

# Enchanted Forest Sanctuary

## Pre- and Post-Study Trip Curriculum

### Grades 3-5

## Objectives

To prepare students for a study trip to the Enchanted Forest Sanctuary (EFS) by introducing or reviewing key concepts and studying several assessed benchmarks using interactive activities. Specific objectives are listed for each activity. Vocabulary words are underlined the first time they occur and are defined on the last page of this packet.

## Purpose

These activities will introduce or review key concepts and vocabulary words for students to prepare for a study trip or review a study trip to the EFS. *While not required*, conducting one or more of these activities will provide students with a foundation from which to understand topics to be discussed at EFS or review topics after the trip.

## Who We Are

The Environmentally Endangered Lands (EEL) Program was established in 1990 by Brevard County citizens to protect the natural habitats of Brevard County by acquiring environmentally sensitive lands for conservation, passive recreation, and environmental education. The EFS is one sanctuary of many totaling over 20,000 acres of land managed by the EEL Program.

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## Pre-Trip Curricula

### Topic: Microhabitats

**Objectives:** At least 75% of students will be able to name at least three differences between the two microhabitats they study.

At least 75% of students will be able to create a bar graph that accurately summarizes the whole-class data worksheet.

**Benchmarks:** SC.G.1.2.7. Knows that variations in light, water, temperature, and soil content are largely responsible for the existence of different kinds of organisms and population densities in an ecosystem. FCAT: content sampled

MA.E.1.2.1. Solves problems by generating, collecting, organizing, displaying, and analyzing data using histograms, bar graphs, circle graphs, line graphs, pictographs, and charts. FCAT: annually assessed

**Materials:** Hand lenses (one per student), data worksheet (one per group of two-three students), clipboards, pencils and summary chart

**Duration:** One 60-minute session or two 30-minute sessions

**Group Size:** Any, though fewer than 30 is recommended

**Background:** Humans and other animals and plants share basic needs of life: we all need food, water, shelter and space to survive. These four “ingredients” create habitat. These “ingredients”, however, need to be in sufficient quantity and quality to be useful, just as in a cooking recipe.

A microhabitat is an area with a small difference from the habitat around it. For example, a microhabitat in a forest ecosystem would be the sunny spot where a tree had fallen compared to the shaded areas around it. Microhabitats are small and can have differences in temperature, soil type, the amount of leaf litter, the amount of water, etc. A small puddle or a pile of leaves would be considered microhabitats.

In order for scientists to understand the world around them, they must observe it, collect data on it and compare that data with other surveys and experiments that have already been done.

This activity provides an opportunity for students to observe and study two different microhabitats and the wildlife that use them. Students will practice observation skills and data collection in preparation for an activity at the EFS.

### **Procedure:**

#### *Getting Ready:*

1. Locate two sites on your school grounds that are extremely different microhabitats (i.e. a sunny dry area and a shady moist area) in close proximity. Each microhabitat should be roughly the same size and be able to accommodate half of the students in your class. If possible, mark the boundaries of each site with marker flags or flagging tape.
2. Review the data worksheet and add or delete categories to fit the microhabitats, plants and animals most common in your selected sites. In addition, review the summary chart and adapt it to your schoolyard site if necessary.

#### *With Students:*

1. Review the term “habitat”. Introduce the term “micro” (small) and see if students can put them together to define “microhabitat”. Ask students what their favorite microhabitat is (their favorite tree to sit under, the vacant lot in the neighborhood, a pond, or a pile of leaves they jump into in the fall). Why do they like it? How is it different from the surrounding habitat? What animals and/or plants live there? What conditions in the environment might affect the kinds of plants or animals that live there?
2. Divide students into groups of two or three. Lead students to the study site. Distribute one clipboard with data sheet and pencil per group and one hand lens per student. Point out the boundaries of the sites. Explain that each team will spend about 10 minutes in each site before switching, and students will work in their groups to complete the activity. Show students how to complete the worksheet, providing examples or explaining terms if necessary. (Lichen are a combination of a fungus and an alga. They usually look like blotches of paint on the bark of trees and are usually light green, white, red, black or orange. If water is present at either site, students might observe green algae in the water. The most common mosses are green and spongy like carpet and grow on the ground or on trees. The most common fungi will be mushrooms or maybe some shelf or bracket fungi growing on the bark of trees. Familiarize yourself with these before you conduct this activity).

3. Provide instructions. Each student should participate in the survey. One student per group will serve as the recorder while the other(s) will observe and identify plants and animals at the site. Instruct students to record the number of different kinds of each type of organism listed, not the number of each organism (i.e. three different types of flowers rather than a total of 30 flowers). Encourage students to find organisms you didn't include and ask them to add these to the bottom of the worksheet.
4. Assign each group to one of the two microhabitats, keeping the number of groups at each site as even as possible. After approximately 10 minutes, switch the groups to the other microhabitat.

*Back in the Classroom:*

1. Reproduce the data worksheet on the board or overhead and construct a whole-class tally using each group's results.
2. Distribute the summary chart to each student and reproduce it on the board or overhead. Discuss the categories listed and ask students to complete the summary chart using the whole-class data worksheet.
3. Inform students that scientists use different methods for learning about something they're interested in. One method they use is a survey, which is done to determine what is in a given area. For example, how many squirrels live here? The students just completed a survey.
4. Ask students to share their conclusions and discuss the differences in plants and animals between the two sites. What types of plants and animals were most abundant in each microhabitat? Why do different microhabitats contain different plants and animals? Was anything the same between the two microhabitats? Students should realize that certain plants grow best in certain microhabitats. These plants then attract certain kinds of animals.
5. Introduce the term "biodiversity". "Bio" means "life" and "diversity" means "different". So "biodiversity" means lots of different kinds of life. Areas with high biodiversity are important because they support so many different types of plants and animals.
6. Finally, ask students what might happen if something about a microhabitat changed (drought, flood, heat wave, freeze, different amount of sunlight, etc.). Students should realize that many organisms are adapted to survive in specific conditions. Discuss the term adaptation. How do wildlife adapt to the environment? Some migrate to a warm area in the winter. Others will burrow into the ground or hide in water to escape the heat. White-tailed deer will flash the white underside of their tail to warn other deer that danger is nearby, usually

in the form of a predator. And lizards can change colors to blend in with their surroundings to avoid detection by predators. These are all examples of adaptations. But sometimes an animal or plant has adapted so well, that they can only live in a certain place and nowhere else. For example, a polar bear can only live in the extreme cold of the arctic, and a gopher tortoise can only live in the hot desert-like environment called scrub in Florida.

**Evaluation:**

1. Instruct students to write a paragraph summarizing the environmental differences (light, temperature, soil, etc.) between the two microhabitats they studied and the differences in plants and animals that occur there.
2. Ask students to create a bar graph of the whole-class data worksheet.

**Acknowledgement:**

This activity was adapted from the Florida Game and Fresh Water Fish Commission's "The Schoolyard Wildlife Activity Guide" Lesson 6: Some Like It Hot!

# Data Worksheet



Group Members: \_\_\_\_\_

Tally the number of different types of each organism found at each site. If you find other organisms that aren't listed here, please add them to the bottom of the worksheet.

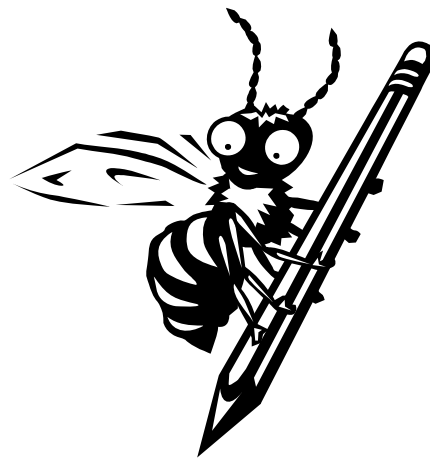
Types of Organisms	Number of Different Types of Organisms Found at Each Site	
	Sunny, Dry Site	Shady, Moist Site
Ants or anthills		
Ant Lions or ant lion pits		
Butterflies		
Beetles		
Worms		
Caterpillars		
Grasshoppers		
Spiders		
Bees		
Dragonflies		
Birds		
Moss		
Fungi		
Lichens		
Algae		
Grass		
Plants with large leaves (not grass)		
Trees		

## Summary Chart

Name: \_\_\_\_\_

Place a check mark in the boxes that apply:

<b>The Site that Has More:</b>	<b>Sunny, Dry Site</b>	<b>Shady, Moist Site</b>
Moss, fungi, lichen and algae		
Grass than other plants		
Trees		
Plants with large leaves		
Ants, anthills, ant lions and ant lion pits		
Butterflies and bees		
Beetles and worms		
Dragonflies		
Different kinds of plants		
Different kinds of animals		



**Topic: Adaptations**

**Objectives:** 75% of students will be able to describe at least two adaptations of a bird of their choosing or creation.

75% of students will be able to describe why the adaptations they created are important for the bird's survival.

**Benchmarks:** SC.G.1.2.2. Knows that living things compete in a climatic region with other living things and that structural adaptations make them fit for an environment. FCAT: annually assessed

**Materials:** paper, crayons or colored pencils, construction paper, glue, tape, etc.

**Duration:** One 45-minute session

**Group Size:** Any, though fewer than 30 is recommended

**Background:** All life forms have adaptations to the environments in which they live that enable them to thrive. Each ecosystem has specific organisms that have adapted to live there. Without these adaptations, it is unlikely the organism will survive or reproduce. Humans have adaptations just like plants and other animals do. Humans have learned to adapt to certain situations and still thrive. A good example is someone who has lost their hearing. People have adapted by creating sign language that allows communication to take place.

Birds are a group of animals that have many adaptations to their living conditions, including characteristics of their beaks, feet, wings, legs and colorations. Various major adaptations are listed on the attached chart. This activity will provide students with an opportunity to study bird adaptations and why they are important for survival.

**Procedure:**

1. Introduce or review the term adaptation. Ask students if people can adapt to environmental conditions? (Put a coat on when it's cold, put up an umbrella when it rains, get into shade when it's hot, etc.).
2. Ask students what adaptations a plant or animal might have to its environment (thick fur in cold places, certain colors to blend in to its surroundings, retreating to a burrow when it's hot, moving to another area {migration}, hiding when pursued by prey, etc.) List these on the

board or overhead. When several have been given, ask students to focus specifically on birds. Create a separate list on the board or overhead for birds.

3. Next, re-create the adaptation chart on the overhead or blackboard with the “advantage” category covered or left blank to fill-in. Reveal each adaptation and ask students to give its advantage to the bird, uncovering that category or recording it as they are given. You can do all of them or select some of them for students to answer. When you are done, reveal the entire chart.
4. Tell students they will each have a chance to design their own bird that has adapted to its ecosystem. Each student should decide:
  - Where the bird lives
  - What it will eat
  - How it moves
  - Its gender
  - How it raises its young
  - What it looks like, and
  - The bird’s name
5. Using the choices provided in the chart or ones they create, have students list the adaptations that are necessary for their bird.
6. Using their list of adaptations, ask students to create their bird using the provided art supplies (you can provide sculpting supplies if you wish)

### **Evaluation:**

1. Using their drawing, have each student write a short report that includes the information in #4 above. Have students include their list of adaptations and the advantages of each for the bird.
2. Using their drawing, have each student present their bird to the class, including the information in #4 above, its adaptations and the advantages of each for the bird. Drawings can be displayed in the classroom.
3. Using the drawing, ask students to imagine their bird in a very different ecosystem. What difficulties might the bird have in this new environment? Why? Would they have any advantages?

### **Acknowledgement:**

This activity was adapted from Project Wild’s “Adaptation Artistry” activity.

## Bird Adaptations

<b>Adaptation</b>	<b>Bird</b>	<b>Advantage</b>
<i>Beaks:</i>		
Pouch	Pelican	Can hold the fish it eats
Long and thin	American Avocet or Hummingbird	Can probe shallow water and mud for the insects it eats; Can probe flowers for nectar
Pointed	Woodpecker	Can break and probe the bark of trees for the insects it eats
Curved and sharp	Hawk	Can tear solid tissue for the meat it eats
Short and stout	Finch	Can crack the seeds and nuts it eats
<i>Feet:</i>		
Webbed	Duck	Aids in walking on mud and swimming
Long toes	Heron	Aids in walking on mud
Clawed	Hawk or Eagle	Can grasp prey and hold onto branches
<i>Legs:</i>		
Long and powerful	Ostrich	Aids in running
Long and slender	Heron	Aids in wading
Powerful muscles	Hawk or Eagle	Aids in lifting and carrying prey
<i>Wings:</i>		
Large	Eagle	Aids in flying with prey or soaring while hunting
<i>Coloration:</i>		
Bright plumage	Male birds	Aids in attracting mates
Dull plumage	Female birds	Aids in camouflage while nesting
Change of plumage	Owls, Ptarmigan	Provides camouflage (brown in summer, white in winter)

## Post-Trip Curricula

### Topic: Data Analysis

**Objectives:** 75% of students will be able to list at least three events that occurred in the lifetime of their saw palmetto and the year they occurred.

75% of students will be able to describe why it is important to share information with other scientists and the general public.

**Benchmarks:** SC.H.1.2.2. Knows that a successful method to explore the natural world is to observe and record, and then analyze and communicate the results. FCAT: annually assessed

(Multiple Social Studies benchmarks will be met with this activity)

**Materials:** Large paper or construction paper, markers or crayons, other art supplies you wish to provide, calculator is optional

**Duration:** One 45-minute session

**Group Size:** Any, though fewer than 30 is recommended

**Background:** Scientists analyze, or study, the data they collect to reach conclusions about their study. It is also a method to determine inconsistencies or bias in collection methods. Scientists then share their data with other scientists and the general public so the study can be repeated for accuracy or be used to create or build upon a theory. Students will create a timeline to share the saw palmetto data they collected with students and others in the school.

#### Procedure:

1. Obtain each group's saw palmetto age from the survey performed at EFS (a staff member can give these to you on an index card before you leave or by phone or email).
2. Instruct your students to sit in the same groups they were in for the saw palmetto activity at EFS. Post on the board or hand out a piece of paper that tells each group how old their saw palmetto was.

3. Ask students why it is important for scientists to share the information they collect in their studies and experiments? (So people can learn, so others can re-create the study, so others can take the research further, or use it to create or build upon theories).
4. Tell students they will be sharing the information they gathered with other students and people in the school. However, so that others don't have to read through the data sheets, students are going to share the age of their saw palmetto by creating a picture. This picture will communicate the age of the saw palmetto quickly and effectively to anyone who looks at it. Tell students that they will be creating a timeline of their saw palmetto as their method of sharing their information.
5. Each group should calculate the year their saw palmetto was born.
6. Next, students will work in their groups to come up with at least five events in the lifetime of their saw palmetto and the year they occurred. Give them two or three examples: end of World War II (1945); the U.S. gains independence (1776); September 11 (2001); Martin Luther King, Jr. gives his "I have a dream" speech (1963); the year(s) the students were born, or other dates you would like to give as examples.
7. Each group will then create a timeline for their saw palmetto. The timeline should begin the year the saw palmetto was born and end with the current year. Using the art supplies provided, instruct students to label the timeline in 10- or 50-year increments (depending upon the age of the palmetto). Students should mark on the timeline the events they listed earlier as accurately as possible. Be sure there is a title on the timeline (Age of a Saw Palmetto at the Enchanted Forest Sanctuary or similar), today's date and student names. You may also wish for them to include a classroom name or the name of the teacher.
8. Each group will share their timeline with the rest of the class. Post the timelines in the classroom or in a school hallway that will allow other students and people in the school to view them.

**Evaluation:**

1. Instruct each student to write three additional events that occurred in the lifetime of their saw palmetto and the year in which they occurred on a piece of paper as a homework assignment.
2. Instruct each student to write a paragraph on why it is important for scientists to share their research with others.

## Grades 3-5 Vocabulary

<b>Adaptation</b>	a characteristic of an organism that increases its chance of survival in its environment (a change in behavior or structure that increases its chance for survival in its environment)
<b>Analyze</b>	to examine carefully and in detail so as to identify causes, key factors, possible results, etc.
<b>Bias</b>	to influence in a particular direction; prejudice; to inhibit impartial judgment
<b>Biodiversity</b>	many different types of life; “bio” means “life” and “diversity” means “different”
<b>Categorize</b>	to put things into groups of similar things
<b>Ecosystem</b>	a wildlife community formed by the interactions of organisms with each other and with the physical features of the landscape (desert, rainforest, tundra, ocean, scrub, mesic hammock, hydric hammock...)
<b>Experiment</b>	a test or procedure carried out under controlled conditions to determine the validity of a hypothesis or make a discovery; to manipulate something to see what happens
<b>Habitat</b>	a place in the ecosystem where an organism normally lives. Habitat is comprised of four “ingredients”: food, water, shelter and space.
<b>Microhabitat</b>	an area with a small difference from the habitat around it
<b>Migrate</b>	to move from one area to another, usually in search of food or mates
<b>Organism</b>	an individual living thing
<b>Population</b>	all the individuals of one species in a given area
<b>Predator</b>	an animal that lives by capturing and eating other animals
<b>Survey</b>	to study something without influencing it; a gathering of sample data considered to be a representative of the whole
<b>Theory</b>	a set of statements or principles devised to explain a group of facts or phenomena, especially one that has been repeatedly tested or is widely accepted and can be used to make predictions about natural phenomena