourage the students to come up with their own reasons.

PAUSE: *What does the prefix “eco” in the words of “economy” and “ecology” mean? Name a reason why the Savannas is an “economical ecosystem” and why the 4 Rs are important for an “ecological economy.”*

The prefix “eco” means house or household. Ecology means “study of the home” (the interrelationships in the household) and economy means the management of the household. An economical ecosystem, such as in nature, cycles all wastes (resources) and maximizes the use of energy as it flows through the system. Interrelationships between living and non-living elements in the system provide the free “labor and materials” needed by the ecosystem. The 4 Rs (reduce, reuse, recycle, recover) are “economical ecosystem” activities required for an “ecological (human) economy.”

Savvying the Savannas

These readings describe the history of the Savannas, its diverse biological communities and the ecological elements which need to be protected. Students will read how the Reserve’s habitats, clean stormwater runoff and groundwater, the cycle of flood and drought and the natural role of periodic (now prescribed) fire are necessary for the preservation of the biological diversity of the Savannas.

Habitat

PAUSE: *Imagine you are a plant or animal of a Savannas' biological community. Try to imagine how that organism senses its environment. Choose a word or series of words that might be used to describe the human activities in and around its home? Please explain your ideas.*

Encourage discussion in class or ask students for a written response.

PAUSE: *Pick the "trespassing plants," melaleuca and Brazilian pepper, out of a lineup.*

Use four or more plant cuttings (1-3 feet long) in a "line-up." Let two of them be invasive exotics (non-natives), such as melaleuca and Brazilian pepper and two or more native shrubs or trees. Have the students identify the "trespassing" habitat destroyers. Take a walk on the school grounds and search out any "criminals" on site. If you wish, report their location with a request for their "arrest." Avoid touching the Brazilian pepper leaves or sap with bare hands, some people will get a poison ivy type rash from contact. Use gloves or other protection when handling Brazilian pepper. Melaleucas in flower causes allergic reaction in some people. In addition to crowding out native species, this is another good reason to have both plants removed.

Unpopulated runoff and groundwater.

PAUSE: *How many gallons of runoff water does your school or home generate a year?*

Multiply the numbers of square feet of impervious surfaces times 55 inches of rain a year times .625 of a gallon of water per square foot=number of gallons generated per year. The dimensions of the school buildings paved areas might be available from the administration or use a 100 foot measuring tape or do a rough estimate by pacing. Measure the length of each pace by having each pacer walk ten normal steps, preferably with another family member or in teams at school.

PAUSE: *Think of a way we could reduce this problem while making use of water.*

Students fill in the blanks (e.g. roof...barrel...watering the landscape). Pollution is the inefficient use of materials or resources. Excess resources become wastes that overload a biological system's ability to survive. Ask students to discuss their answers and/or have them come up with ideas on how this problem at home or school can turn into an asset. Collecting and using rainwater from a roof is a technique used in many parts of the world. Ask them to draw a simple cistern design that uses the water from the roof in the landscape. Ask volunteers to explain their design to the class.

PAUSE: List the substances that are used or may be occasionally spilled onto the impervious and permeable surfaces at school or home.

Brainstorm a list in class, then ask the school maintenance staff to show the class what pesticides or fertilizers are being used on the turfed areas, shrubs and trees. Are there any cleaning agents being used on roofs or paved areas? See pages 5-6 in Water for South Florida for more information on groundwater and aquifers.

PAUSE: If any of these substances are in your drinking water, do you feel it would make the water unfit for you to drink?

This is a subjective question that meant to encourage thought about preventing runoff or ground water pollution. Students write "OK" or "No way" by each substance listed.

Demonstrate that one gallon of motor oil or gasoline will contaminate one million gallons of water by putting one drop of dark colored vegetable oil or water (simulating motor oil and gasoline into a gallon of water. Not only would this gallon of water be contaminated, but mixing this gallon of water with sixteen more gallons would also make that water unfit to drink.

PAUSE: If samples of sediments in Lake Eden show an average of .00029 ppm of methylmercury and in fish (largemouth bass) an average of 1.97ppm of methylmercury. How many times greater (magnification) is the amount of methylmercury in the fish than in the sediment?

Bioconcentration is the accumulation of certain chemicals within an organism. Bioconcentration opens the door for the phenomenon **biological magnification (biomagnification)**, the build up of chemicals in organisms in the food chain. Biomagnification exposes organisms high on the food chain to potentially dangerous levels of many chemicals. Synthetic chemicals like DDT (still used on some of the food imported into the U.S.), some lead and mercury compounds, and some radioactive substances are all biomagnified. Calculations: 1.97 ppm (fish) divided by .00029 ppm (sediment)=6793 times more methylmercury in the fish than the sediment. The methylmercury is the portion of the mercury that can be biomagnified. Even when you have less than 1 percent of methylmercury in the total mercury, it can be biomagnified several thousands of times. See the HRS brochure "Health Advisory mercury."

PAUSE: The concentration of mercury would likely be lower-higher (circle one) in the animals, such as ospreys and eagles, than in the bass they eat. Explain your answer.

Higher. Mercury (methylmercury) becomes more concentrated as it moves up the food chain because of the large quantity/total mass of contaminated prey that is eaten. Much of the

consumed methylmercury is not eliminated, but becomes concentrated in the tissues of the animal.

PAUSE: *List some of the differences in the amount of energy and materials, including water, used by people to maintain 1) a natural pine flatwoods or wetlands (biologically simple community designed by humans).*

1) People do not have to input energy and materials into self-sustaining natural systems. 2) Grass (from lawns) is the largest single crop in the United States (25-30 million acres). Human labor and fuel is necessary in the regular harvesting (mowing) of this crop that is not eaten and often considered to be trash. Lawns use more fertilizers and pesticides than any other agricultural crop. Lawn and landscape irrigation consumes more than half of the water used in Florida. Chemically treated and fertilized lawns can be a source of runoff and groundwater pollution and sometimes a hazard to children and pets.

PAUSE: *What landscaping lesson can we learn from nature? How can we apply any these principles in the landscape at school or home?*

Brainstorm the advantages of landscaping with native plants and raising some of our own food. Well adapted animals use their habitat to obtain more calories than they use in the pursuit of food. Living near a food supply conserves energy. People can conserve energy by raising some food (plants and animals) at home (habitat) and/or purchasing locally grown food.

The cycle of flood and drought

PAUSE: *List three sources of waste from home or school that can be broken down (composted) by nature.*

See [4 Rs project](#) activities, grade 9-12, pages 147-56. Contact your county solid waste managers for more information on composting.

Flood and drought are part of the natural nutrient cycle of the Savannas. Floods drown many plants, scatter the dead plants organic matter and speed the decomposition of this material. Students can observe decomposition by composting. Organic waste can become a resource to recycle instead of a waste added to a landfill. Students could research different types of composting bins. Set up an experimental composting operation at school using food scraps from the cafeteria and other organic waste generated on site. Use the compost in a food garden at school.

Periodic Fire

PAUSE: *Observe the adaptations of a slash pine tree to fire (look at the base of the trunk and at the bark) and the saw palmetto (look at the direction in which the trunk grows) Speculate why these features protect the plants from being damaged by a fire.*

The thick, scaly bark of the slash pine protects the trunk from fire damage. The lower branches on the pine fall off so the fuel from the branches is on the ground. The fuel burning on the ground is not usually able to burn up the tree and ignite the crown. The saw palmetto trunk grows laterally and, therefore, close to the ground where the fire is not as hot. Fronds get burned but new ones grow quickly after the fire.

Part 2-Savoring the Savannas

Performance standards: 8.06, 8.07, 8.09, 11.01, 14.01, 14.03

The Field Trip to the Savannas-Preparation

Discuss the meaning of “savoring.” How does one maximize the possibilities of having a savory experience. Examples: It is difficult to hear/enjoy the words of any song if we do not listen or if we are talking; a favorite dessert is better appreciated if it is allowed to slowly roll over the tongue a bit before swallowing; an extended, concentrated view of something/someone beautiful may be satisfying than a glancing look. Encourage the students to be quiet, to listen and to watch while in the Savannas.

In order to get to know the Savannas and enjoy it as a potential “friend,” we need to be observant and respectful. Unnecessary talk also distracts others from enjoying the sounds and silence of the Savannas. Learning will require the students to do their part by focusing on the activities.

Appropriate protective clothing (hat, long pants, rain gear, and old shoes) should be worn. Sunblock is recommended. Insect repellent can be taken although mosquitoes are not usually a problem in the Savannas. Since there are poisonous snakes in the Savannas, students will have to stay in designated open areas. Students should not bother or touch any wildlife, especially snakes, that they might encounter. Students will not be in the canoes or in the water.

The day’s schedule of activities and further details will be sent to you.

Part 3-Saving the Savannas

Performance Standards: 8.03, 8.04, 8.08, 16.01, 16.03, 16.05, 16.06, 16.07, 16.08.

The experience in the Reserve will hopefully create a bonding feeling toward nature. Experiences in nature might interest the students in making ecological lifestyle changes at home and school. This part of the Guide provides ideas for activities that teach and model these “Earth friendly” skills. A measurement of the success of this program lies in behavioral changes that the students make that benefit the health of the Savannas’ biological communities.