SECTION THREE

WORKSHOP INSTRUMENTS/ MATERIALS

Schoolyard Wildlife Workshop

_____

(Date & Time)

_____

(Place)

For K-12 educators, agency personnel and leaders of youth organizations

To register contact: _____

_____

The Schoolyard Wildlife Project is an environmental education program that can teach you how to turn school grounds into an effective outdoors classroom and provide important wildlife habitat. Its resources will help you incorporate Florida's natural history into your curricula to teach ecology, critical thinking skills and land stewardship principles.

Each participant will receive a free supplementary guide full of innovative activities. Participating teachers are also eligible for in-service credit.

For more information on Schoolyard Wildlife Activities contact:
Florida Fish & Wildlife Conservation Commission
Project WILD/ K-12 Programs
620 South Meridian Street
Tallahassee, FL 32399-1600
850-488-4679

http://myfwc.com/education/educators/schoolyard-wildlife/

Florida Fish and Wildlife Conservation Commission

MyFWC.com

WORKSHOP PROPOSAL

FOR OFFICE USE ONLY
RECEIVED _____
W ___ F___ File___ Cal___
SENT_____

Date of Workshop:_____

Name: _____
(One name only; list additional names under additional facilitators)

Material Mailing Address: (check one) ☐ Business ☐ Residential (Please, no PO Boxes)

Address:_____

City:_____ State: _____ Zip:_____

Day Phone: (_____)_____ Phone for public interest: (_____)_____

E-mail for public interest & Fed-Ex tracking: _____

Can we post on the Web site for public interest? ☐ Yes ☐ No

Additional PW facilitators:_____

Location of workshop: (Name of park, school, center, etc)

_____

City: _____County:_____

Type of workshop: (*circle ONE* – one workshop per form)

Project WILD (6 hours) Aquatic WILD (6 hours) Project WILD & PLT (8 hours)

Project WILD/Aquatic WILD Combination (6 hours) Wet, WILD, & Woodsy (12 hours)

Schoolyard Wildlife Activities & Ecology (4 hours) Schoolyard Ecosystems (6 hours)

Schoolyard Wildlife/Ecosystems Combination (8 hours) FL Black Bear Curriculum (4 - 6 hours)

Flying WILD (4 – 6 hours) Growing Up WILD (3 - 6 hours)

Audience/Number of participants: _____

Teachers: ☐ Elementary ☐ Pre-service teachers ☐ Youth organizations
☐ Middle ☐ Homeschool teachers ☐ Youth camp staff
☐ High ☐ Agency staff ☐ School administrators
☐ Private conservation groups ☐ Other _____

Registration fee (if any): _____

Project WILD FLORIDA

Continued on Back

Tentative agenda: (Please include times & activities)

To order workshop materials, please attach the appropriate workshop packing list.

Mail to: **Florida Fish & Wildlife Conservation Commission**
Project WILD
620 South Meridian Street
Tallahassee, FL 32399-1600
Phone: 850/488-4679

Fax to: 850/921-5778

E-mail to: beverly.eikeland@MyFWC.com

Please mail or fax this proposal with appropriate checklist at least four (4) weeks in advance to ensure adequate packing and shipping time.

Materials are shipped Fed-Ex and should arrive approximately one week in advance of your proposed workshop date provided that you have submitted your proposal with all needed information four (4) weeks in advance. **Your completion of all the necessary forms is greatly appreciated.**

Thank you!

Project WILD FLORIDA

Schoolyard Activities & Ecology Workshop Packing List

The following is a list of available Schoolyard Wildlife workshop materials. In keeping with the WILD philosophy, we are taking action to conserve supplies as well as postage. However, due to a change is many of our forms, we are asking that you please check your supplies from previous workshops and recycle any forms from previous years, then order what you need. ***List the amount of each item needed on the ____.***Thank you in advance for your assistance in our conservation efforts.

Facilitator Supplies

_____ Instructions for facilitators
_____ Introduction to Schoolyard WILD
_____ Sign-in sheet (20 names per page)
_____ Facilitator reporting form
_____ Schoolyard Wildlife packing list
_____ Workshop proposal form
_____ Postage paid envelope (for returning evaluations and extra paperwork)
_____ Workshop announcement poster (for future workshops)
_____ Travel reimbursement form (mileage only)
_____ Door prize pack (only one per workshop, please)

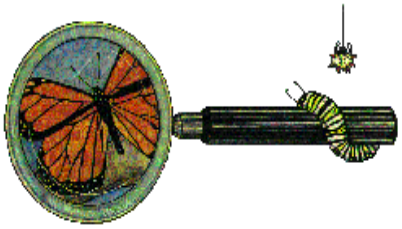
Participant Supplies

_____ Schoolyard Wildlife Activity Guide
_____ Schoolyard Wildlife Handbook
_____ Water Resource Activity Pack
_____ Certificates
_____ Name Tags
_____ Schoolyard Wildlife pre/post test
_____ A Schoolyard Safari
_____ Schoolyard Wildlife evaluation form

Informational Supplies

_____Project WILD brochure
_____Florida Black Bear Curriculum brochure
_____Growing Up WILD brochure
_____ Florida Wildlife Magazine sample issues
_____ Butterfly gardening
_____ Bird Watching Basics booklet
_____ Back Yard Feeder Birds poster
_____ Florida Native Snakes brochure
_____ FWC education contacts list
_____ Information request form
_____ Florida Invaders insert
_____ Florida Invaders poster
_____ Manatee brochure
_____ Bald eagle article
_____ Red wolf article
_____ Key deer article
_____ Key deer brochure
_____ Florida panther facts
_____ Keep your Cat Indoors
_____ LEEF membership form (League of Environmental Educators of Florida, Inc.)

Schoolyard Ecosystems Workshop Packing List



The following is a list of available Schoolyard Wildlife workshop materials. In keeping with the WILD philosophy, we are taking action to conserve supplies as well as postage. However, due to a change is many of our forms, we are asking that you please check your supplies from previous workshops and recycle any forms from previous years, then order what you need. ***List the amount of each item needed on the ____.***Thank you in advance for your assistance in our conservation efforts.

Facilitator Supplies

_____ Instructions for facilitators
_____ Introduction to Schoolyard WILD
_____ Sign-in sheet (20 names per page)
_____ Facilitator reporting form
_____ Schoolyard Wildlife packing list
_____ Workshop proposal form
_____ Postage paid envelope (for returning evaluations and extra paperwork)
_____ Workshop announcement poster (for future workshops)
_____ Travel reimbursement form (mileage only)
_____ Door prize pack (only one per workshop, please)

Participant Supplies

_____ Schoolyard Ecosystems of Florida
(A Guide for Planning, Installing, Maintaining and Using)
_____ WILD School Sites (only one per workshop, please)
_____ Certificates
_____Name Tags
_____ Schoolyard Ecosystems pre/post test
_____ Schoolyard Ecosystems Trek
_____Schoolyard Ecosystems evaluation form

Informational Supplies

_____Project WILD brochure
_____ Flying WILD brochure
_____Florida Black Bear Curriculum brochure
_____ Growing Up WILD
_____ Florida Wildlife Magazine sample issues
_____ Florida Wildlife Magazine subscription form
_____ Butterfly gardening
_____ Bird Watching Basics booklet
_____ Florida Native Snakes brochure
_____ FWC education contacts list
_____ Information request form
_____ Florida Invaders insert
_____ Manatee brochure
_____ Bald eagle article
_____ Red wolf article
_____ Key deer article
_____ Key deer brochure
_____ Florida panther facts
_____ Keep your Cat Indoors
_____ LEEF membership form
(League of Environmental Educators of Florida, Inc.)

FACILITATOR REPORTING FORM

FOR OFFICE USE ONLY
RECEIVED _____
W F A ENT

Name: _____

Additional facilitators: _____

Date of workshop: _____ Location/City: _____ County: _____

Type of workshop: (*circle one*)

Project WILD (6 hours) Aquatic WILD (6 hours) Project WILD & PLT (8 hours)

Project WILD/Aquatic WILD Combination (6 hours) Wet, WILD, & Woodsy (12 hours)

Schoolyard Wildlife Activities & Ecology (4 hours) Schoolyard Ecosystems (6 hours)

Schoolyard Wildlife/Ecosystems Combination (8 hours) FL Black Bear Curriculum (4 - 6 hours)

Flying WILD (4 – 6 hours) Growing Up WILD (3 - 6 hours)

Number of contact/teaching hours: _____ Number of participants: _____

- **Audience:** (Check all that apply)

Teachers: ☐ Elementary ☐ Pre-service teachers ☐ Youth organizations
☐ Middle ☐ Homeschool teachers ☐ Youth camp staff
☐ High ☐ Private conservation groups ☐ Agency staff
☐ School administrators ☐ Other _____

Don't forget to return:

☐ This form (Reporting form)
☐ Pre/Post tests (if applicable)
☐ Goal cards (if applicable)
☐ Final agenda with times and activities by title
☐ Evaluations (PW/AW)
☐ Sign-in sheet(s)
☐ Additional handouts from workshop

Mail to: Florida Fish & Wildlife Conservation Commission
Project WILD
620 South Meridian Street
Tallahassee, FL 32399-1600
PHONE: 850/488-4679
FAX: 850/921-5778

Or use pre-addressed postage paid return envelope

Project WILD FLORIDA

Continued on Back

Credit:

Academic or other credit provided? ☐YES ☐NO

If YES, what kind? _____ How many units? _____

From:_____

Did you take care of requested credit? ☐YES ☐NO

Budget:

Direct Dollars (registration): _____ Refunded _____

In kind contribution _____

Total Amount $_____

Expenses & supplies:

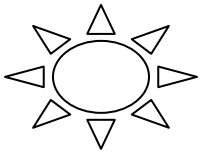
Source	Item	Dollar amount or value

Preparation: Briefly describe items that were used to announce workshop.
Please include samples if available.

Follow-up: Briefly describe any planned follow-up with your participants.

Problems: Briefly describe any difficulties that were experienced in this workshop.

New ideas: Please list, everyone could use them!!



Thank you for your time and energy in offering these workshops and providing this information! ☺

SIGN IN SHEET

Facilitator_____Workshop_____Date_____

NAME (Please Print)	SCHOOL/DISTRICT (County)	DATE	TIME IN/OUT	EMAIL ADDRESS
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				

Florida Fish & Wildlife Conservation Commission Outreach and Educational Contacts 11/12

Divisions

Exotic Species Coordination

Lori Haynes, Project WILD/K-12 Programs Coordinator Phone: 561/625-5142 Fax: 561/625-5129
8535 Northlake Blvd, West Palm Beach, FL 33412 Toll free: 877/450-WILD
Lori.Haynes@myfwc.com
Beverly Eikeland, Project WILD Staff Assistant Phone: 850/488-4679 Fax: 850/921-5778
620 South Meridian Street, MC 5A5, Tallahassee, FL 32399-1600
Beverly.Eikeland@myfwc.com

Imperiled Species Management Section, Manatee Program

Bonnie Abellera, Management Analyst Phone: 850/922-4330 Fax: 850/922-4338
Bonnie.Abellera@myfwc.com

Community Relations Office

Alicia Wellman, Public Information Specialist Phone: 850/488-9434 Fax: 850/488-1961
620 South Meridian Street, Tallahassee, FL 32399-1600
Alicia.Wellman@myfwc.com

Office of Recreation Services

Judy Gillan, Conservation Stewardship and Interpretation Section Leader
Phone: 850/921-4484 Fax: 850/488-3940
Judy.Gillan@myfwc.com
Anne Glick, Wildlife Viewing Section Coordinator Phone: 850/922-0664 Fax: 850/488-3940
Wings Over Florida/Bird Detective Program
Anne.Glick@myfwc.com
Mark Kiser, Birding Trail Manager Phone: 850/488-9478 Fax: 850/488-3940
Great Florida Birding Trail
Mark.Kiser@myfwc.com
TBA, Volunteer Coordinator Phone: 850/921-1047 Fax: 850-488-3940
@myfwc.com
Pam Murfey, Nature Center Director Phone: 352/754-6722 Fax: 352/540-6032
Chinsegut Nature Center
23212 Lake Lindsey Road, Brooksville, FL 34601
Pamela.Murfey@myfwc.com

Division of Marine Fisheries Management

Outreach and Education
100 8th Avenue SE, St. Petersburg, FL 33701 Fax: 727/893-9183
Richard Abrams, Environmental Administrator Phone: 727/896-8626 x2056 Fax: 850/488-7125
Rich.Abrams@myfwc.com
2590 Executive Center Circle East, Suite 204, Tallahassee, FL 32301
Gus Cancro, Environmental Specialist II Phone: 850/488-6058 x224
Gus.Cancro@myfwc.com
Michelle Owen, Public Information Specialist Phone: 850/488-6058 x229
Michelle.Owen@myfwc.com

Gina Russo, Enhancement Research Facility Stock Phone: 941/723-4505 Fax: 941/723-4507
14495 Harllee Road, Port Manatee, FL 32441
Gina.Russo@myfwc.com
Melissa Jackson, Environmental Specialist I Phone: 352/543-6089
Kirkpatrick Marine Lab
11350 SW 153rd Court, Cedar Key, FL 32625
Melissa.Jackson@myfwc.com

Commercial Outreach Program
Division of Marine Fisheries Management Phone: 850/922-4340 x204
2590 Executive Center Circle East, Tallahassee, FL 32301
Dan Ellinor, Government Analyst I
Dan.Ellinor@myfwc.com

Fish and Wildlife Research Institute (FWRI)

Outreach Coordination Office
100 8th Avenue SE, St. Petersburg, FL 33701-5020
Wendy Quigley, Management Analyst IV Phone: 727/896-8626 x2058 Fax: 727/893-9183
Wendy.Quigley@myfwc.com
Jessica Pernell, Environmental Specialist II Phone: 727/986-8626 x2060
Jessica.Pernell@myfwc.com
Elissa Riley, Environmental Specialist I, Phone: 727/896-8626 x2074
Elissa.Riley@myfwc.com
Carli Segelson, Media Relations Coordinator Phone: 727/896-8626 x2076
Carli.Segelson@myfwc.com
Robin Allen, Staff Assistant
Robin.Allen@myfwc.com

Division of Fresh Water Fisheries Management

Steve Marshall, Angler/Aquatic Education Coordinator Phone: 561/292-6050 Fax: 561/266-6616
Freshwater Fisheries Management
9557 Majestic Way, Boynton Beach, FL 33437
Steve.Marshall@myfwc.com
Dennis Renfro, Special Projects Phone: 352/357-2398 Fax: 352/742-6461
Eustis Research Lab
601 West Woodward Avenue, Eustis, FL 32726
Dennis.Renfro@myfwc.com
Rae Waddell, Education Coordinator Phone: 850/410-0810 Fax: 850/488-6127
Joe Budd Aquatic Education Center
PO Box 59, Midway, FL 32343
Rae.Waddell@myfwc.com

Division of Hunting and Game Management

Hunter Safety and Ranges
William Cline, Hunter Safety Coordinator Phone: 850-413-0084 Fax: 850-413-7989
620 South Meridian Street, Tallahassee, FL 32399-1600
Bill.Cline@myfwc.com
Renee Hays, Hunter Safety Administrative Assistant Phone: 850-488-9532 Fax: 850-413-7989
620 South Meridian Street, Tallahassee, FL 32399-1600
Renee.Hays@myfwc.com
Mark Trainor, Public Awareness Coordinator Phone: 850/488-4676 Fax: 850/488-1961
620 South Meridian Street, Tallahassee, FL 32399-1600
Mark.Trainor@myfwc.com

Regional Offices

Southwest Region – Region 1

3900 Drane Field Road, Lakeland, FL 33811 Phone: 863/648-3206 Fax: 863/701-1248
Gary Morse, Regional Information Coordinator
Gary.Morse@myfwc.com
Jessica Rivera, Regional Information Staff Assistant
Jessica.Rivera@myfwc.com

Hunting and Game Management, Hunter Safety Section

John Weatherholt, Hunter Safety Coordinator Phone: 863/648-3200 ext1113
John.Weatherholt@myfwc.com
Carrie Ream, Hunter Safety Staff Assistant
Carrie.Ream @myfwc.com

North Central Region – Region 2

Route 7 Box 440, Lake City, FL 32055 Phone: 386/758-0525 Fax: 386/758-0533
Karen Parker, Regional Information Coordinator
Karen.Parker@myfwc.com
Regional Information Staff Assistant Phone: 386/623-5512

Hunting and Game Management, Hunter Safety Section

Steve Robbins, Hunter Safety Coordinator Phone: 386/ 758-0525
Steve.Robbins@myfwc.com
Samantha Hurst, Regional Hunter Safety Assistant
Samantha.Hurst@myfwc.com

Northwest Region – Region 3

3911 Highway 2321, Panama City, FL 32409 Phone: 850/265-3676 Fax: 850/747-5690
Stan Kirkland, Regional Information Coordinator
Stan.Kirkland@myfwc.com
Toni Brannon, Regional Information Administrative Assistant Phone: 850/265-3676
Toni.Brannon@myfwc.com

Hunting and Game Management, Hunter Safety Section

David Crosariol, Hunter Safety Coordinator
David.Crosariol@myfwc.com
Stacy Dickens, Regional Hunter Safety Assistant
Stacy.Dickens @myfwc.com

South Region – Region 4

8535 Northlake Boulevard, West Palm Beach, FL 33412 Phone: 561/625-5132 Fax: 561/625-5129
Gabriella Ferraro, Regional Public Information Coordinator 561/625-5122
Gabriella.Ferraro@myfwc.com

Hunting and Game Management, Hunter Safety Section
Lynne Hawk, Hunter Safety and Becoming an Outdoors-Woman Coordinator Phone: 561/625-5122
Lynne.Hawk@myfwc.com

Susan Harrass, Hunter Safety and Becoming an Outdoors-Woman Staff Assistant Phone: 561/625-5126 EXT. 151
Susan.Harrass@myfwc.com

Northeast Region – Region 5

1239 SW 10th Street, Ocala, FL 34474 Phone: 352/732-1225 Fax: 352/732-1391
Joy Hill, Regional Information Coordinator
Joy.Hill@myfwc.com
Call Center Phone: 352/732-1225

Hunting and Game Management, Hunter Safety Section

Ocala Conservation Center Phone: 352/625-2804 Fax: 352/625-0333
7325 NE 170th Avenue, Silver Springs, FL 34488
Greg Workman, Director of the Ocala Conservation Center
Greg.Workman@myfwc.com
JoAnne Peagler, Education Specialist /Hunter Safety Coordinator
JoAnne.Peagler@myfwc.com
Rhonda Levay, Office Manager
Rhonda.Levay@myfwc.com

Updated 08/30/11

Schoolyard Activities Knowledge Assessment

Name_____ Circle one: Pre-test Post-test

Workshop Date_____ Facilitator(s):_____

TRUE-FALSE *(Circle the correct answer)*

1. True False The activities in the *Schoolyard Wildlife Activity Guide* were developed mainly for middle school students.

2. True False Every lesson in the *Schoolyard Wildlife Activity Guide* has both content knowledge and attitude objectives.

3. True False All of the lessons in the *Schoolyard Wildlife Activity Guide* include a component that should be completed outside.

4. True False The lessons in the *Schoolyard Wildlife Activity Guide* must be completed in order.

5. True False The *Schoolyard Wildlife Activity Guide* does not contain any lessons that focus on plants.

MUTLIPLE CHOICE *(Circle the letter of the correct answer.)*

6. The reference guide containing background information about schoolyard organisms is called the:
   A. Golden Guide to Schoolyard Wildlife
   B. Handbook to Schoolyard Plants and Animals
   C. Project WILD Schoolyard Guide
   D. Schoolyard Wildlife Activity Guide

7. The agency that funds the Florida Schoolyard Wildlife Program is the:
   A. Florida Advisory Council on Environmental Education
   B. Florida Department of Education
   C. Florida Department of Environmental Protection
   D. Florida Fish and Wildlife Conservation Commission

8. Smaller components of a larger habitat are called:
   A. Habitat parcels
   B. Microclimates
   C. Microhabitats
   D. Niches

FILL IN *(Write your answers in the spaces provided.)*

9. Two examples of basic science process skills used in schoolyard lessons are _____
_____

10. The four major goals of the Schoolyard Program are knowledge, _____,

_____, and _____.

Schoolyard Ecosystems Knowledge Assessment

Name_____ Circle one: Pre-test Post-test

Workshop Date_____ Facilitator(s):_____

TRUE-FALSE *(Circle the correct answer)*

1. True False A schoolyard ecosystem may reduce the need for field trips.

2. True False Once established, the native plants included in the Schoolyard Ecosystems will require less water than landscaped areas of grass and non-native ornamental shrubs.

3. True False A drift fence array is used to measure the length of the ecosystem boundaries.

4. True False Trees and shrubs will dominate annually mowed areas.

5. True False No more than a dozen different bird species will use bird houses.

6. True False Existing native plants are good indicators of the type of ecosystem to be restored.

7. True False Bird counts should begin as close to sunset as possible.

8. True False A base map of the ecosystem should contain existing vegetation.

9. True False The spacing between trees and shrubs is different among all of Florida's natural ecosystems.

10. True False Regardless of size, the entire schoolyard ecosystem should be installed within one year to achieve maximum enjoyment.

FILL IN THE BLANK and SHORT ANSWERS

11. How often should newly installed plants receive water during the first 2 weeks? _____

12. PVC pipe is used to attract what kinds of animals? _____

13. What is a Dendy sampler is used for? _____

14. Name two of the many factors that should be considered when determining the best location for a schoolyard ecosystem site. _____

15. What is the name of the data that should be collected on plants and animals to see what lives on the site before you do anything to enhance the area? _____

16. Plant _____ are used to collect data from a representative sample of plants in the ecosystem area.

17. What is the name of the sampling technique used to determine if medium-sized mammals are using the site? _____

18. What is a 10-foot plastic drain tile used for? _____

19. What is the name of a designated part of the ecosystem site that will not be planted by humans?
_____

20. What important planning item can be obtained from the county property appraiser's office?

_____

Schoolyard Activities Knowledge Assessment Answer Key

Name_____ Circle one: Pre-test Post-test

Workshop Date_____ Facilitator(s):_____

TRUE-FALSE *(Circle the correct answer)*

1. True **False** The activities in the *Schoolyard Wildlife Activity Guide* were developed mainly for middle school students.

2. **True** False Every lesson in the *Schoolyard Wildlife Activity Guide* has both content knowledge and attitude objectives.

3. **True** False All of the lessons in the *Schoolyard Wildlife Activity Guide* include a component that should be completed outside.

4. True **False** The lessons in the *Schoolyard Wildlife Activity Guide* must be completed in order.

5. True **False** The *Schoolyard Wildlife Activity Guide* does not contain any lessons that focus on plants.

MUTLIPLE CHOICE *(Circle the letter of the correct answer.)*

6. The reference guide containing background information about schoolyard organisms is called the:
   A. Golden Guide to Schoolyard Wildlife
   B. Handbook to Schoolyard Plants and Animals
   C. Project WILD Schoolyard Guide
   D. Schoolyard Wildlife Activity Guide

7. The agency that funds the Florida Schoolyard Program is the:
   A. Florida Advisory Council on Environmental Education
   B. Florida Department of Education
   C. Florida Department of Environmental Protection
   D. Florida Fish and Wildlife Conservation Commission

8. Smaller components of a larger habitat are called:
   A. Habitat parcels
   B. Microclimates
   C. Microhabitats
   D. Niches

FILL IN *(Write your answers in the spaces provided.)*

9. Two examples of basic science process skills used in schoolyard lessons are **(any two of the following: observation, classification, communication, measurement, prediction, inference).**

10. The four major goals of the Schoolyard Program are knowledge, **(attitudes, behavior and conservation).**

Schoolyard Ecosystems Knowledge Assessment
Answer Key

TRUE-FALSE *(Circle the correct answer)*

1. **True** False A schoolyard ecosystem may reduce the need for field trips.

2. **True** False Once established, the native plants included in the Schoolyard Ecosystems will require less water than landscaped areas of grass and non-native ornamental shrubs.

3. True **False** A drift fence array is used to measure the length of the ecosystem boundaries.

4. True **False** Trees and shrubs will dominate annually mowed areas.

5. True **False** No more than a dozen different bird species will use bird houses.

6. **True** False Existing native plants are good indicators of the type of ecosystem to be restored.

7. True **False** Bird counts should begin as close to sunset as possible.

8. **True** False A base map of the ecosystem should contain existing vegetation.

9. **True** False The spacing between trees and shrubs is different among all of Florida's natural ecosystems.

10. True **False** Regardless of size, the entire schoolyard ecosystem should be installed within one year to achieve maximum enjoyment.

FILL IN THE BLANK/SHORT ANSWERS *(Write your answers in the spaces provided.)*

11. How often should newly installed plants receive water during the first 2 weeks? **(Daily)**

12. PVC pipe is used to attract what kinds of animals? **(Treefrogs)**

13. What is a Dendy sampler is used for? **(To sample aquatic invertebrates and other pond life)**

14. Name two of the many factors that should be considered when determining the best location for the schoolyard ecosystem site. **(any two of the following: Manageable Size, Traffic Circulation, Underground Utilities, Visibility, Aesthetics, Activities of Other Outside Activities, Drainage Patterns, Accessibility, Connection Between Upland and Wetland Areas, Existing Vegetation, Existing Natural Areas, Adjacent Land Use)**

15. What is the name of the data that should be collected on plants and animals to see what lives on the site before you do anything to enhance the area? **(Baseline)**

16. Plant **transects** are used to collect data from a representative sample of plants in the ecosystem area.

17. What is the name of the sampling technique used to determine if medium-sized mammals are using the site? **(Track stations)**

18. What is a 10-foot plastic drain tile used for? **(Provide habitat for animals that use burrows)**

19. What is the name of a designated part of the ecosystem site that will not be planted by humans? **(Natural succession area)**

20. What important planning item can be obtained from the county property appraiser's office? **(Aerial photos)**

Schoolyard Activities Attitude Assessment

Name_____ Circle one: Pre-test Post-test

Workshop Date_____ Facilitator(s):_____

INSTRUCTIONS: Please respond to these items honestly and circle your preferred response for each item. There are no right or wrong answers.

	Strongly Agree	Agree	Unsure	Disagree	Strongly Disagree
1. I prefer teaching inside a classroom because it is too difficult to manage student behavior outdoors.	SA	A	U	D	SD
2. I feel uncomfortable teaching about schoolyard organisms because I do not have access to adequate information about them.	SA	A	U	D	SD
3. I think it takes longer to plan and implement outdoor schoolyard lessons than it does to plan and implement indoor lessons.	SA	A	U	D	SD
4. I think many of my female and minority students would feel too uncomfortable participating in outdoor schoolyard lessons.	SA	A	U	D	SD
5. I think my students need to learn just as much about spiders, ants, worms, and wasps as they do about large animals like manatees, black bears, and panthers.	SA	A	U	D	SD
6. I think my students would rather have class in an outdoor schoolyard than have class in our regular room.	SA	A	U	D	SD
7. I would need to purchase many expensive supplies in order to conduct outdoor schoolyard lessons on a regular basis.	SA	A	U	D	SD
8. Outdoor schoolyard activities are fun but they won't really help me address the Sunshine State Standards.	SA	A	U	D	SD
9. I think it is my responsibility as a teacher to focus on attitudes and responsible behaviors just as much as I focus on increasing student knowledge about local ecosystems and the organisms living in them.	SA	A	U	D	SD
10. I would like to conduct outdoor schoolyard activities at least once every two weeks.	SA	A	U	D	SD

Schoolyard Ecosystems Attitude Assessment

Name_____ Circle one: Pre-test Post-test

Workshop Date_____ Facilitator(s):_____

INSTRUCTIONS: Please respond to these items honestly and circle your preferred response for each item. There are no right or wrong answers.

	Strongly Agree	Agree	Unsure	Disagree	Strongly Disagree
1. Animals like frogs, snakes and mice are really not important to a schoolyard ecosystem.	SA	A	U	D	SD
2. It is important to enhance the diversity of native plants and animals on school property.	SA	A	U	D	SD
3. Ecosystem restoration activities on school property can help some threatened or endangered species.	SA	A	U	D	SD
4. The best way for students to learn about their natural environment is to watch videos.	SA	A	U	D	SD
5. Most students have no interest in finding out what animals live on school campuses.	SA	A	U	D	SD
6. I do not have the knowledge or skills to lead a project to enhance wildlife habitats on our school campus.	SA	A	U	D	SD
7. It is more important for school campuses to look manicured than to provide good habitats for wildlife.	SA	A	U	D	SD
8. Wildlife has plenty of good habitats without our help.	SA	A	U	D	SD
9. Schoolyard ecosystems can provide excellent learning environments for a variety of school topics.	SA	A	U	D	SD
10. Because Florida's wildlife belongs to all residents, good stewardship activities on school campuses are appreciated by more than just students and teachers.	SA	A	U	D	SD

Schoolyard Activities Attitude Assessment Answer Key

INSTRUCTIONS: Please respond to these items honestly and circle your preferred response for each item. There are no right or wrong answers.

	Strongly Agree	Agree	Unsure	Disagree	Strongly Disagree
1. I prefer teaching inside a classroom because it is too difficult to manage student behavior outdoors.	SA	A	U	D	**SD**
2. I feel uncomfortable teaching about schoolyard organisms because I do not have access to adequate information about them.	SA	A	U	D	**SD**
3. I think it takes longer to plan and implement outdoor schoolyard lessons than it does to plan and implement indoor lessons.	SA	A	U	D	**SD**
4. I think many of my female and minority students would feel too uncomfortable participating in outdoor schoolyard lessons.	SA	A	U	D	**SD**
5. I think my students need to learn just as much about spiders, ants, worms, and wasps as they do about large animals like manatees, black bears, and panthers.	**SA**	A	U	D	SD
6. I think my students would rather have class in an outdoor schoolyard than have class in our regular room.	**SA**	A	U	D	SD
7. I would need to purchase many expensive supplies in order to conduct outdoor schoolyard lessons on a regular basis.	SA	A	U	D	**SD**
8. Outdoor schoolyard activities are fun but they won't really help me address the Sunshine State Standards.	SA	A	U	D	**SD**
9. I think it is my responsibility as a teacher to focus on attitudes and responsible behaviors just as much as I focus on increasing student knowledge about local ecosystems and the organisms living in them.	**SA**	A	U	D	SD
10. I would like to conduct outdoor schoolyard activities at least once every two weeks.	**SA**	A	U	D	SD

Schoolyard Ecosystems Attitude Assessment Answer Key

NOTE: This instrument should be used for diagnostic purposes only. It can be used to document changes in participants' attitudes as a result of the workshop. Some of these items do not have a clearly preferred view overall; however, from a systems-centered perspective, the responses chosen here represent preferred scientifically-based attitudes. Unfortunately, all of these items are related to extremely complex management and conservation issues with multiple ethical, economic, and legal implications. Facilitators need to make sure they do not try to impose their personal attitudes regarding these issues on workshop participants.

INSTRUCTIONS: Please respond to these items honestly and circle your preferred response for each item. There are no right or wrong answers.

	Strongly Agree	Agree	Unsure	Disagree	Strongly Disagree
1. Animals like frogs, snakes and mice are really not important to a schoolyard ecosystem.	SA	A	U	D	**SD**
2. It is important to enhance the diversity of native plants and animals on school property.	**SA**	A	U	D	SD
3. Ecosystem restoration activities on school property can help some threatened or endangered species.	**SA**	A	U	D	SD
4. The best way for students to learn about their natural environment is to watch videos.	SA	A	U	D	**SD**
5. Most students have no interest in finding out what animals live on school campuses.	SA	A	U	D	**SD**
6. I do not have the knowledge or skills to lead a project to enhance wildlife habitats on our school campus.	SA	A	U	D	**SD**
7. It is more important for school campuses to look manicured than to provide good habitats for wildlife.	SA	A	U	D	**SD**
8. Wildlife has plenty of good habitats without our help.	SA	A	U	D	**SD**
9. Schoolyard ecosystems can provide excellent learning environments for a variety of school topics.	**SA**	A	U	D	SD
10. Because Florida's wildlife belongs to all residents, good stewardship activities on school campuses are appreciated by more than just students and teachers.	**SA**	A	U	D	SD

SCHOOLYARD ECOSYSTEMS FOR FLORIDA
SLIDE SET NARRATIVE

[LIGHTS ON: Introduction]

A native ecosystem is a place where living and nonliving elements interact in a condition that has been relatively unchanged by humans. Living elements include plants that fix energy from the sun and manufacture food for the other living elements, animals. Nonliving elements include things such as soil, water, and minerals that are important for the survival of plants and animals.

Most schoolyards are developed sites where natural ecosystems have been drastically changed by human activity. There are many opportunities for us to be respectful members of these ecosystems by restoring or putting back some natural elements. Today I will give you the tools to re-create ecosystems on schoolyards in Florida. During the rest of this workshop, I will illustrate various concepts with slides. We will stop the slide show three times to conduct hands-on activities related to the concepts just discussed. The first topics are Benefits of Schoolyard Ecosystems, Planning, and Locating a Site.

[LIGHTS OUT: Begin Slides]

1

SCHOOLYARD ECOSYSTEMS IN FLORIDA

Hundreds of people have participated in the Schoolyard Ecosystems for Florida Program. It has won 2 conservation education awards.

2

WHY DEVELOP A SCHOOLYARD ECOSYSTEM?

A Schoolyard Ecosystem is more than just a nature trail or a butterfly garden. A true Schoolyard Ecosystem is a restored habitat containing plants and animals native to the area in which a particular school is located. A wide variety of educational and environmental benefits can result from developing one of these dynamic systems on your school campus.

[MAKE THE FOLLOWING INTERACTIVE AND ASK IF PARTICIPANTS AGREE OR HAVE EXPERIENCED EACH OF THESE BENEFITS]

3

EDUCATIONAL BENEFITS

- Developing positive attitudes toward the environment
- Presenting information relevant to Florida
- Helping students learn environmental concepts
- Minimizing the need for field trips
- Providing opportunities for community involvement
- Providing permanent sites for environmental education

By the time most students reach middle school, their interest in studying natural environments is limited and their attitudes toward the natural environment are primarily neutral or negative. This trend can be reversed if students are exposed to, and learn about, natural ecosystems at an early age.

Students are more motivated to learn about scientific concepts when local, familiar, accessible examples are used instead of examples of species living somewhere other than Florida.

By directly observing a natural environment, students will better understand complex concepts such as food webs, succession and symbiotic relationships in the students' own environment.

Schools can use their own schoolyard ecosystems to conduct ongoing outdoor environmental education activities on a weekly or daily basis reducing the need for costly field trips.

Parents, businesses, and other segments of the local community can assist in the design, preparation, construction, and/or maintenance of the site as well as use it for their own recreational purposes.

Schoolyard ecosystems can be used to implement environmental education activities and programs both before and after the site is restored to study the effects of these efforts. Appendix L in the Schoolyard Ecosystem Guidebook provides excellent information regarding which ecosystem components you can add to the site and also use in various activities mentioned in the Schoolyard Wildlife Activity Guide.

[ASK IF PARTICIPANTS CAN THINK OF ANY MORE EDUCATIONAL BENEFITS]

4

ENVIRONMENTAL BENEFITS

- Reducing risks of skin cancer
- Restoring degraded habitat
- Instilling a sense of land ethic
- Conserving water use on campus
- Improving the quality of water run-off

Most school campuses are not shaded and physical activities are conducted in areas where students are unprotected from the sun. Taking protective measures such as wearing hats, applying sunscreen, and planting trees that provide shade will reduce exposure to the sun.

Native ecosystems on school campuses can help preserve species of wildlife and plant life by providing viable habitats where they can thrive.

Those who participate can develop a greater sense of ethics when dealing with the environment directly, and will be better equipped to make responsible decisions about environmental issues in the future.

Once established, the native plants included in schoolyard ecosystems will require no use of chemical poisons and less water than landscaped areas of typical lawn grass and many non-native ornamental shrubs.

Water flowing over exposed soil into rivers, ponds and lakes can significantly reduce the clarity and quality of water, which can harm or kill wildlife. Water contaminated with high nitrogen fertilizers and pesticides/herbicides also harms and kills wildlife.

[ASK IF PARTICIPANTS CAN THINK OF ANY MORE ENVIRONMENTAL BENEFITS]

5

PLANNING

- **Who Needs to be Involved?**
- Concerns to be Discussed
- 2 Scales – Campus-wide and Study Site

For the next few minutes, we will be talking about the planning phase of a Schoolyard Ecosystem. A Schoolyard Ecosystem Committee needs to be organized. You'll find a list of potential members of a committee on page 8 of your guidebook. Students can learn as much from the planning and building stages of the project as they can when the Ecosystem is complete.

6

PLANNING

- Who Needs to be Involved?
- **Concerns to be Discussed**
- 2 Scales – Campus-wide and Study Site

The Committee should discuss several concerns, such as safety, vandalism, and funding, and develop strategies to deal with each concern.

7

PLANNING

- Who Needs to be Involved?
- Concerns to be Discussed
- **2 Scales – Campus-wide and Study Site**

Two basic plans are needed for the schoolyard ecosystem project. The Campus-wide Ecosystem Restoration Plan is a basic map of the entire campus that indicates the usage of different zones. There is usually a physical education field zone, as well as zones for retention ponds, parking, future building expansion, natural areas and a Schoolyard Ecosystem Study Site.

8

RESTORE NATIVE ECOSYSTEMS IN UNUSED OPEN AREAS

The Study Site should be restored as closely as possible to its natural, original ecosystem. It is the major focus for school-based environmental education programs and therefore receives the most attention in the restoration process.

9-12

(4 slides of different school campuses)

Invite participants to offer their impressions of the relative educational and environmental values of these sites.

CAMPUS-WIDE SCALE
● Select the Appropriate Ecosystem 1) Original Ecosystem 2) Soil Type 3) Most Common Ecosystem in Vicinity 4) Native Ecosystems desired for Educational Purposes 5) Existing Native Vegetation

Several different ecosystems occur throughout Florida. We will look at some photos of these during our next activity. Your selection of the ecosystem you want to restore should be based on one or more of these variables. There are several good activities, such as "Down and Dirty" in the Water Resources Activity Pack, students can use to test the suitability of soil for different plants.

14

CAMPUS-WIDE SCALE
● Helpful Resources 1) Historic Records 2) County Soil Survey 3) Records from Local Foresters

When selecting an ecosystem the following resources may be helpful:

1) Historic records of land use on the school site;
2) County soil survey, which can be found at the local library or at the U.S. Dept. of Agriculture Soil Conservation Office;
3) Records from local foresters of original ecosystems in your area.

15

(Slide of the FWC's map of land cover types of Florida)

Ask participants to name the dominant land cover and native ecosystems in their local area.

16

STUDY SITE LOCATION CONSIDERATIONS
• Manageable Size • Traffic Circulation • Underground Utilities • Visibility • Aesthetics • Other Outside Activities • Accessibility • Connection Between Upland and Wetland Areas • Existing Vegetation • Existing Natural Areas • Adjacent Land Use • Drainage Patterns • Site Plan of School Campus

Many factors should be considered before selecting the final location of the Schoolyard Ecosystem Site.

17

[STOP SLIDES: Conduct Activities to Determine Ecosystem Type and Site Location]

18

BASELINE (Pre-ecosystem installation) DATA COLLECTION

- Student, Teachers and Volunteers
- Plants
- Animals

During this section, we will discuss the importance of and how to collect baseline data on students, teachers, volunteers, plants and animals.

19

BASELINE INFORMATION ON STUDENT, TEACHER, AND VOLUNTEER KNOWLEDGE, ATTITUDES, AND ENVIRONMENTAL ACTION

Collecting data on existing environmental knowledge, attitudes and behaviors of students, teachers and volunteers with the evaluation forms you filled out at the beginning of this workshop is critical for assessing the impacts of this project.

20

BASELINE INFORMATION ON PLANTS AND ANIMALS
(Picture of a Hooded Warbler)

Baseline data also need to be collected on plants and animals to see what lives there before you do anything to enhance the area. Periodic follow-up surveys will show if your restoration efforts improved habitat quality and to what degree habitat quality has improved.

21

SURVEY PLANTS

- Compare to Natural Ecosystems
- Document with Photographs
- Measure Plant Density
- Use Plant Transects

There are several ways you can collect baseline information on plants. Visit a local mature natural ecosystem and observe the various layers of plants, such as tall trees, understory trees, shrubs, and herbaceous and grasslike plants, all of which are required to sustain various species of wildlife. Remember the photos we looked at during our planning activity. This will allow you to compare your new ecosystem to one that is established and successful so that you can see exactly what you are doing correctly and incorrectly.

22

SURVEY PLANTS

- Compare to Natural Ecosystems
- **Document with Photographs**
- Measure Plant Density
- Use Plant Transects

Document the changes taking place in your ecosystem by taking annual photographs. Pictures should be taken from permanent photo stations that ensure that photos are taken from the same angle each time.

23

SURVEY PLANTS

- Compare to Natural Ecosystems
- Document with Photographs
- **Measure Plant Density**
- Use Plant Transects

High plant density ensures many hiding, nesting and feeding places for animals. It should be measured at regular time intervals so that density measurements can be compared between years and seasons. The measurement procedure is outlined in your guidebook.

24

SURVEY PLANTS

- Compare to Natural Ecosystems
- Document with Photographs
- Measure Plant Density
- **Use Plant Transects**

Estimate a plant variable by measuring the plants found in fixed representative sample areas established along parallel transects. Transects should be at least 10 meters long and about 5 meters apart. Walk along each side of the transect holding a meter stick perpendicular to the transect. Record data from all woody plants the meter stick touches.

25

SURVEY ANIMALS

- **Invertebrates, Amphibians, and Reptiles**
- Mammals
- Birds
- Pond Life

Use a two-bucket drift fence array to survey invertebrates, amphibians, and reptiles. At least five meters from the edge of your ecosystem, dig a hole 0.7 meters deep and 0.3 meters wide. Make several 1/4-inch holes in the bottom of two 5-gallon plastic buckets. Place one bucket in the hole so that the top is level with the ground surface. Dig a second hole for the second bucket. Cut one 1-cm wide slit in each bucket and slide a 10 x 1 foot board between the buckets into the slits. Animals will walk or crawl up to the board and into either bucket.

26

Funnel Trap

Funnel traps can be easily constructed by stapling window screening. Reptiles and amphibians can enter, but have difficulty finding their way out.

27

Treefrog House

Plastic PVC pipes are useful for surveying treefrogs. Push a 2 to 4-foot long 1 1/2 inch diameter piece of PVC pipe vertically about 15 cm deep into the ground. Check for treefrogs by looking into the pipe with a flashlight.

28

SURVEY ANIMALS

- Invertebrates, Amphibians, and Reptiles
- **Mammals**
- Birds
- Pond Life

Larger mammals do not need to be caught to be recorded. Numbers of medium-sized mammals can be recorded with track stations. A track station consists of a bare soil area, 1 meter in diameter, covered with a layer of Quick Crete and baited in the center. Survey small mammals by using Sherman livetraps, outlined in Appendix J of your guidebook.

29

SURVEY ANIMALS

- Invertebrates, Amphibians, and Reptiles
- Mammals
- **Birds**
- Pond Life

Use a stationary count method to detect birds in layers of vegetation. At least one station located about 15 meters from the ecosystem allows the recorder to see birds without frightening them. Bird counts should begin as close to sunrise as possible on calm, clear mornings.

30

SURVEY ANIMALS

- Invertebrates, Amphibians, and Reptiles
- Mammals
- Birds
- **Pond Life**

It is very important that students remember to wash their hands thoroughly after surveying pond life. Also, use caution when handling pond organisms because some can bite. Use a Multi-plate or Dendy pond sampler to collect aquatic insect larva and other organisms.

31

[STOP SLIDES: Participants Conduct Plant and Animal Survey Activities as Just Described]

32

MAPPING: MATERIALS NEEDED

- **Site Plan of the School Campus**
- Land Use Plan
- Existing Utility locations
- Aerial Photograph
- Soils Map

Now we are going to discuss how to create a base map of the site where you want to install your Schoolyard Ecosystem. First obtain a site plan of your campus from the district office if your school does not have one. Elements such as buildings, parking areas, utilities, roads and retention areas should be clearly identified on the map, as well as locations for future planning. This will help you to avoid planting in areas where problems may occur.

33

MAPPING: MATERIALS NEEDED

- Site Plan of the School Campus
- **Land Use Plan**
- Existing Utility locations
- Aerial Photograph
- Soils Map

Each Florida city and county has a comprehensive land use plan. It outlines how the community is preparing to deal with expansion. Use this to see how your school will deal with upcoming changes taking place in your community.

34

MAPPING: MATERIALS NEEDED

- Site Plan of the School Campus
- Land Use Plan
- **Existing Utility locations**
- Aerial Photograph
- Soils Map

Call local utilities agencies to find out the location of pipes and lines beneath the ground.
This will avert many problems that could occur when digging.

35

MAPPING: MATERIALS NEEDED
• Site Plan of the School Campus • Land Use Plan • Existing Utility locations • **Aerial Photograph** • Soils Map

An aerial photograph, which can be obtained from the county property appraiser's office, will stimulate curiosity in students and provide them with an awareness of their surroundings on a different scale.

36

MAPPING: MATERIALS NEEDED
• Site Plan of the School Campus • Land Use Plan • Existing Utility locations • Aerial Photograph • **Soils Map**

A local U.S.D.A. soil conservation agent and materials from this office can provide descriptions of soil and their suitability for certain plants.

37

PREPARE A GRID ON THE SITE (Photo of students standing in a grid pattern)

Lay out a square or rectangular checkerboard grid on the ground using lime, stakes and string, or nontoxic spray paint for the lines. The grid should encompass the entire site planned for the Ecosystem.

38

PREPARE A GRID ON THE SITE	
(Photo showing how to spray paint grid coordinates)	(Photo showing sketch from guidebook showing grid pattern on a site)

Draw or paint lines every five meters beginning at an easily recognizable fixed mark.

39

ORIENT THE MAP TO THE SITE

Students should help in the outlining process. By working in groups with copies of the gridded "Schoolyard Ecosystem Plan," students should orient themselves in the proper direction and outline the site by relating the grid on the ground to the one on paper.

40

ADD EXISTING OBJECTS TO THE MAP	
(Sketch from guidebook showing students mapping objects)	(Sketch from guidebook showing objects such as trees included on map)

Use one corner of the grid as the starting point (coordinates 0,0 on a graph) and find the coordinates of trees and other fixed objects within the Ecosystem site. Students should record these objects onto their gridded map paper. Draw and label each object.

41

ADD TRAILS TO THE MAP
☐ At least 2-meters wide
☐ Tie into school's existing pathways

Trails should be at least 2 meters wide and begin and end at an appropriate junction that ties into the school's existing pathways.

42

DESIGNATE NATURAL SUCCESSION AND ANNUALLY MOWED AREAS

The natural succession area will not be planned or maintained by humans. Instead, it will gradually evolve into the same type of ecosystem that the students and volunteers planned and installed. The students will be able to draw comparisons between the ecosystem they planned and the one that evolved naturally.

43

DEVELOP A PERCEPTION OF PLANT ARRANGEMENT	
(Photo of Hardwood Hammock)	(Photo of North Florida Flatwoods)

Study the natural arrangement of plants in the ecosystem you selected. Do not copy the ecosystem exactly, for no two natural environments are exactly alike. Instead, look at the spacing between plants and how much light this will enable plants to receive.

44

ADD PLANTS TO THE MAP

Students should use the templates in the guidebook when adding plants to the map layout. They should use different colors for different groupings of plants on the map. For example, all the small shrubs would be one color and all the large scrubs would be another color. This will be helpful when they select the individual plants that will be used in their schoolyard. They should then cut out all the colored plant templates and glue them onto their plans.

45

ADD NON-PLANT ELEMENTS

Non-plant elements, like bird houses, rock piles, underground burrows, bat houses, treefrog houses, and benches should be placed close to the trail so that visitors to the ecosystem can see them easily. But these elements should not be so close that they are subjected to frequent disturbance. When adding these elements to the map students should use the same techniques that they did when adding plants.

46

DEVELOP A MASTER PLAN

Now that you have several plans designed by students for the same project, you need to develop a final master plan. Try to incorporate as many of the students' ideas as possible to create a sense of ownership and pride in the project. If you need help doing this, a landscape architect may be a tremendous help.

47

LABEL THE PLANTS

Find a list of the plants that naturally occur in the type of ecosystem you have chosen. Use the list in Appendix E to indicate the species name of each plant on your Master Plan. Make sure your plants are characteristic of the ecosystem you have chosen and that you have as many different species as is possible. Also, make sure you have included plants found in Appendix J of your guidebook, which are necessary to conduct the activities in the Schoolyard Wildlife Activity Guide.

48

PREPARE COST FORMS

List the common and scientific names of all trees and shrubs that you will use in your ecosystem in the appropriate columns of the "Plant Materials Cost Form." The form is found in Appendix F of the guidebook. Count the number of individuals of each species and enter these also. Enter each container size (usually in gallons) and the "total cost" (Number X Cost/Plant) for each species. Fill out the "Non–Plant Materials Form" by recording the number and cost of each birdhouse, bench, etc.

49

HOW MUCH SHOULD YOU TACKLE?

Once you determine the total cost of installation of the entire project, it may be necessary to complete the job in stages as funding comes in from donors, fundraisers and grants. Prepare a time schedule to help schedule donations when they are needed. You don't want to accept a donation of plant materials and not be able to put them into the ground right away.

50

[STOP SLIDES: Participants Conduct Mapping Activities as Just Described and Demonstrate Various Non-plant Elements]

51

INSTALLATION AND MAINTENANCE

Now we are almost ready to install our ecosystem. First we need to transfer the grid that you originally drew on paper to the ground using string and tape, wooden stakes, lime or nontoxic spray paint. By doing this, information can easily be transferred from the master plan to the site. Remove sod. If you choose to use herbicides, beware of the impacts on water and environmental quality. Students should not be exposed to these chemicals nor taught to use them. Collect all debris.

52

INSTALL TRAILS

A simple but effective way to install trails is to:
(1) excavate the trail, 5-8 cm deep
(2) lay a weed barrier over the excavated area
(3) place mulch over the weed barrier

53

PUT PLANTS IN THE RIGHT PLACE (reverse the mapping process)

Now you basically just reverse the mapping process that you did before. This time you are using the map to find locations on the ground.

54

PUT PLANTS IN THE GROUND
- ☐ Trees and Shrubs
- ☐ Perennials and Ground Covers
- ☐ Seeding Native Grasses and Annual Wildflowers

After you have put all of the plants in the proper place according to the map, start putting them in the ground. For trees and shrubs, dig a hole for each plant that is a little wider than the container it came in or than the root ball. The hole should be the same depth as the root ball or container. Carefully remove the plants from their containers and backfill around the soil that came with the plant. Place a layer of mulch 5-cm deep around the plant, avoiding contact with the stem.

For perennials and ground covers, prepare an entire bed by shoveling the area to a depth of 15 cm. Rake the bed to create a smooth surface and sow seeds on the surface of the soil.

Areas to be seeded should be stripped of their sod during site preparation. Organic matter, such as compost, manure or peat, should be tilled into the soil. Smooth the surface of the seedbed with a rake.

55

INSTALL NON-PLANT ELEMENTS

Non-plant elements can be added at any time. These items include various types of birdhouses, burrows, treefrog houses, rock and brush piles, bird and squirrel feeders and ponds.

56

ADD SIGNAGE

Include an entry sign, which illustrates the school's name and the special purpose of the site. Signs with names of plant and non-plant elements, donors and participants can also be added.

57

MAINTAIN

- ☐ Water
- ☐ Mow
- ☐ Prune and Weed
- ☐ Retain Snags
- ☐ Fertilize and Treat Diseases and Plant Pests

Mortality rates of plants are highest during the first few weeks. Monitor the Schoolyard Ecosystem closely during this time and pay close attention to moisture needs.

Irrigate by providing water to individual plants, not by spraying water throughout. Water daily for the first 2 weeks, 3 time per week for the next 2 months, and weekly for the next 6 months.

The location of the mow line relative to the edge of a tree line is critical. Proceed with care when mowing so as not to damage young plants. Keep mulch area around the base of each plant and do not use "weed eaters" to trim grass or weed around woody plants.

Keep pruning to a minimum. Only prune to:

1) rejuvenate older or weaker plants;
2) thin out areas of dense growth;
3) remove certain diseased plants or parts of plants;
4) remove dead limbs or trees that could threaten the safety of children.

Fertilizing is not encouraged because it disrupts the processes of natural selection and natural succession. However, spot fertilizing may be beneficial when planting in infertile soils; to increase the growth rate of climax species or replacement plants; and to provide an initial source of nutrients for aquatic plants.

Controlled infestations of some weeds, diseases, and animal pests should be allowed and periodically inspected by a person who is knowledgeable about environmentally sound management practices. Do not employ someone who will just spray chemicals.

58

MONITOR CHANGES (people, plants and animals)	
(Photo of Talbot Elementary Site in 1992)	(Photo of Talbot Elementary Site in 2000)

Use the same methods that you used to collect your baseline information to determine changes in people, plants and animals.

59

HOW MUCH CAN YOU PUT BACK ON YOUR SCHOOLYARD?

[LIGHTS ON, CONCLUSION]

Recreating native environments on Florida's school campuses benefits the environment, the students, and the community as a whole. It is a unifying project that the entire community can become involved in and it provides a valuable learning tool for students at every stage of its development.

Throughout this project, those involved will learn just how connected we are to the environment and to each other. Through concrete examples and hands on experience, students will learn the importance of restoring the respective habitats of various plants and animals. The Schoolyard Ecosystems of Florida Program lets them take responsibility for, and ownership of, a special piece of land on their campuses, which may improve their attitudes toward environmental issues. This may also increase the likelihood that they will become involved in other positive environmental actions in the future.

[OPEN THE DISCUSSION TO QUESTIONS FROM THE PARTICIPANTS]

SCHOOLYARD SAFARI

Name_____ Date_____

PART 1. USE THE *HANDBOOK* TO ANSWER THESE QUESTIONS.

1. What is the target audience of the *Handbook*?

2. What major Florida habitat contains the driest and most nutrient poor vegetation?

3. Name one "Leggy thing that isn't a spider."

4. What is frass?

PART 2. USE THE *ACTIVITY GUIDE* TO ANSWER THESE QUESTIONS.

5. Name one type of "Interaction between hungry organisms and food organisms that want to be eaten."

6. What are the two categories of science process skills?

7. Which lessons focus at least partially on mushrooms and other fungi?

8. Which lessons can be conducted in Grade 2?

9. How many lessons are designed specifically for auditory learners?

10. Which process skill is addressed in every lesson in the *Activity Guide*?

PART 3. REFER TO LESSON EIGHT-"ANTWICHES" TO ANSWER THESE QUESTIONS.

11. Answer the following background questions:

    a. Do ants have wings?

    b. How many body parts do ants have?

    c. Are most ants social?

    d. What do worker ants do?

    e. What chemical do ants use to protect themselves and the colony

    f. Name three kinds of ants that are common in schoolyards.

12. What is the total minimum and maximum amount of time required to complete this lesson?

13. Could this lesson be done on a cold January day?

14. What is the attitude objective of this lesson?

15. What item would be helpful but not essential for this lesson?

16. What other lesson is an extension of this one?

SCHOOLYARD SAFARI ANSWER KEY

PART 1. USE THE *HANDBOOK* TO ANSWER THESE QUESTIONS.

1. What is the target audience of the *Handbook*? (*People who work with elementary school children)*

2. What major Florida habitat contains the driest and most nutrient poor vegetation? (*Sand pine scrub*)

3. Name one "Leggy thing that isn't a spider." (*Harvestmen or daddy-long-legs*)

4. What is frass? (*The droppings of a leaf-eating insect such as a caterpillar*)

PART 2. USE THE *ACTIVITY GUIDE* TO ANSWER THESE QUESTIONS.

5. Name one type of "Interaction between hungry organisms and food organisms that want to be eaten." (*Interactions between fruits and fruit-eaters or interactions between flowers and pollinators*)

6. What are the two categories of science process skills? (*Basic and integrated*)

7. Which lessons focus at least partially on mushrooms and other fungi? (*Lessons 6 and 30*)

8. Which lessons can be conducted in Grade 2? (*Lessons 1, 11, 17, 18, and 20*)

9. How many lessons are designed specifically for auditory learners? (*Four)*

10. Which process skill is addressed in every lesson in the *Activity Guide*? (*Observation*)

PART 3. REFER TO LESSON EIGHT-"ANTWICHES" TO ANSWER THESE QUESTIONS.

11. Answer the following background questions:

    a. Do ants have wings? (*Only reproductive adults have wings*.)

    b. How many body parts do ants have? (*Three*)

    c. Are most ants social? (*Yes*)

    d. What do worker ants do? (*Build or dig the nest, gather food, care for larvae and pupae*)

    e. What chemical do ants use to protect themselves and the colony? (*Formic acid*)

    f. Name three kinds of ants that are common in schoolyards. (*Yellow cone ant, fire ant, southeastern harvester ant, big-headed ant, northern fungus growing ant, crazy ant, winter ant, carpenter ant*)

12. What is the total minimum and maximum amount of time required to complete this lesson? (*45 to 65 minutes*)

13. Could this lesson be done on a cold January day? (*No*)

14. What is the attitude objective of this lesson? (*Become aware that humans often bias decisions regarding environments by viewing them only from a human perspective and scale*)

15. What item would be helpful but not essential for this lesson? (*Ant farm*)

16. What other lesson is an extension of this one? (*Ant views)*

SCHOOLYARD ECOSYSTEMS TREK

Name_____ Date_____

EXPLORE THE ENTIRE *GUIDE* TO ANSWER THESE QUESTIONS.

1. What is the common name of the only small shrub listed for Sandhill Plants that can live in the shade?
   _____

2. What is the title of the fifth row in the Animal Survey Data Sheet's Survey Data Table?
   _____

3. What are the two basic plans needed?
   _____

4. What are the three safety considerations during site selection and use?
   _____

5. Ecosystem conservation is an approach used to protect, maintain and restore all (or as much as possible) of the natural living and nonliving ecosystem elements and their _____?
   _____

6. What is the third material needed on the list for the CERP?
   _____

7. What are the two categories of benefits that can result from developing a schoolyard ecosystem?
   _____

8. What is the fourth item listed in the Schoolyard Ecosystem Planning Checklist under Installation?
   _____

9. A plant transect should be at least how many meters long?
   _____

10. Who is the first person listed on the potential members of the Schoolyard Ecosystem Committee?
    _____

11. How large should the buckets be for the drift fence arrays?
    _____

12. How many native mammal species are there in Florida?
    _____

13. What is the recommended procedure for removing trees and shrubs from plastic containers?
    _____

14. What are the animals listed that will use the non-plant ecosystem element burrows?
    _____

15. What is the scale recommended on the Gridded Map Paper?
    _____

16. What is the recommended size of the entrance hole for an Eastern bluebird house?

    _____

17. How many species in the treefrog family live in Florida and might use a treefrog house?

    _____

18. What is the first resource listed that will be helpful in your selection of ecosystems?

    _____

19. What is title of the fourth column on the Plant Materials Cost Form?

    _____

20. What is Step 5 of preparing a SESS?

    _____

SCHOOLYARD ECOSYSTEMS TREK ANSWER KEY

1. What is the common name of the only small shrub listed for Sandhill Plants that can live in the shade? *(American beautyberry)*

2. What is the title of the fifth row in the Animal Survey Data Sheet's Survey Data Table? *(Sex)*

3. What are the two basic plans needed? *(Campus-wide Ecosystem Restoration Plan, and Master Plan for the Schoolyard Ecosystem Study Site)*

4. What are the three safety considerations during site selection and use? *(Potentially harmful animals, potentially harmful plants, and water concerns)*

5. Ecosystem conservation is an approach used to protect, maintain and restore all (or as much as possible) of the natural living and nonliving ecosystem elements and their _____? *(Interactions [functions] to a particular site)*

6. What is the third material needed on the list for the CERP? *(Existing utility locations)*

7. What are the two categories of benefits that can result from developing a schoolyard ecosystem? *(Educational and Environmental)*

8. What is the fourth item listed in the Schoolyard Ecosystem Planning Checklist under Installation? *(Site preparation)*

9. A plant transect should be at least how many meters long? *(10)*

10. Who is the first person listed on the potential members of the Schoolyard Ecosystem Committee? *(Principal)*

11. How large should the buckets be for the drift fence arrays? *(5-gallon)*

12. How many native mammal species are there in Florida? *(94)*

13. What is the recommended procedure for removing trees and shrubs from plastic containers? *(Lay the container on its side, gently squeeze the container to loosen the plant and soil, try to remove the plant by gently pulling on the trunk and the soil ball while also actually pouring the plant out)*

14. What are the animals listed that will use the non-plant ecosystem element burrows? *(Frogs, toads, snakes, lizards, turtles, mice and insects)*

15. What is the scale recommended on the Gridded Map Paper? *(1 centimeter = 1 meter)*

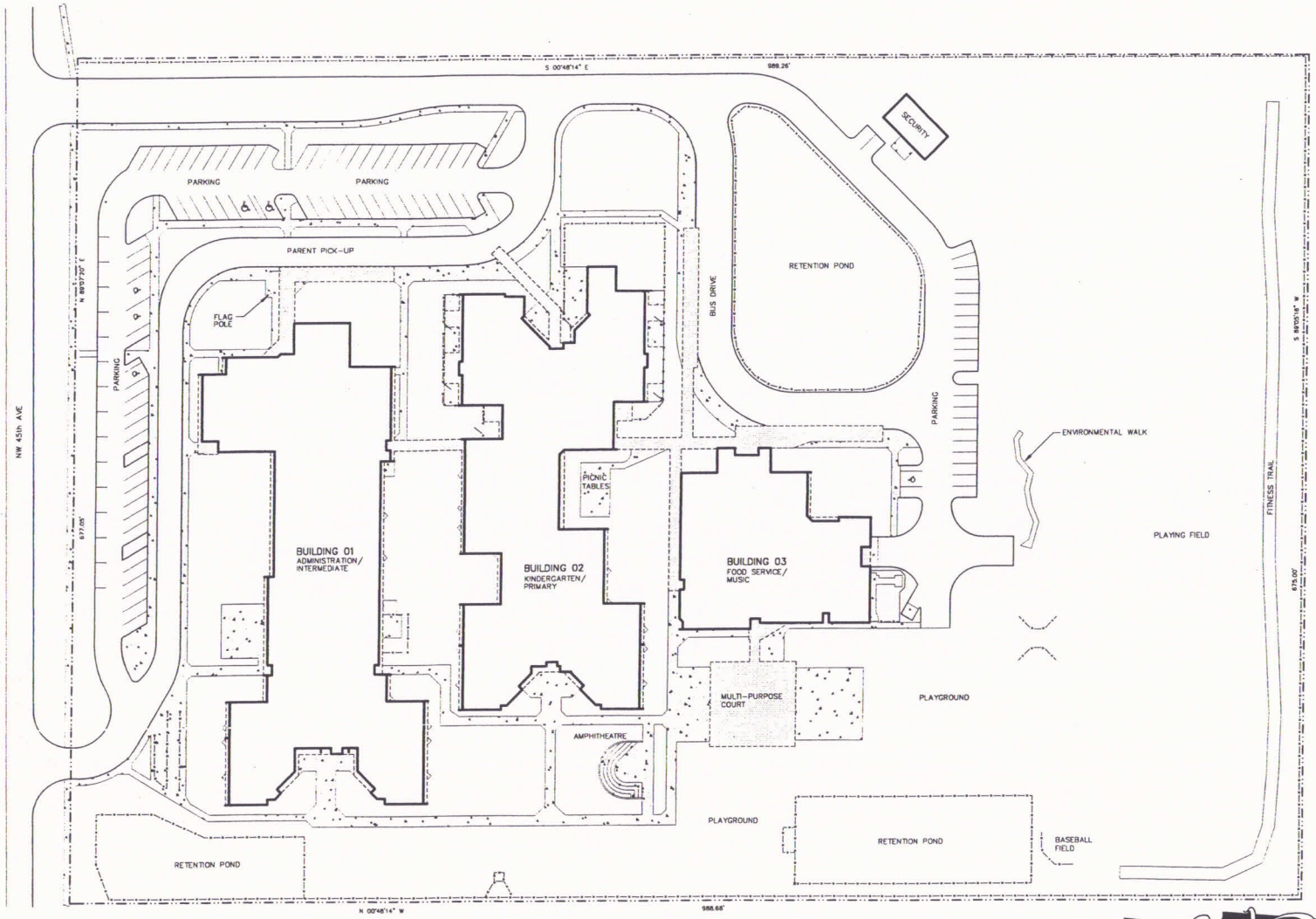
16. What is the recommended size of the entrance hole for an Eastern bluebird house? *(1 1/2 inches)*

17. How many species in the treefrog family live in Florida and might use a treefrog house? *(15)*

18. What is the first resource listed that will be helpful in your selection of ecosystems? *(Historic records of land use on the school site)*

19. What is title of the fourth column on the Plant Materails Cost Form? *(Size)*

20. What is Step 5 of preparing a SESS? *(Record All Existing Objects Onto the Paper)*



SITE PLAN

40' 0 40' 80'

SCALE FEET

0038s.dwg 3-5-99 9:52:47 am ES1

school board of alachua county
facilities department
1500 e. university avenue
gainesville, florida 32641
phone (352)955-7400

"BUILDING BETTER SCHOOLS"

project title: FISH SITE PLAN

sheet title: NORTON ELEMENTARY SCHOOL
2200 NW 45th AVE., GAINESVILLE FL 32605

revisions	
date	description

scale:
date: 03/05/99
drawn: JSR
checked:
admin. no.: 0038

38

Surveying Plants and Wildlife[1]

Joe Schaefer and George Tanner[2]

Periodically surveying the plant and wildlife species on your property will help you evaluate the success of your ecosystem conservation efforts. Success, of course, is a relative term. You first have to know what you wanted to accomplish before you can determine if you were successful. Plant and wildlife surveys will help you determine if a plant community, habitat values, or number of wildlife species on a particular site haave changed over time.

Designing Surveys

Baseline Survey

Not all sites have the same habitat values one, two, three, or more years after your conservation practices begin. Each site is unique, and the only way to evaluate success of your efforts is to establish some baseline values to which comparisons can be made in the future.

Before you add plants and other habitat features, burn, or implement some other conservation practice, make a baseline survey or inventory of the site. Data should be collected on both the plant and animal components of the area. It is important to develop standard measuring techniques to use at regular intervals so comparisons across years, and in some situations, among different areas within a site, will be meaningful.

> *For example, are more wildlife species found in areas where there are more species of plants or in the areas of greatest canopy cover?*

Survey Schedule

Surveys can be conducted for one week during each season as well as annually so comparisons can be made. Plants do not move around, so they can be surveyed in a single day. Animals do move and their activity patterns are impacted by daily weather conditions. That's why several days of sampling are needed to determine which species are present. A survey schedule might consist of preparing the survey equipment and, if necessary, setting the traps on Monday and then checking the traps and conducting the surveys on Tuesday through Friday.

Each survey should be conducted at the same place every time it is repeated (i.e., each season or each year). You will need to prepare a map showing the locations of all survey sites.

Surveying Plants

Plants are the most dominant features of any ecosystem: Their composition, diversity, and structure will directly affect which animals can live in a given area. Each wildlife species has certain requirements that must be present in an area.

> *For example, most woodpeckers need dead trees for food and cover. Therefore, they will be unlikely residents unless there are dead trees or at least dead branches on the site.*

Other species, such as turkey, bobcats, deer, etc., need large areas of relatively undisturbed habitats.

1. This document is WEC12, one of a series of the Wildlife Ecology and Conservation Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Original publication date March 1997. Revised September 2002. Reviewed April 2012. Visit the EDIS website at http://edis.ifas.ufl.edu.

2. Joe Schaefer, professor and district Extension director for South Florida, and George Tanner, emeritus professor, Wildlife Ecology and Conservation Department, Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, FL 32611.

The Institute of Food and Agricultural Sciences (IFAS) is an Equal Opportunity Institution authorized to provide research, educational information and other services only to individuals and institutions that function with non-discrimination with respect to race, creed, color, religion, age, disability, sex, sexual orientation, marital status, national origin, political opinions or affiliations. U.S. Department of Agriculture, Cooperative Extension Service, University of Florida, IFAS, Florida A&M University Cooperative Extension Program, and Boards of County Commissioners Cooperating. Millie Ferrer-Chancy, Interim Dean

There are a variety of ways you can survey plants and habitat types in your area to determine how suitable it is for wildlife.

Comparing to Natural Ecosystems

One way to develop an appreciation for plant growth and successional changes that will take place on your newly managed property is to visit a local, natural ecosystem of the type you plan to restore.

Many state parks are managed to maintain natural ecosystems and are good places to use as references. Notice the diversity and arrangement of plants. Unlike newly planted ecosystems, mature natural communities usually have several vertical layers of plants--tall trees, understory trees, shrubs; low herbaceous and grasslike plants. Every layer provides essential food and cover requirements for some wildlife species.

> *Observe and ask yourself: Are additional habitat elements such as dead trees, burrows, and water present?*

Documenting with Photographs

Changes in the plants on your site should be documented with photographs taken at least annually. It's a good idea to establish permanent photo stations so that pictures always will be taken from the same direction. See Figure 1.

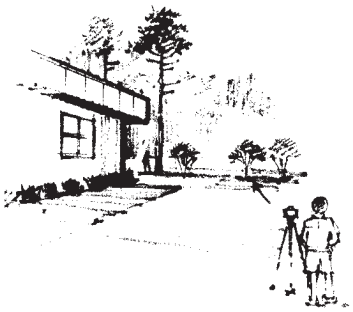


Figure 1. Set up a permanent photo station.

Figure 2. Photograph from this station annually.

Try to include nonliving, unchanging permanent objects such as a building or a large, mature tree in the scene so that comparisons of plant size, abundance, type, etc., can be made relative to the object over time, as in Figure 2.

Measuring Plant Density

The density (or thickness) of plants is an important habitat variable. Areas with dense vegetation have many hiding, nesting, and feeding places for a variety of animals. Density of plants within about 3 feet of the ground can be measured with a 3ft x 3ft-square piece of cardboard divided into 6 equal-sized boxes.

Hold this at permanent points (selected randomly by tossing pennies on your plan (map) as it is laying flat on a table) that will be used each time plant density measurements are made. An observer about 20 feet away stationed at a permanent observation point can estimate how many boxes have leaves, branches, or some other plant material in front of them. Compare your density figures among different areas and among years or seasons. This sampling procedure also can be used for shrub layer plants (3 to 6 feet above ground).

The **foliage height diversity board** is another device that can easily be used to measure the "thickness" of the vegetation. This technique calls for a person to stand at a fixed distance from a board and ocularly estimating the percent of the board covered by vegetation. Various shapes and sizes of boards can be used, but most are subdivided into black and white squares to help you estimated the amount of cover. One common shape is a 6ft long, 1" x 8" board, with each 1ft segment alternately painted black and white. The observer may wish to estimate foliage cover at different heights from the ground as some wildlife species require ground vegetation while others require vegetation in the 4ft to 10ft level, see Figure 3.

Figure 3. Use a foliage height diversity board.

Transects

The first transect can be located randomly by tossing a penny on your map as it is laying flat on a table and picking a direction (e.g., north-south or east-west). Try to arrange the transects so they are at least 30 feet long and mark both ends so you can return to the same place on subsequent sampling dates.

PERCENT OF AREA COVERED BY DIFFERENT TYPES OF PLANTS

The canopy or spread of each plant shades or covers a certain amount of ground under it. A fun way to measure canopy cover of the different layers of vegetation is by using a toilet paper roll and some string. Cut four slits in one end of the toilet paper roll and insert string into the slits so that the space at the end of the tube is divided into quarters. At each even number meter along each transect, look straight up and without moving your head put the toilet paper roll over one eye and record in how many quarters you can see leaves, branches, and other tree parts for the tall tree layer (e.g., 3 quarters=75%). Then do the same for the small tree and other layers. Another technique is to record the percentage of the transect line that is intercepted by the different vegetation layers. Use a copy of Table 1 to record your observations.

Table 1. Plant Survey Data Form

Owner's Name:	Sample Site Number:
Observer(s):	
Date:	Time of Day:
Percentage of Line Covered by Plants or Bare Ground:	
% covered by tall tree canopy (greater than 30 ft tall)	
% covered by small tree canopy (less than 30 ft tall)	
% covered by shrub canopy	
% covered by herbaceous plants	
% covered by bare ground	

Figure 4. Estimate plant variables in a sample area, including woody, flowering or fruiting plants.

Table 2. Woody Plants within 1-yard (Both Sides) of 30-ft Transects

Estimate plant density, height, and canopy cover				
PINE TREES	**transect 1**	**transect 2**	**transect 3**	**transect 4**
species name or symbol				
tree height				
widest canopy				
trunk diameter				
HARDWOOD TREES	**transect 1**	**transect 2**	**transect 3**	**transect 4**
species name or symbol				
tree height				
widest canopy				
trunk diameter				
SHRUBS	**transect 1**	**transect 2**	**transect 3**	**transect 4**
species name or symbol				
height				
widest canopy				
Total # of pine species			Total #of pine trees	
Total # of hardwood tree species			Total # of hardwood trees	
Total # of shrub species			Total # of shrubs	

WOODY PLANTS ALONG TRANSECT

You can estimate plant variables for your entire ecosystem by measuring only the plants found in representative sample areas. These sample areas can be established along parallel transects (straight lines). Just do this: Walk along each side of these transects holding a yard stick parallel to the ground and perpendicular to the transect, as in Figure 4. Record data from all woody plants that the yard stick touches (See Table 2). Be sure to record which species are either in flower or producing fruit during each survey.

Surveying Animals

As the plant community in on your site changes over time, it will become less suitable for some wildlife species and more suitable for others. The best way to determine if your conservation practices have caused desirable changes in the wildlife community is to survey animals before--and at least every year after--installation. If more animals are detected after you began your conservation practices, that would indicate that more food and cover needs of wildlife have become available as a result of your efforts.

You can take photos of each species--not every individual animal--and keep them in an album. Pictures of birds and other species that are difficult to photograph can be cut out of guidebooks and pasted on paper. A running tally of species surveyed on the site should be maintained with the date each new species is found using the ecosystem.

Invertebrates, Amphibians, Reptiles, and Small Mammals

There are about 30,000 non-aquatic invertebrates, 51 native amphibians, and 88 native reptile species in Florida.

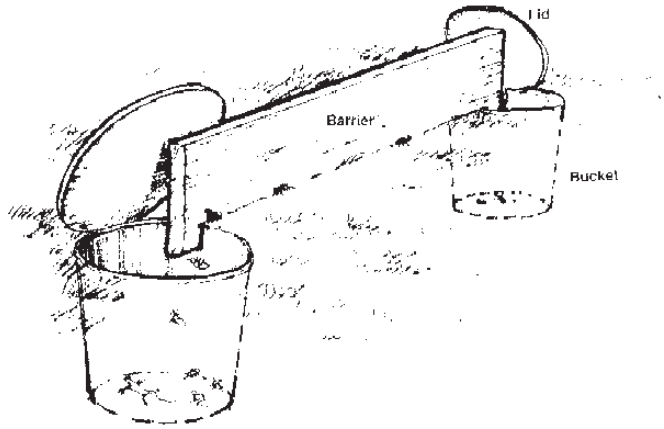


Figure 5 . A popular critter counter: the drift fence.

DRIFT FENCE

The most common survey technique for these animals is a two-bucket drift fence array (see Figure 5). You need: a shovel, two 5-gallon plastic buckets with lids, tin snips, a 10 ft. x 2 ft. board and a tropical fish net.

At a randomly determined point on your site, at least 15 feet from an edge (e.g., road, field, etc.), dig a hole about 2 ft. deep and 1 ft. wide. Make 1/4-inch holes in the bottom of

the buckets by drilling or hammering a nail or screwdriver. Place one of the 5-gallon buckets in the hole so the top edge is level with the ground. (The holes in the bucket bottoms help rain water run out so captured animals will not drown.) Cut a ½-inch slot about 4 inches deep in the rim of the bucket with tin snips. Dig a 10-ft. long trench about 4 inches deep out from the slit in the bucket. Lay the board next to the trench to determine where to dig a hole for the other bucket (about 4 inches closer to the first bucket than the length of the panel). Dig a hole for the second bucket, cut a slot in its rim, stand the panel on its side in the trench and in the slots in the two buckets, and backfill dirt against both sides. Support the board in the middle with a stake or two if need be.

When animals walk or crawl up to your drift fence, they will turn one way or the other and then end up in one of the buckets. If your area is large enough, you can place several bucket arrays in different microhabitats (e.g., shaded and unshaded) so you can see if different species live in different areas.

Shade each bucket with its lid or a board elevated at least 6 inches above the ground to allow for entry of larger animals such as box turtles. **Keep lids on buckets. Or, if you are not going to check their contents within 24 hours, remove the lids.** Place a damp sponge in the bottom of the buckets so captured animals won't dry out.

Remove caught animals with a tropical fish net. Do not handle caught animals with your hands. Some animals, such as scorpions, can give you a serious sting or bite. After you have identified the animal, taken a picture if it is a new species, and collected all the data (see Table 3), release the critter at least 10 feet away from the bucket.

PVC PIPE

Plastic 1-1/2 inch PVC pipe is a useful tool for surveying treefrogs. Push a 4-ft. pipe vertically into the ground about a foot deep until it is standing firm and will not fall over. Checked the contents later by looking down into the pipe with the aid of a flashlight.

TIME-CONSTRAINED SURVEYS

Time-constrained surveys also can be conducted on each study site in an attempt to find animals (such as large snakes) that are less susceptible to bucket traps. This involves moving through the site turning logs, inspecting retreats, and watching for surface-active species. Record all animals observed during these surveys. Also, be sure to return logs and stumps to their original positions after turning.

Table 3. Animal Survey Data Form

Circle the one right source: Bucket drift fence treefrog house track station bird surveys			
Owner's Name:		Location No. from map:	
Observers:			
Date:	Time of Day:	Ecosystem Type:	
First survey on site (Baseline) or Number _____?			
Day of this survey period: 1 2 3 4 Other _____ (circle one)			
WEATHER DATA			
Is the sky? Mostly Clear or Mostly Cloudy		Temperature:	
Amount of rainfall during the past 24 hours:		Is it raining now? Yes No	
Comments:			
Species or Description	**Number of Individuals**	**Gender (M or F)**	**Comments**

Mammals

There are 94 native species of mammals in Florida.

SQUIRRELS

Tree squirrels observed at any time on the site can be recorded. Squirrels are most active and more likely to be observed during morning hours.

TRACK STATIONS

Figure 6 . Baited track stations are simple, useful.

You don't have to capture larger mammals to record their presence on your site. Medium-sized mammals such as raccoon, opossum, and fox can be censused with track stations.

A track station consists of a bare soil area or a plywood board about 3-feet in diameter or 3-feet square covered with a layer of fine dirt, sand, or flour (to better detect prints) and baited in the center with a cotton ball immersed in fish emulsion and placed on a stick pushed into the ground (See Figure 6).

You can also make plaster of Paris casts of the tracks. Other signs of critters such as scat, hair, and dens on your site also should be noted.

DEER

Deer abundance can be monitored using track count surveys. Disk ¼ to 1 mile stretches along sandy, unvegetated roads the evening prior to recording the number of individuals crossing the strip the next morning. Drag the road after each count and repeat for at least three consecutive nights.

Birds

About 473 native bird species can be found in Florida. Some of these are year-round residents and others only visit during the winter.

STATIONARY COUNTS

Figure 7 . Count stations should give you a good vantage point, be marked on your map, and reused.

Use this method to most effectively detects birds in various layers of vegetation. Select locations that will give you the best chance of detecting birds on the site. Permanently mark count stations outside and on a map to assure reuse consistency.

Usually, at least one station located about 50 feet from the edge of a small site (e.g. on an urban or suburban lot) will give you an opportunity to see birds using the site without scaring them away. Survey at this station first. See Figure 7. Then go onto the site to survey at one or more stations. Space your stations about 300 feet apart.

If your site is smaller, then only use one station. Approach each station quietly. Wait five minutes at the station for the birds to get used to you before counting. Then record all birds seen for the next five minutes. If you do not see a bird, but recognize the call or song of a familiar species, such as a crow or quail, record that also. (Making these counts during the spring when male bobwhite quail are calling to attract mates is an excellent means of monitoring year-to-year trends in quail abundance.)

Bird counts should begin as close to sunrise as possible on calm, clear mornings when possible. Surveys should be conducted four consecutive days of each season (fall, winter, spring). Flying birds should be counted only if they

Table 5. Bird House Survey Data Form

Owner's Name:		Location No. from map:
Observers:		
Date:	Time of Day:	Ecosystem Type:
Date bird house first put in place:		
Species occupying house:		
Date egg-laying began:		Date egg-laying completed:
Date eggs hatched:		Number of eggs:
Date young fledged:		Number of young fledged:
Habitat Description:		
Height of house:		
Full Sun Partial Shade Full Shade (circle one)		
Nest material:		
Comments:		

appear to be using the census area, not merely passing by it. You can also record additional data such as nest locations. If you detect singing (territorial) males, nesting behavior (carrying twigs or insects), actual nests, or fledgling birds you can consider this evidence of breeding.

INCIDENTAL AND NIGHT SURVEYS

Incidental observations made between bird counts and while checking traps can be beneficial for recording a number of relatively secretive species such as ovenbirds and hummingbirds. Night-censuses can be conducted to detect owls, chuck-wills-widow and other nocturnal birds. See Table 5.

19 OF THE MOST COMMON BIRDS

You do not have to be able to recognize all 473 species of birds to conduct meaningful surveys. We recommend that you should try to be able to identify at least the following 19 most common birds in Florida (see Table 4).

These species will not all use the same habitat elements in your ecosystem. Some are cavity-nesters, some feed on the ground, and others prefer to stay up in the tops of tall trees. Their presence indicates that certain habitat requirements are available in your ecosystem.

Table 4. Where species obtain their habitat requirements

Species	Feeding	Nesting
American crow	ground	tall trees
Red-winged blackbird	ground	cattails
Brown thrasher	ground	shrubs
Starling (non-native)	ground	cavity
Cardinal	ground	shrubs
Brown-headed cowbird	ground	shrubs
Loggerhead shrike	ground	small trees
Mourning dove	ground	small trees
Common grackle	ground	small trees
Ruby-throated hummingbird	nectar flowers	trees
Carolina chickadee	ground & trees	cavity
Tufted titmouse	ground & trees	cavity
Red-bellied woodpecker	dead trees	cavity
Pileated woodpecker	dead trees	cavity
Common flicker	ground & dead trees	cavity
Great crested flycatcher	trees	cavity
Blue jay	ground & dead trees	small trees
Carolina wren	shrubs	cavity
Mockingbird	ground & dead trees	small trees

Materials Lists

Materials for Plant Surveys

Camera
Yard-stick
Two 30-ft. measuring tape
Diameter tape
Density board

Materials for Wildlife Surveys

Drift Fence

Two 5-gallon buckets (with lids preferred)
One 10-ft. long x 2-ft. wide board
Tropical fish net
Shovels
Hammer and large nail
Tin snips

Treefrogs
4-ft. long, 1-½-inch diameter PVC pipe

Mammal track stations
Fish emulsion (from plant stores)
Cotton ball
Fine dirt or cooking flour

Birds
Binoculars

Useful References

Bird Guide for Florida Species

Kale, H. W. II, and D. S. Maehr. 1990. *Florida's Birds.* Pineapple Press, Sarasota, FL

Amphibian and Reptile Guides for Florida Species

Ashton, R.E., Jr. and P.S. Ashton. 1981. *Handbook of Reptiles and Amphibians of Florida. Part One: The Snakes.* Windward Publishing Co., Miami, FL.

Ashton, R.E., Jr. and P.S. Ashton. 1981. *Handbook of Reptiles and Amphibians of Florida. Part Two: Lizards, Turtles, and Crocodilians.* Windward Publishing Co., Miami, FL.

Ashton, R.E., Jr. and P.S. Ashton. 1981. *Handbook of Reptiles and Amphibians of Florida. Part Three: The Amphibians.* Windward Publishing Co., Miami, FL.

The Golden Nature Guide Series

Publisher: Golden Press, c/o Western Publishing Co., Racine, WI
Authors: various
Titles:

- *Golden Guide to Birds*
- *Golden Guide to Reptiles*
- *Golden Guide to Mammals*
- *Golden Guide to Weeds*
- *Golden Guide to Nonflowering Plants*
- *Golden Guide to Flowers*
- *Golden Guide to Trees*

The Golden Field Guide Series

Publisher: Golden Press, c/o Western Publishing Co., Racine, WI
Authors: various
Titles:

- *Birds of North America*
- *Amphibians of North America*
- *Reptiles of North America*
- *Trees of North America*

The Peterson Field Guide Series

Publisher: Houghton Mifflin Co., Boston, MA
Authors: various
Titles:

- *A Field Guide to the Birds*
- *A Field Guide to Bird Nests (found east of the Mississippi River)*
- *A Field Guide to the Mammals*
- *A Field Guide to Animal Tracks*
- *A Field Guide to Reptiles and Amphibians of the United States and Canada East of the 100 th Meridian*
- *A Field Guide to the Ferns and Their Related Families of Northeastern and Central North America*

National Audubon Field Guide Series

Publisher: Chanticleer Press, New York, NY
Authors: various
Titles:

- *Birds (Eastern Region)*
- *Mammals*
- *Reptiles and Amphibians*
- *North American Trees*
- *Wildflowers (Eastern Region)*

Other Plant Identification Books

Bell, C. R. and B. J. Taylor. 1982. *Florida Wild Flowers and Roadside Plants.* Laurel Hill Pres, Chapel Hill, NC.

Foote, L. E. and L. B Jones, Jr. 1989. *Native Shrubs and Woody Vines of the Southeast.* Timber Press, Portland, OR.

Duncan, W. H. and M. B. Duncan. 1988. *Trees of the Southeastern United States.* Univ. Georgia Press, Athens, GA.

Plants as Wildlife Food

Martin, A. C., H. S. Zim, and A. L. Nelson. 1951. *American Wildlife & Plants: A Guide to Wildlife Food Habits.* Dover Publications, Inc., New York, NY.

PLANT SURVEY DATA SHEET

School Name: _____ School District: _____

Observers: _____

Date: _____ Time (a.m. or p.m.): _____

% of ecosystem covered by tall tree (≥ 30 feet high) canopy _____
% of ecosystem covered by small tree (10 to 30 feet high) canopy _____
% of ecosystem covered by shrub canopy _____
% of ecosystem covered by herbaceous plants _____
% of ecosystem covered by grasses _____
% of ecosystem covered by bare ground _____
(Maximum for each separate layer cannot be more than 100%)

Woody plants within 1 meter of both sides of a 10m line (total area surveyed = 20m²)				
PINE TREES	#	#	#	#
Species (name or symbol)				
Height				
Widest canopy				
Trunk diameter				
BROADLEAF TREES	#	#	#	#
Species (name or symbol)				
Height				
Widest canopy				
Trunk diameter				
SHRUBS	#	#	#	#
Species (name or symbol)				
Height				
Widest canopy				

Total # of plants _____ Total # of species _____

ANIMAL SURVEY DATA SHEET

School Name: _____ School District: _____

Observers: _____

Date: _____ Time (a.m. or p.m.): _____

Sky (circle one): Mostly Clear Mostly Cloudy Temperature: _____

Amount of rainfall during the past 24 hours: _____

Is it raining now? Yes No

Species or Physical Description			
Survey Type (a)			
Ecosystem Type (b)			
Comments			
Sex			
Physical Measurements of Captured Animals			
Weight			
Total Body Length (including tail)			
Tail Length			
Photo Taken (yes or no)			

(a) Survey Type: 1) Bucket drift fence array, 2) Treefrog house (PVC pipe), 3) Track Station, 4) Small mammal trap, 5) Stationary bird observation, 6) Burrow (in-ground), 7) Bird house, 8) Incidental sighting

(b) Ecosystem Type: 1) Scrub, 2) Sandhill, 3) Hardwood Hammock, 4) Flatwoods

Schoolyard Ecosystem Committee Form

_____	_____
School Name	District or County
_____	_____
Contact Person	Date

_____

Street Address

_____

City and Zip Code

Contact Person: _____

Principal or Assistant Principal: _____

Ground Maintenance Person: _____

Physical Education Teacher: _____

Student Representative: _____

Kindergarten Teacher: _____

1st Grade Teacher: _____

2nd Grade Teacher: _____

3rd Grade Teacher: _____

4th Grade Teacher: _____

5th Grade Teacher: _____

Other interested faculty (e.g., library or media specialists, school beautification person): _____

_____

_____

Schoolyard Ecosystem Committee Form (continued)

Parent Organization Representative: _____

Youth Group Leaders (e.g., Scouts, 4-H): _____

School Board Nursery Staff: _____

Business Sponsor Representatives: _____

Local Resource People (e.g., County Extension Service Rep, Forester, Wildlife Biologist, Native Plant Society or Native Nursery Member, Landscape Architect): _____

_____

_____

_____

_____

Relative Ecological Importance of Ecosystem Elements

So the question many people face when planning an ecosystem restoration project is: How can I get the greatest return for my money? Maybe space and/or other resources are limited. If you only have a 200-square foot plot and $100, what ecosystem elements should you install to help restore the site to it's original natural status? One of the easiest ways to approach this part of planning is to compare the relative value of each element to wildlife. For example, if you use your $100 to buy several butterfly nectar plants, butterfly species in the adult stage may use this as a feeding site. You will also provide prey (butterflies) on the site for birds that eat butterflies, such as the Northern Mockingbird. Or, you could use your $100 to purchase an underground burrow (plastic drain pipe), treefrog houses (PVC pipe), bird houses, a few butterfly nectar plants, a small pond or bird bath, and plants that provide berries and nesting cover for birds. This latter plan may not provide as much nectar for butterflies as the first plan, but it would provide habitat requirements for many more species. The following list ranks the ecological importance of ecosystem elements based on the number of species that may be directly benefited. In addition to this list, the uniqueness of the element not only on the site, but also in the vicinity (neighborhood), should be considered. For example, if the school is located next to a lake, water is already readily available and adding a pond will not have as great an impact on the ecology of the area as some other element that is not already available to wildlife living in the area.

Rank	Ecosystem Element	Species Benefitted
1	In-ground ponds	Most wildlife species either drink, lay eggs, live at least part of their life cycle, or bathe in ponds
2	Natural succession area	Many butterflies, small mammals, reptiles and birds; species using the area will change as its plant structure (height and density) changes
3	Underground burrows	48 vertebrate species and many insects use burrows to escape predators and/or weather, and to nest
4	Food plants	Varies considerably by plant species and also by the availability of other food plants in the vicinity; for example pine seeds are eaten often by 29 species and dogwood berries are eaten infrequently by 27 species; value increases as the diversity of food plants installed increases
5	Cover plants	Must have thick foliage to provide best cover; must also be provided at different heights as some species nest close to the ground and others in the tops of the tallest trees; value increases as the diversity of cover plants installed increases
6	Bird houses	25 bird species and several mammals (e.g. squirrels) nest in cavities; many reptiles and amphibians also use them for cover; must install different sizes to accommodate the greatest number of species
7	Rock piles	Many reptiles and small mammals
8	Brush piles	Many small mammals, reptiles and birds
9	Early succession area	Many butterflies, small mammals, reptiles and birds
10	Treefrog houses	15 species in the treefrog family live in Florida
11	Bird feeders	At least 2 dozen bird species and some mammals such as squirrels & opossums; should be used sparingly since they can also spread diseases by concentrating birds
12	Above ground bird baths	Dozens (including winter migrants) will bathe and drink

Site Evaluation Checklist

This checklist was used to determine the ecological value of Schoolyard Sites. Recommendations for the following components can be found in the various appendices of Schoolyard Ecosystems for Florida guidebook and other sources.

A natural ecosystem is a place where living and non-living components interact in a condition that has been relatively untouched by recent human society. Living components include decomposers like bacteria and fungi and green plants that fix energy from the sun and manufacture food for the other living components, animals. Non-living components include soil, water, and minerals that are important for the survival of plants, animals and other living organisms.

Schools and other human-made buildings are located on sites where natural ecosystems once occurred. As a result of such development, many of the ecosystem components are destroyed and the interactions that make them ecological systems no longer take place. We can be good conservationists by putting back or restoring as much of the original ecosystem as possible. Some sort of general knowledge of ecosystems may be needed to help make this seemingly endless task more feasible. Keep in mind that any living or non-living component of a natural ecosystem supports more natural ecosystem interactions than asphalt and concrete. Even plant-free, sandy areas may provide enough habitat for a food chain consisting of ants, ant-lions, and lizards. The following are some ecological concepts that will help you to be most effective in restoring an ecosystem.

Ecosystem differences

Processes, interactions and components that define ecological systems occur in patterns across the Florida landscape. Fire frequency is greater on sites with more longleaf pine trees than areas dominated by oaks and magnolias. More gopher tortoises per acre can be found in areas with sandy soils than in areas with highly organic soils. Ecologists have developed a system of assigning names to areas according to their unique natural characteristics. We refer to these units as vegetation communities or ecosystems. This also makes mapping, management, and in some cases land use regulation easier. Each ecosystem shares some characteristics with adjacent ones, but is also very different from them. If a sandhill ecosystem is destroyed as a result of building a school facility, all of the processes, interactions and components unique to sandhills are also destroyed as well as those in adjacent areas that were shared. Replacing a sandhill with a flatwoods ecosystem would not be the best way to restore that which was destroyed. Restoring the proper piece of the puzzle is the best way to improve the ecology of the schoolyard and the surrounding area.

The most fundamental concept to apply to any restoration effort is “the more diversity, the better.” Restoration undertakings are most cost efficient and ecologically effective when the greatest diversity of ecosystem components is provided. For example, $100 could purchase 5 holly trees that will provide food for a variety of bird species. Or, this same amount of money could purchase one holly tree, an oak tree, a birdhouse, some butterfly and hummingbird nectar plants, and material to build a pond. These ecosystem components can provide not only berries for birds, but also acorns for squirrels, nesting cover for chickadees, nectar sources for dozens of butterfly species and the ruby-throated hummingbird, and a place for eggs and tadpoles of many frog species. This diversity concept can also be applied to each type of ecosystem component.

Living and non-living ecosystem components added to schoolyards help to restore the natural value of the site making it a better place for native wildlife to live. These components provide some of the essential requirements for animals: food, cover, and water.

Food

Plants are the primary source of energy in all ecosystems. Some animals only eat plants (herbivores or vegetarians); some eat plants and other animals (omnivores), and some eat only meat (carnivores). All of this eating transfers energy and nutrients to all the animals in the ecosystem’s food web. When animals

eliminate some of the uneaten food or die, this nutrition is available for plants. This cycle of life continues as long as there are sufficient food components.

Animals eat many plant parts. Squirrels eat seeds, nuts bark and buds. Insects eat leaves and fruits. Birds eat nuts, seeds and fruits. Some of these plant parts are only available at certain times of the year. Buds are mostly available in the spring, and fruits and nuts in the fall. Adult cardinals eat mostly seeds during winter, but insects when they are feeding nestlings in the summer. Bluebirds eat insects during summer, but include fruit in their winter diet. If a site, such as a schoolyard, does not have all of the foods required at different times of the year, animals must find food somewhere else and may leave the schoolyard temporarily or permanently. Diets of each individual (including humans) also change with age. Baby humans consume different foods than adults. Baby butterflies eat leaves of specific plant species while most adults eat flower nectar.

Diversity in structure and species of plants is much better than having a large number of one species. Food from some plants is most available during summer, others during the fall or some other season. Variety provides food year-round. Some animals feed on fruits or insect of tall plants. Others feed on or close to the ground. A diversity of vertical vegetation layers will provide suitable vertical habitat for the greatest variety of animals.

FOOD COMPONENTS	POINT VALUES
1. Butterfly plants (*Choose one from both nectar and larvae categories*)	
• 1 species of nectar plants	2 pts
• 2-5 species of recommended nectar plants	4 pts
• > 5 species of recommended nectar plants	5 pts
• Recommended larvae plants for 1 species of butterfly	3 pts
• Recommended larvae plants for 2-5 species of butterfly	4 pts
• Recommended larvae plants for > 5 species of butterfly	5 pts
Total (of maximum possible 10 points)	____ pts
2. Hummingbird plants (*Choose one*)	
• 1 species of recommended nectar plants	2 pts
• 2-5 species of recommended nectar plants	5 pts
• > 5 species of recommended nectar plants	10 pts
Total (of maximum possible 10 points)	____ pts

3. Native plants (*Choose one from each of the 2 following groups*)

- 1 species of recommended native plants
  1 pt
- 2-5 species of recommended native plants 3 pts
- > 5 species of recommended native plants 5 pts

- Recommended plants from 1 category (grasses, grasslikes, herbaceous, vines, small shrubs, tall shrubs, small trees, large trees) 1 pt
- Recommended plants from 2-3 categories (grasses, grasslikes, herbaceous, vines, small shrubs, tall shrubs, small trees, large trees) 3 pts
- Recommended plants from >4 categories (grasses, grasslikes, herbaceous, vines, small shrubs, tall shrubs, small trees, large trees) 5 pts

Total (of maximum possible 10 points) ____ pts

4. Non-native plants (*Choose one*)

- 100% of area covered by plants are non-native species -10 pts
- 51 to 99% of area covered by plants are non-native species - 7 pts
- 1 to 50% of area covered by plants are non-native species - 5 pts
- 0 % of area covered by plants are non-native species 10 pts

Total (of maximum possible 10 points) ____ pts

5. Bird feeders (*Choose one*)

- 1 feeder without thistle, millet or black oil sunflower seeds 2 pts
- 1 feeder with thistle, millet or black oil sunflower seeds 5 pts
- >1 feeder without thistle, millet or black oil sunflower seeds 3 pts
- >1 feeder with thistle, millet or black oil sunflower seeds 10 pts

Total (of maximum possible 10 points) ____ pts

Cover

Like humans, wildlife species need protection from both predators and weather. Cover also helps restrict the amount of food available at any time to each level in a given food web so that the energy flow will be sustained generation after generation. For example, if bird nests were highly visible to predators, every egg and nestling would be eaten and no offspring would be available to continue the important balance between predators and prey.

Cover requirements are almost as diverse as food requirements and can be provided by both plant and non-plant ecosystem components. Some plants are excellent fruit or nut producers, but their foliage is not thick enough to offer good cover (For example, dogwood trees). Certain insects feed on the underside of leaves to reduce detection. Dozens of birds, mammals, reptiles and amphibians use tree cavities for nesting and sleeping (Bird houses can help to artificially replace this natural component). About 4 dozen species use underground burrows from nesting, sleeping and hiding.

Many birdhouses of the same size will accommodate only those birds of a certain size, but a diverse selection of birdhouses can provide nesting cover for birds as large as barred owls and as small as chickadees.

COVER COMPONENTS	POINT VALUES

1. Bird houses (*Choose one; numbers of houses are for each half acre or half of a soccer field*)

• 1 house of recommended specifications for 1 species	1 pt
• 2-3 houses of recommended specifications for 1 species	3 pts
• >3 houses of recommended specifications for 1 species	4 pts
• 2-3 houses of recommended specifications for 2-3 species	6 pts
• >3 houses of recommended specifications for 2-3 species	7 pts
• >3 houses of recommended specifications for >3 species	10 pts
Total (of maximum possible 10 points)	____ pts

2. Treefrog houses (*Choose one; numbers of houses are for each half acre*)

• 1 house in appropriate location	3 pts
• 2-5 houses in appropriate locations	7 pts
• >5 houses in appropriate locations	10 pts
Total (of maximum possible 10 points)	____ pts

3. Bat houses (*Choose one*)

• 1 house of recommended specifications and placement per half acre	5 pts
• >1 house of recommended specifications and placement per half acre	10 pts
Total (of maximum possible 10 points)	____ pts

4. Vertical dead trees (*Choose one; at least 1 foot in diameter and 10 feet high*)

• 1 per acre	5 pts
• 2 per acre	7 pts
• 3 per acre	10 pts
Total (of maximum possible 10 points)	____ pts

5. Burrows (*Choose one from each of the 3 following groups*)

• 4 inch diameter opening	3 pts
• > 4 inch diameter opening	4 pts
• Depth of 1-3 feet	3 pts
• Depth > 3 feet	4 pts
• Vegetation at least 1 foot tall within 1 foot of entrance	2 pts
Total (of maximum possible 10 points)	____ pts

6. Brush piles (*Choose one*)

• 1 brush pile	5 pts
• > 1 brush piles	10 pts
Total (of maximum possible 10 points)	____ pts

7. Rock piles (*Choose one*)

• 1 rock pile	5 pts
• > 1 rock piles	10 pts
Total (of maximum possible 10 points)	____ pts

Water

Fresh water is essential for most plants and wildlife. Many animals need to drink water and other species such as frogs and toads require standing water during all or some of the year to complete part of their life cycles. A water source on one piece of property may be critical to all wildlife living in the entire neighborhood. While traditional, elevated bird baths are accessible only to birds, a pond with gently sloping sides allows many kinds of wildlife to choose different depths to satisfy their requirements. Even small depressions in rocks or soil that retain water only temporarily help satisfy wildlife water requirements. Some amphibians mostly use temporary ponds that hold water only for a few months out of the year.

WATER COMPONENTS	POINT VALUES
1. Source of water (*Choose one only if it contains water for at least 1 month*)	
• Above ground bird bath(s)	2 pts
• On ground, < 3 inches deep bird bath(s)	3 pts
• Installed pond with steep sides and no areas < 3 inches deep	3 pts
• Installed pond with sloping sides and some areas < 3 inches deep	4 pts
• Installed pond with marsh or swamp plants from recommended list	5 pts
• Installed pond with marsh or swamp plants from recommended list and connected to a restored or natural upland area	6 pts
• Natural body of water (pond, lake, stream, or river) with native marsh or swamp plants	8 pts
• Natural body of water with native marsh or swamp plants and connected to a restored or natural upland area	10 pts
Total (of maximum possible 10 points)	____ pts
2. Irrigation (*Choose one from each of the following 5 groups)*	
• Grass is watered based on a schedule regardless of rainfall	0 pts
• Grass is watered based on the water needs of the grass	2 pts
• Grass is watered during mid-day	0 pts
• Grass is watered during early morning	2 pts
• Woody plants are watered with spray nozzles that cover large areas	0 pts
• Woody plants are watered with irrigation systems that conserve water (i.e., apply water directly on plants)	2 pts
• Woody plants are watered based on a schedule regardless of rainfall	0 pts
• Woody plants are watered based on amount of rainfall	2 pts
• Woody plants are watered during mid-day	0 pts
• Woody plants are watered during early morning	2 pts
Total (of maximum possible 10 points)	____ pts
3. Surface water management (*Choose one)*	
• Grasses, grasslikes, or herbaceous plants cover 0 to 25% of the ground within 10 feet of the edge of a constructed or natural in-ground pond	2 pts
• Grasses, grasslikes, or herbaceous plants cover 26 to 50% of the ground within 10 feet of the edge of a constructed or natural in-ground pond	4 pts
• Grasses, grasslikes, or herbaceous plants cover 51 to 75% of the ground within 10 feet of the edge of a constructed or natural in-ground pond	6 pts
• Grasses, grasslikes, or herbaceous plants cover 76 to 100% of the ground within 10 feet of the edge of a constructed or natural in-ground pond	10 pts
Total (of maximum possible 10 points)	____ pts

Space

An animal's need for space is simply the size of area containing sufficient food, cover, and water for the creature to survive. This size varies depending on the density and availability of these resources. For example, a Florida panther needs about 100 miles ^{2} and a cardinal needs about 1 acre.

Most Florida wildlife species are not able to satisfy their space requirements on a typical schoolyard. Because animals readily move across property lines, larger suitable habitats can be accomplished if adjacent properties contain suitable habitats that are connected to the schoolyard ecosystem.

Most species have vertical space requirements too. Some, such as the American Crow, nest high in tall trees but feed on the ground. Others, like the Hooded Warbler and Brown Thrasher, nest close to the ground but feed in small trees.

SPACE COMPONENTS	POINT VALUES
1. Connected to ≥ 1 acre of good habitats on adjacent properties	
• Yes	10 pts
Total (of maximum possible 10 points)	____ pts
2. Size of Site (*Choose one*)	
• Less than 1 acre	1 pts
• 1 to 5 acres	3 pts
• 5 to 10 acres	6 pts
• 10 to 20 acres	8 pts
• more than 20 acres	10 pts
Total (of maximum possible 10 points)	____ pts
3. Natural succession area	
• Natural succession area set aside as recommended	10 pts
Total (of maximum possible 10 points)	____ pts
4. Annually mowed area	
• Annually mowed area set aside and maintained as recommended	10 pts
Total (of maximum possible 10 points)	____ pts
Grand Total (of maximum possible 190 points)	**____ pts**

SCHOOLYARD HABITAT DRAWING EVALUATION TOOL

The following scoring rubric can be used to evaluate student drawings of schoolyard habitats. The criteria on this rubric are based on relevant research findings and the instrument was pilot tested using a sample of 77 drawings from students in grades 2 through 6 in seven different school sites in Florida. Ideally, students should make their drawings on large paper (11" x 17") using colored crayons. Directions for drawing should be very general: "Draw and label the outdoor learning areas at your school." No time limit should be imposed and students should complete the drawings indoors, out of view of their schoolyard habitats. Finally, students should be spread out and complete each drawing independently.

This scoring rubric focuses on easily-observable criteria related to the **content** of the drawings, rather than the **artistic quality** of the drawings. Each criterion is assigned a score range of 1 through 5, with 5 representing the most desirable score. The potential total score for the rubric ranges from 7 to 35. This instrument can be used to analyze drawings made by students before and after they experience a schoolyard-based curriculum and can document the impact of schoolyard learning experiences on student knowledge and attitudes.

The seven criteria are based on the following research findings:

- Criterion 1: Students with a more thorough understanding of their schoolyard habitats fill up more of the available drawing area.

- Criterion 2: Students who are more aware of the diversity of features in their schoolyard habitats include a greater number of different features in their drawings.

- Criterion 3: Students with a more comprehensive understanding of their schoolyard habitats draw abundant features such as trees more than once, rather than just drawing one representative sample of each feature.

- Criterion 4: Students who think natural features of their schoolyard habitats, such as plants and animals, are more important than man-made features, such as boardwalks or seating areas, include more natural features in their drawings and draw these features proportionally larger than the man-made features.

- Criterion 5: Students with a broader ecosystem focus draw more complete pictures of their schoolyard habitats while students with a more narrow focus concentrate on drawing one dominant, isolated fragment of their schoolyard habitat, like a pond or butterfly garden.

- Criterion 6: In keeping with the theory that "language precedes logic," students with a more in-depth understanding of their schoolyard habitats include more labels and descriptive words.

- Criterion 7: Drawings of students with a more accurate understanding of their schoolyard habitats more closely match the actual layout, organization, and contents of the schoolyard site. Students who do not know as much about their schoolyard sites omit key features or place them incorrectly in their drawings.

SCHOOLYARD HABITAT DRAWING SCORING RUBRIC

Student Name_____ Date of Drawing_____

DIRECTIONS: Circle the number representing the score for each criterion.

CRITERION	SCORE				
1. % of drawing area covered with features	100%	80%	60%	40%	≤20%
	5	4	3	2	1
2. Total number of different features on drawing	≥10	8-9	6-7	4-5	≤3
	5	4	3	2	1
3. Number of features drawn more than once	≥4	3	2	1	0
	5	4	3	2	1
4. Emphasis on natural vs. man-made features (frequency and size of natural vs. man-made)	all natural		even		all man-made
	5	4	3	2	1
5. Level of focus (fragment vs. entire ecosystem)	system		partial		isolated fragment
	5	4	3	2	1
6. Number of labels/descriptive words	≥4	3	2	1	0
	5	4	3	2	1
7. % match of drawing with actual site features	≥80%	80%	60%	40%	20%
	5	4	3	2	1

TOTAL SCORE: _____ (Maximum score: 35 points)

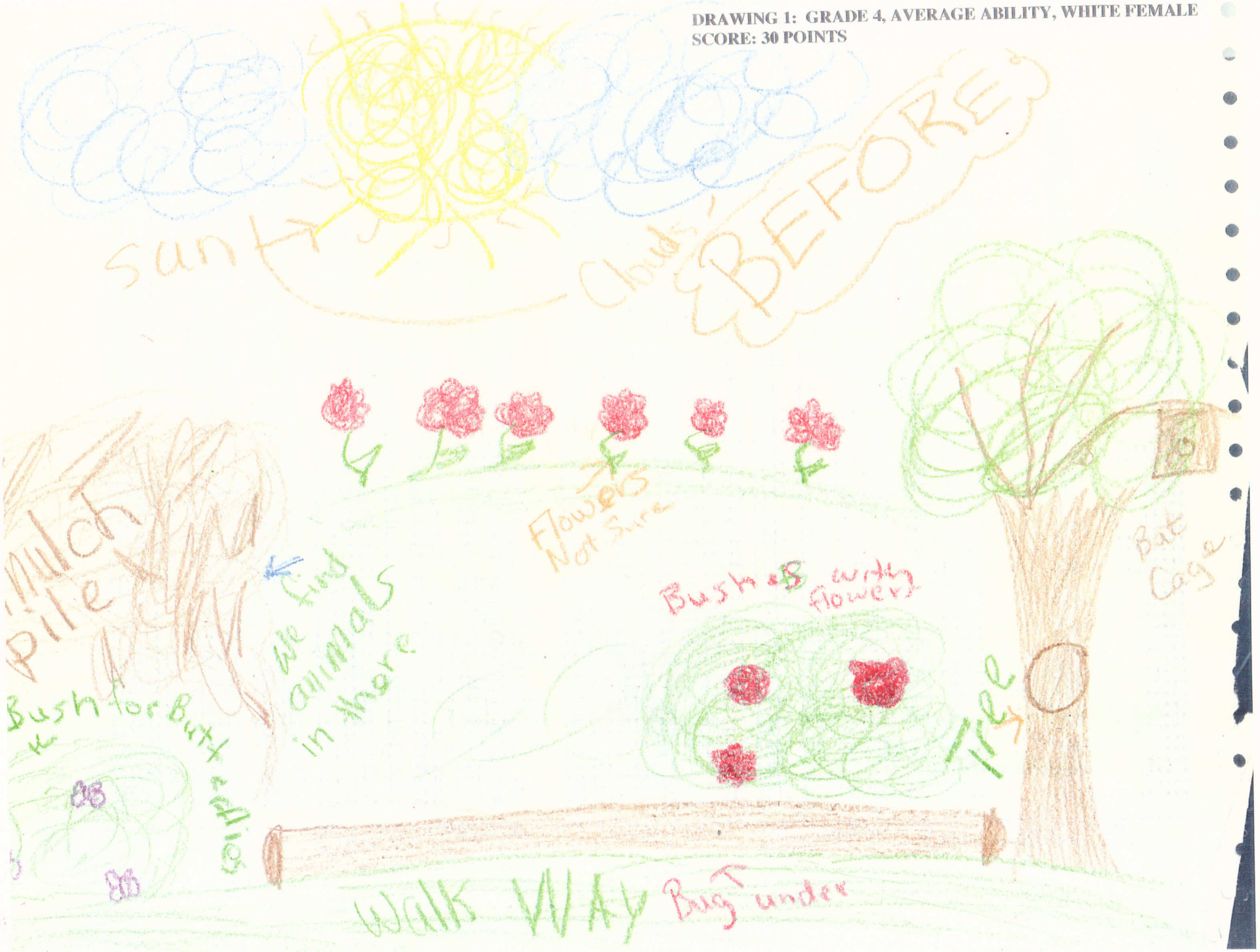
SAMPLE STUDENT SCHOOLYARD DRAWINGS

Educators can practice using the rubric and analyzing student drawings using the two samples provided. Since workshop participants cannot view the actual school site drawn by students, they should only score Criteria 1 through 6. They can then compare their evaluations with the recommended scoring choices described here.

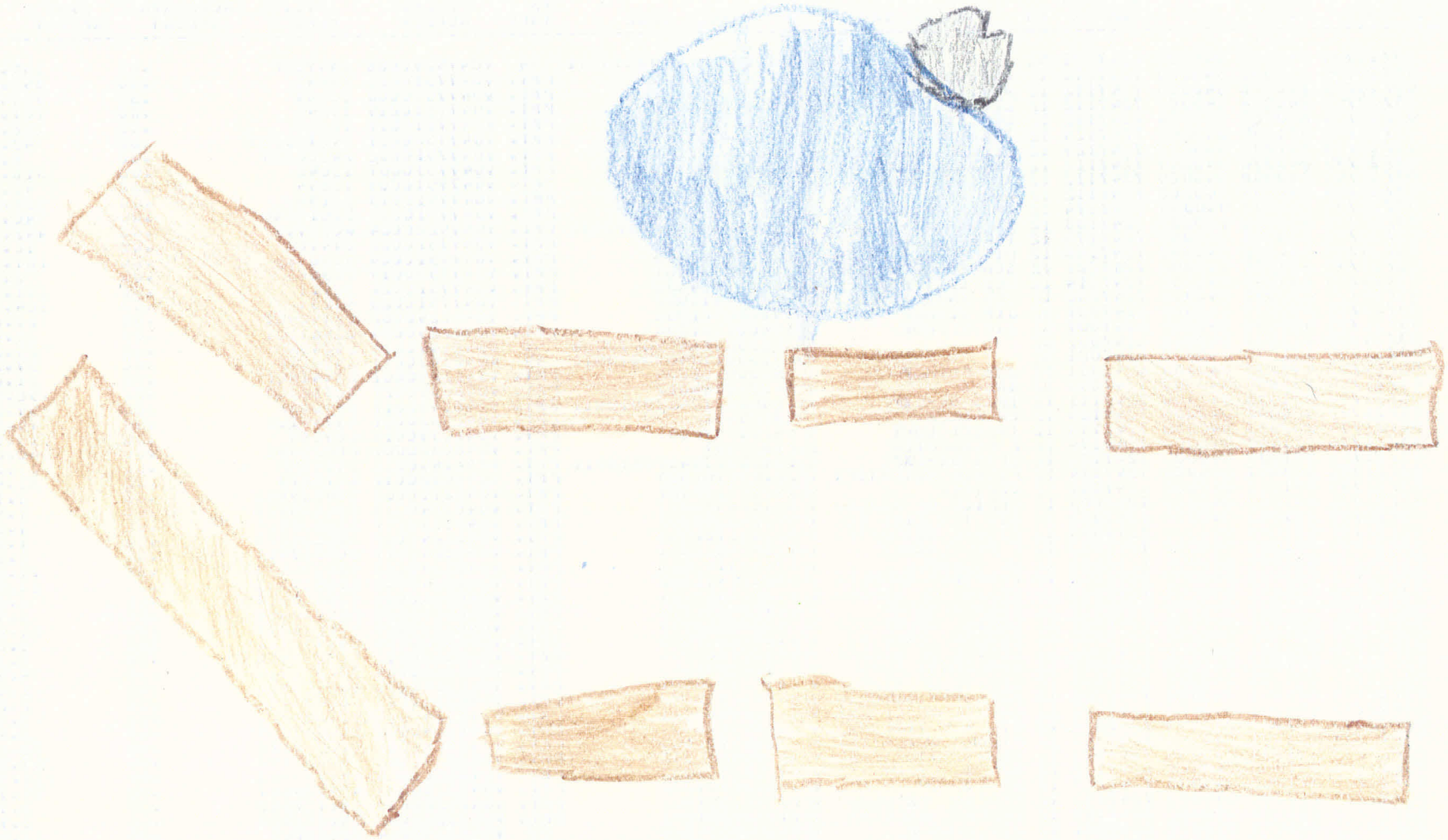
Drawing 1 was completed by a fourth grade, average ability, female student. Her drawing's average total score (including criterion 7) should be 30 out of 35 points. Virtually the entire drawing is covered with features; she included at least 10 different features in her drawing; she drew a few features, such as flowers and bushes, more than once; she clearly emphasized the natural features of her schoolyard habitat; she focused on the broader system rather than one small component; she used many descriptive words and phrases; and except for the fact that she only drew one tree, her drawing very closely matches her actual school site's features. Interestingly, this student's schoolyard habitat was destroyed about three months before this drawing was completed due to the installation of portable classroom buildings, explaining the large label "BEFORE" in the top right section of her drawing. This drawing reflects a very accurate memory of a site she had not seen for several months.

Drawing 2 was completed by a fifth grade, average ability, male student. His drawing's average total score (including criterion 7) should be 9 out of 35 points. Only a small portion of the available drawing area was used; only three features (a walkway, a pond, and one rock) are included in the drawing; no features were drawn more than once; he emphasized the man-made boardwalk more than any other feature; he only focused on a small fragment of his schoolyard habitat; he did not use any labels or descriptive words; and his drawing only matches two of the site's actual features (the boardwalk and the pond). It is interesting to note that although the actual schoolyard site is forested and contains many different kinds of trees and shrubs, this student did not include any plants, animals, or other living things in his drawing. In addition, this school's habitat area is located right outside his fifth grade classroom window.

DRAWING 1: GRADE 4, AVERAGE ABILITY, WHITE FEMALE
SCORE: 30 POINTS



DRAWING 2: GRADE 5, AVERAGE ABILITY, BLACK MALE
SCORE: 9 POINTS



Schoolyard Activities Workshop Evaluation

Please help us continue to improve the quality of our curriculum resources and workshops by completing this evaluation. Your input is very important to us! Thank you!

Workshop Date_____ Workshop Site_____
Facilitator(s)_____ Social Security Number_____
Name_____ Telephone (____) _____
Home Address _____
City _____ State _____ Zip _____ E mail _____

PART 1. DEMOGRAPHIC INFORMATION (*Please circle or fill-in appropriate responses.)*

1. Gender: Male Female 2. Age in years:_____ 3. Years of teaching experience:_____

4. Highest degree held: High School Bachelors Masters Specialist Doctorate

5. Current position *(Circle all that apply)*:
Pre-service Teacher Inservice Teacher Informal Educator Volunteer Other_____

6. Place of employment *(Circle all that apply)*:
Public school Private school Home school Informal ed. Center Other_____

7. County of employment: _____

8. Grade level taught *(Circle all that apply)*:
PreK-2 3-5 6-8 9-12 College/University General Public

9. Subjects taught *(Circle all that apply)*:
All Science Social Studies Math Language Arts P.E. Art/Music/Drama Other_____

10. Audience I plan to use the Schoolyard Activities materials with *(Circle all that apply)*:
Students at school Students visiting informal learning centers Students attending summer camp
General Public Scout, 4-H, or other Youth groups Other_____

PART 2. OVERALL WORKSHOP EXPERIENCE (*Please circle your responses.)*

11. Usefulness of the Schoolyard Safari: Excellent Good Fair Poor

12. Organization of the workshop: Excellent Good Fair Poor

13. Amount/quality of background content information: Excellent Good Fair Poor

14. Amount/quality of information about teaching strategies: Excellent Good Fair Poor

15. Overall workshop presentation:: Excellent Good Fair Poor

16. Best features of the workshop *(Circle all that apply)*: Setting Facilitators Activities
Curriculum Guide Other_____

PART 3. WORKSHOP COMPONENTS (*Please circle your responses.)*:

17. Amount of time spent on hands-on activities: Just Right Too Much Too Little

18. Amount of time allowed for interaction with other participants: Just Right Too Much Too Little

19. Amount of time spent lecturing/presenting information: Just Right Too Much Too Little

20. Amount of time allowed for questions/discussion: Just Right Too Much Too Little

21. Amount of time allotted for breaks: Just Right Too Much Too Little

PART 4. WORKSHOP FACILITATOR(S) *(Please circle your responses.)*:

22. Preparedness: Excellent Good Fair Poor

23. Presentation skills: Excellent Good Fair Poor

24. Knowledge about schoolyard wildlife: Excellent Good Fair Poor

25. Knowledge about effective teaching strategies: Excellent Good Fair Poor

26. Ability to answer questions/address concerns: Excellent Good Fair Poor

27. Overall rating of workshop facilitator(s): Excellent Good Fair Poor

PART 5. GENERAL QUESTIONS (*Please answer these questions in the spaces provided.)*

28. How did you find out about this workshop? *(Circle all that apply)*:
Flyer/Poster Word of mouth Notice in newsletter Announcement in a class or meeting
Other_____

29. Why did you attend this workshop? *(Circle all that apply)*:
To receive inservice credit As part of a college course Personal interest in the topic It was required
Other_____

30. Did this workshop adequately prepare you to use the Schoolyard Wildlife Activity Guide as a teaching tool?
Yes No If not, please explain: _____

_____

31. Are there any ways in which the workshop could be improved? Yes No If yes, please explain:
_____

_____

32. Are you interested in becoming a facilitator of the Fish and Wildlife Conservation Commission's K-12 conservation education programs (Schoolyard Program, Project WILD, Black Bear, etc.)? Yes No

Schoolyard Ecosystem Workshop Evaluation

Please help us continue to improve the quality of our curriculum resources and workshops by completing this evaluation. Your input is very important to us! Thank you!

Workshop Date_____ Workshop Site_____
Facilitator(s)_____ Social Security Number_____
Name_____ Telephone (____) _____
Home Address (Street) _____
City _____ State _____ Zip _____ E mail _____

PART 1. DEMOGRAPHIC INFORMATION (*Please circle or fill-in appropriate responses.)*

1. Gender: Male Female 2. Age in years:_____ 3. Years of teaching experience: _____

4. Highest degree held: High School Bachelors Masters Specialist Doctorate

5. Current position *(Circle all that apply)*:
Pre-service teacher Inservice teacher Informal educator Volunteer Other _____

6. Place of employment *(Circle all that apply)*:
Public school Private school Home school Informal ed. center Other_____

7. County of employment: _____

8. Grade level taught *(Circle all that apply)*:
PreK-2 3-5 6-8 9-12 College/University General Public

9. Subjects taught *(Circle all that apply)*:
All Science Social Studies Math Language Arts P.E. Art/Music/Drama

Other _____

10. Audience I plan to use the Schoolyard Ecosystem Materials with *(Circle all that apply)*:
Students at school Students visiting informal learning centers Students at summer camp

General Public Scout, 4-H, or other Youth groups Other _____

PART 2. QUALITY OF COMPONENTS (*Please circle your responses.)*

11. Usefulness of the Schoolyard Ecosystem Trek	Excellent	Good	Fair	Poor
12. Organization of the workshop	Excellent	Good	Fair	Poor
13. Slide presentation	Excellent	Good	Fair	Poor
14. Outside activity on surveying plants and animals	Excellent	Good	Fair	Poor
15. Outside activities on site selection and mapping	Excellent	Good	Fair	Poor
16. Inside activity on preparing ecosystem maps	Excellent	Good	Fair	Poor

17. Inside activity on preparing the Materials Cost Form Excellent Good Fair Poor
18. Group presentations of maps session Excellent Good Fair Poor

19. Best features of the workshop *(Circle all that apply)*
Setting Facilitators Activities Guidebook Other_____

PART 3. TIME SPENT ON COMPONENTS (*Please circle your responses.*):

20. Amount of time spent on hands-on activities Just Right Too Much Too Little

21. Amount of time for interaction with other participants Just Right Too Much Too Little

22. Amount of time spent lecturing/presenting information Just Right Too Much Too Little

23. Amount of time allowed for questions/discussion Just Right Too Much Too Little

24. Amount of time allotted for breaks Just Right Too Much Too Little

PART 4. WORKSHOP FACILITATOR(S) *(Please circle your responses.)*:

25. Preparedness Excellent Good Fair Poor

26. Presentation skills Excellent Good Fair Poor

27. Knowledge about topic Excellent Good Fair Poor

28. Ability to answer questions/address concerns Excellent Good Fair Poor

29. Overall rating of workshop facilitator(s) Excellent Good Fair Poor

PART 5. GENERAL QUESTIONS (*Please answer these questions in the spaces provided.)*

30. How did you find out about this workshop? *(Circle all that apply)*:
Flyer/Poster Word of mouth Notice in newsletter Announcement in a class or meeting
Other_____

31. Why did you attend this workshop? *(Circle all that apply)*:
To receive inservice credit As part of a college course Personal interest in the topic
It was required Other_____

32. Did this workshop adequately prepare you to use the Schoolyard Ecosystem Guide as a teaching tool?
Yes No
If "No", please explain: _____

33. Are there any ways in which the workshop could be improved? Yes No
If "Yes", please explain:
_____

34. Are you interested in becoming a facilitator of the Fish and Wildlife Conservation Commission's K-12 conservation education programs (Black Bear, Project WILD, Schoolyard Wildlife, etc.)? Yes No

35. Would you recommend this workshop to anyone else? No Maybe Definitely

ACTION COMMITMENT FORM

INSTRUCTIONS FOR FACILITATORS:

In keeping with the "awareness to action" philosophy of environmental education, this is a sample of a card each participant will receive as part of your workshop. Individual cards will be included in the workshops materials mailed to you by FWC staff. At the end of your workshop collect these cards and return them with your post-workshop paperwork. After 8 weeks, the cards will then be ailed back to schoolyard activities and schoolyard ecosystems workshop participants to remind them of their personal commitments.

SCHOOLYARD ACTIVITIES WORKSHOP
MY PERSONAL ACTION COMMITMENT

Within the next 6 months, I, _____, commit to take the following actions to educate students and others regarding schoolyard ecosystems and their plant and animal inhabitants:

_____
_____
_____

Signed _____ Date_____

SCHOOLYARD ECOSYSTEMS WORKSHOP
MY PERSONAL ACTION COMMITMENT

Within the next 6 months, I, _____, commit to take the following actions to restore or establish a schoolyard ecosystem:

_____
_____
_____

Signed _____ Date_____

COMMON WILDLIFE PICTURES FOR SURVEYING EXERCISE

MAMMALS

Black Bear
Bobcat
Gray Squirrel
Opossum
Rabbit
Raccoon
Red Fox
River Otter
Spotted Skunk
White-tailed Deer

BIRDS

Barred Owl
Burrowing Owl
Green-backed Heron
Killdeer
Limpkin
Northern Cardinal
Northern Mockingbird
Red-shouldered Hawk
Red-winged Blackbird
Sandhill Crane
Wild Turkey
Wood Duck

REPTILES AND AMPHIBIANS

Barking Treefrog
Broadhead Skink
Bullfrog
Coral Snake
Corn Snake
Florida Box Turtle
Gopher Tortoise
Green Treefrog
Pinewoods Treefrog
Rough Green Snake
Softshell Turtle
Yellow Rat snake

COMMON WILDLIFE PICTURES FOR SURVEYING EXERCISE

MAMMALS

Black Bear

Bobcat

Gray Squirrel

Opossum

Rabbit

Raccoon

Red Fox

River Otter

Spotted Skunk

White-tailed Deer

BIRDS

Barred Owl

Burrowing Owl

Green-backed Heron

Killdeer

Limpkin

Northern Cardinal

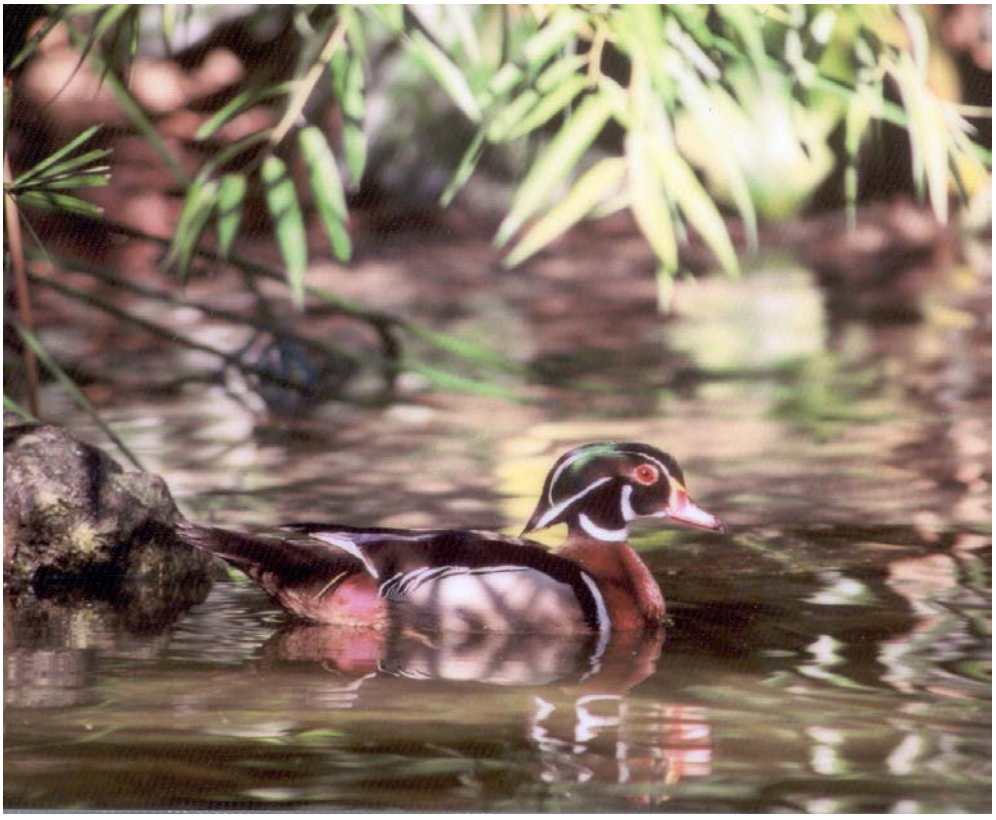
Northern Mockingbird

Red-shouldered Hawk

Red-winged Blackbird

Sandhill Crane

Wild Turkey



Wood Duck

REPTILES AND AMPHIBIANS

Barking Treefrog

Broadhead Skink

Bullfrog

Coral Snake

Corn Snake

Florida Box Turtle

Gopher Tortoise

Green Treefrog

Pinewoods Treefrog

Rough Green Snake

Softshell Turtle

Yellow Rat snake

SECTION FOUR

BLACKLINE MASTER TRANSPARENCIES

FLORIDA SCHOOLYARD PROGRAM

FOUR COMPONENTS:

1. Handbook to Schoolyard Plants & Animals
2. Schoolyard Wildlife Activity Guide
3. Schoolyard Ecosystems for Florida
4. Water Resource Activity Pack

SCHOOLYARD PROGRAM RATIONALE

1. Florida is the third most populous state in the U.S.

2. Florida's population is growing by hundreds of new residents each day.

3. Florida's staggering growth rate is placing heavy demands on all of the state's natural resources, including nongame wildlife species.

4. Florida, California, and Hawaii have more threatened & endangered plants & animals than any other states in the U.S.

5. Proper management/conservation of Florida's wildlife depends on education of the state's citizens.

6. This educational process must begin at an early age since attitudes toward wildlife & the environment are fixed by age 12.

7. Wildlife education programs are more common in high school & least common in the elementary grades where they are most needed.

8. Wildlife education programs must focus on both content knowledge & attitudes to ensure a permanent change in behavior.

9. Environmental education is most successful when a combination of hands-on field experience & other instructional methods are used.

10. Wildlife education is more relevant & motivating when local, familiar accessible organisms are studied.

GOALS OF THE SCHOOLYARD PROGRAM

KNOWLEDGE:

Help students, teachers, parents & the general public learn more about local natural environments and their inhabitants.

ATTITUDES:

Help students, teachers, parents & the general public develop more positive attitudes toward local natural environments and their inhabitants.

BEHAVIOR:

Provide opportunities for students, teachers, parents & the general public to take long-term action to develop, restore, & preserve local natural environments.

CONSERVATION:

Increase the amount of suitable habitat available for local native plant & animal species by creating, restoring & managing natural schoolyard ecosystems.

ADVANTAGES OF THE SCHOOLYARD PROGRAM

1. Activities allow repeated firsthand experience with the local environment.

2. No need to plan off-campus field trips.

3. Activities allow students to replicate the work of real field scientists. Activities are actual field investigations, not simulations or role playing activities.

4. Activities can be implemented in any order or combination to match student interests & available organisms & habitats.

5. Activities address major ecological concepts in the Sunshine State Standards for Science & can be easily integrated into existing curricula.

6. Activities require little teacher preparation time & use easy-to-obtain, inexpensive materials.

7. Activities can be completed in one to two elementary class periods.

8. Activities can easily be integrated with other subjects.

9. Activity guide is complemented by a reference handbook containing background information.

10. Blackline masters for all overhead transparencies & student worksheets are provided.

11. Activities allow students to work cooperative in small groups. Teacher can facilitate rather than direct.

12. All activities were pilot tested in actual classrooms & reviewed by content and education experts.

13. Activities provide opportunities for direct, non-destructive interaction with natural environments & organisms.

14. Activities are Florida-specific & relevant to elementary students' interests.