Wildlife Loves Refuges

J.N. "Ding" Darling NWR, Sanibel, Florida
ENVIRONMENTAL EDUCATION GUIDE
# Table of Contents

- Field Trip Guidelines: Page 4
- Missions of the USFWS: Page 6
- Why Visit the J.N. “Ding” Darling National Wildlife Refuge?: Page 6
- J.N. “Ding” Darling NWR Environmental Education Program: Page 7
- The National Wildlife Refuge System: Page 9

## Pre-Visit Activities

### Chapter 1 National Wildlife Refuge System/ U.S. Fish and Wildlife Service
- Learning about the Refuge Word Search (K-8): Page 10
- Magnificent Mapping (K-8): Page 11
- Vocabulary Vision (4-8): Page 11
- Writing for Wildlife (4-8): Page 12
- Color by Number (K-2): Page 13

### Chapter 2 Jay Norwood “Ding” Darling
- Cartoons for Conservation (K-8): Page 15
- Conservation Cartoon Contest (4-8): Page 17
- Draw a Duck Stamp/ Junior Duck Stamp Contest (K-12): Page 18

### Chapter 3 Healthy Habitats at the “Ding” Darling NWR
- Balancing Habitat Mobile (K-8): Page 20
- Habitat is HOME (K-3): Page 22
- Habitat Song (K-3): Page 22
- Habitat Lap Sit (4-8): Page 23

### Chapter 4 Wonderful Wetlands- Exploring the Estuary
- Let the Cat-tail Out of the Bag! (K-8): Page 25
- Color an Estuary - Color Sheet (K-8): Page 26
- Wetland Migration (4-8): Page 27
- Where Does Your Water Go? (4-8): Page 28

### Chapter 5 Magnificent Mangroves
- Amazing Mangroves!: Page 30
- Making a Mangrove Tree in your Classroom (K-8): Page 31
- Mangrove Song (K-3): Page 32
- Mangrove Worksheet: Page 33

### Chapter 6 Wacky Wildlife at the Refuge
- Color Sheet of Native Animals (K-8): Page 35
- What’s Wildlife? (K-3): Page 36
- Animals in the Wildlife Refuge Word Search (K-8): Page 37
- Animal Squares (3-8): Page 38
- Who Am I? (K-8): Page 39
<table>
<thead>
<tr>
<th>Chapter 7</th>
<th><strong>Birds - Our Feathery Friends</strong></th>
<th>Page 40</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Fascinating Feathers (K-8)</td>
<td>Page 41</td>
<td></td>
</tr>
<tr>
<td>• Birds, Bills and Beaks Wheel</td>
<td>Page 42</td>
<td></td>
</tr>
<tr>
<td>• Bird Bingo Sheet</td>
<td>Page 43</td>
<td></td>
</tr>
<tr>
<td>• Bills, Beaks and How Do They Eat? (K-8)</td>
<td>Page 44</td>
<td></td>
</tr>
<tr>
<td>• Moving Day - Bird Migration</td>
<td>Page 45</td>
<td></td>
</tr>
<tr>
<td>• Pine Cone Bird Feeders (K-8)</td>
<td>Page 46</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chapter 8</th>
<th><strong>Endangered Species</strong></th>
<th>Page 47</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Endangered Species Riddles (4-8)</td>
<td>Page 48</td>
<td></td>
</tr>
<tr>
<td>• Oh, Panther! (K-8)</td>
<td>Page 50</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chapter 9</th>
<th><strong>Fabulous Food Chains</strong></th>
<th>Page 51</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Construct a Refuge Food Chain Activity Sheet (K-8)</td>
<td>Page 51</td>
<td></td>
</tr>
<tr>
<td>• Food Web Work Sheet (with teacher copy) (4-8)</td>
<td>Page 52</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chapter 10 Post-Visit Activities:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Field Nature Journals (4-6) Art &amp; Science</td>
<td>Page 54</td>
</tr>
<tr>
<td>• Field Journal Technique (4-8) Art &amp; Science</td>
<td>Page 54</td>
</tr>
<tr>
<td>• Field Journal Practice Exercises (4-8)</td>
<td>Page 55</td>
</tr>
<tr>
<td>• Nature Swap (K-6) Art, Science &amp; Language Arts</td>
<td>Page 56</td>
</tr>
<tr>
<td>• Draw &amp; Discuss (4-6) Art, Science &amp; Language Arts</td>
<td>Page 57</td>
</tr>
<tr>
<td>• Everyone is a Poet! (K-8) Science &amp; Language Arts</td>
<td>Page 58</td>
</tr>
<tr>
<td>• Taking Action for the Planet (4-8) Science &amp; Language Arts</td>
<td>Page 60</td>
</tr>
<tr>
<td>• History Lesson (4-8) Science &amp; Language Arts</td>
<td>Page 61</td>
</tr>
<tr>
<td>• Draw your favorite memory (K-8) Art &amp; Science</td>
<td>Page 62</td>
</tr>
</tbody>
</table>

| Vocabulary Glossary | Page 63 |
| Teacher Packet Evaluation – Fax 239-472-4061 | Page 64 |

Attention Ranger Toni Westland at
E-mail corrections/suggestions to: toni_westland@fws.gov

This guide was developed by J.N. “Ding” Darling National Wildlife Refuge staff and volunteers. It was adopted from other lessons used at the Refuge and other useful environmental education guides.
Field Trip Guidelines

LOGISTICS:

- Please schedule school trips in advance by calling Park Ranger Toni Westland at 239/472-1100 ext. 236. Please have alternative dates. The best months to view birds are January, February and March along with a low tide.

- We recommend you use buses or vans for transportation to the refuge especially if you want a tour along Wildlife Drive. Caravanning of multiple cars is not as affective and can be dangerous during busy times.

- For large groups, Refuge volunteer logistical support may be available.

- An adult-to-student ratio of at least 1:10 is recommended for students above 4th grade. More adults are suggested for younger children.

- The best days to schedule a field trip are Monday-Thursday. Please note that Wildlife Drive is CLOSED on Fridays to the public although the education center will still be available for programs. The J.N. “Ding” Darling Education Center is open 9 a.m. to 4 p.m. daily.

- Teachers are asked to check in at the J.N. “Ding” Darling Education Center when they arrive, and call the refuge if they are running late. 239/472-1100

- There are no lunch facilities at the Refuge. Teachers are encouraged to have their trip planned accordingly. There are three picnic areas outside of the refuge at Bowman’s Beach, City Park (off Periwinkle) and the Causeway to Sanibel. All have picnic benches and restrooms except City Park which only has picnic areas.

- Grants for field trips are available some years for schools that qualify. Inquire with Ranger Westland.

- Have students bring bottled water, sunscreen, hats and insect repellant.

PARKING:

- Please have the bus driver drop students off in front of the Education Center by the flagpole. Long-term parking is available in the upper lot and look for the area labeled “Bus Parking.”

FACILITIES:

- Restrooms are located at the top of the ramp outside of the Education Center. Please have an adult accompany students to the restroom to make sure they stay neat.

- The “Ding” Darling Society Bookstore is open daily and is located inside the Education Center. We recommend the students be divided into small groups to shop and that they have adult supervision. There are a number of items under $5.00. Please remind your students that prices do not include tax. This will be available upon request.
GENERAL:

- In a Wildlife Refuge, wildlife comes first. Please do not stray from designated trails, other authorized areas or your guide. Do not disturb the wildlife - this is their home.

- Take only memories. The collecting of animals, plants, or other natural materials is NOT permitted in the Wildlife Refuge.

- Cameras and binoculars are encouraged. The refuge does have a classroom set of binoculars for use upon request.

- Inside the Education Center, please ask your students not to place their clipboards on any part of the exhibits. The exhibits are easily damaged and must be given special care.

- If someone becomes injured while visiting the refuge, there is the Sanibel Medical Clinic located at 1715 Periwinkle Way 239/395-2005. Please notify a staff member or volunteer immediately.

- Websites: [www.fws.gov/dingdarling/](http://www.fws.gov/dingdarling/)  
  [www.dingdarlingsociety.org](http://www.dingdarlingsociety.org)

CANCELLATIONS:

- So that other groups may be accommodated, please inform Park Ranger Toni Westland of cancellations as soon as possible at 239/472-1100 ext. 236.

Get a FREE Wildlife Classroom Poster for each teacher who attends a field trip to the refuge by doing the following:

- □ Raise $20.00 for wildlife habitat
- □ Bring it with you on your field trip
- □ Buy BOTH a Federal & Junior Duck Stamp at Refuge Bookstore
- □ Get your free Poster!
The U.S. Fish and Wildlife Service is the chief conservation agency dedicated to managing endangered species and migratory birds within the United States.

**Mission of the United States Fish and Wildlife Service**

“To conserve, protect, and enhance fish and wildlife and their habitats for the continuing benefit of the American people.”

**Mission of the National Wildlife Refuge System**

“To preserve a national network of lands and waters for the conservation and management of the fish, wildlife, and plants of the United States for the benefit of present and future generations.”

**Goals of the U.S. Fish and Wildlife Service and National Wildlife Refuge System**

1. To preserve, restore and enhance in their natural ecosystems (when practicable) all species of animals and plants that are endangered or threatened with becoming endangered.
2. To perpetuate the migratory bird resource.
3. To preserve the natural diversity and abundance of flora and fauna on refuge lands.
4. To provide an understanding and appreciation of fish and wildlife ecology and peoples’ role in their environment, and to provide refuge visitors with high-quality, safe, wholesome, and enjoyable recreational experiences oriented toward wildlife to the extent that these activities are compatible with the purpose for which the refuge was established.

**Objectives for Environmental Education within the USFWS**

1. To foster public understanding and appreciation.
2. To encourage and facilitate thoughtful, safe, and minimum impact of the Refuge.
3. To promote the policies, practices, and programs of the USFWS.
4. To expose students to environmental education problem solving.
5. To support management objectives.

**Why visit the "Ding" Darling Refuge?**

A class visit to the “Ding” Darling Refuge can be a fun and exciting wildlife experience. The Refuge offers visitors a unique opportunity to observe and learn about the delicate balance of wildlife and habitat. Our mission is Wildlife First!

The four-mile Wildlife Drive winds through mangrove wetlands and mudflats. At low tide hundreds of wading birds feed on animals such as crabs, amphipods and mussels. This is an excellent opportunity to talk about food chains, food webs and the importance of the mangrove estuary.

There are over 250 different species of birds throughout the year, twenty species of birds can easily be found during the trip. The variety of birds provides an excellent opportunity to learn bird identification by comparing beaks, feet, and body shape. The variety itself creates ample opportunity to discuss structure-function, adaptation, diversification and competition.

The refuge manages these lands for the benefit of wildlife. Protection of diversified habitats, exotic species control, and water management help to make the refuge a haven for wildlife.
PRE-VISIT RESPONSIBILITIES

• Prepare your class before your visit to the refuge by giving them a basic knowledge of the U.S. Fish and Wildlife Service, The National Wildlife Refuge System, Jay Norwood “Ding” Darling, and estuarine and mangrove habitat. This guide is designed to give you background knowledge of all of these subjects. (Don’t worry - you don’t need to be an expert!)

• Arrange a pre-visit field trip to your school by refuge staff. These trips can greatly enhance the refuge experience and are highly recommended. Call Ranger Toni Westland to schedule a visit. 239/ 472-1100 ext. 236

• Use the lessons and activities provided to help your children understand wildlife and their habitats. Lessons are designated by a magnifying glass symbol and all lessons are developed to meet the Sunshine State Standards.

• Discuss with your students in a positive way, how to behave at a National Wildlife Refuge:
  ✓ No picking or taking of anything from the Wildlife Refuge
  ✓ No approaching any animals
  ✓ No quick movements - they will scare the animals away
  ✓ No feeding of any animals or leaving any food behind in the refuge
  ✓ No running or yelling - the quieter they are the more your students may see
  ✓ Stay with the group and listen to the leader at all times for safety reasons
  ✓ Behave as if they were learning in their classroom – this is an outdoor classroom.

FIELD TRIP TO THE REFUGE

• Trips are conducted by Refuge staff and include:
  o Inside Scavenger Hunt in Education Center (45+ minutes) & outside
  o An outside emphasis: (1 hour 30+ minutes) – TEACHERS CHOOSE ONE:

  **Birds of South West Florida:** Take a journey along Wildlife Drive studying the birds found in the Refuge. Bird identification cards are supplied to help the students identify the birds surrounding them. A limited number of binoculars are available. Students will be broken into groups to compete for the most species found! Great way to learn what is flying over head! Bird bingo sheets will be available.

  **Endangered Species:** What is the Endangered Species Act (ESA)? In this hands-on problem-solving program, students will learn which animals are protected by this law and why. They will then brainstorm about what they can do to help these animals survive.

  **Exploring the Estuary:** Bring your wet shoes! Bring your class on an adventure into the estuary. Learn about the importance of the estuary, who lives there, the different species of mangrove trees and their functions and what lives below the water. The class can dip net into the water and sift through the sand for creatures hidden below.

  **Nature Journaling:** Want to incorporate Reading, English, Art and Science? Have your students create nature journals and bring them along on their field trip at the Refuge. Learn about the Florida Junior Duck Stamp program.
POST-VISIT LESSONS/ACTIVITIES

- Conduct post-visit activities provided in this packet to reinforce what the students have learned on their trip to “Ding” Darling Refuge.

CONTACT:
Park Ranger Toni Westland, at the J.N. “Ding” Darling National Wildlife Refuge (239/472-1100 ext. 236) to discuss curriculum and theme of your visit, special needs, dates, and times.
What is a Wildlife Refuge?
A wildlife refuge is a special place for animals - wild lands (habitat) set aside to benefit all wildlife. There is a wildlife refuge located in every state and within 50 miles of every major city in the United States! Wildlife Refuges are placed along four flyways to help migratory birds make their long journeys. These flyways are the Atlantic, Mississippi, Central, and Pacific. Use the activity sheet attached to help your students learn the vocabulary associated with refuges.

The National Wildlife Refuge System, managed by the U.S. Fish and Wildlife Service, is the largest collection of lands and waters set aside for wildlife conservation in the world. The J.N. “Ding” Darling National Wildlife Refuge System is one of more than 540 National Wildlife Refuges and 93 million acres ranging from the Artic circle in Alaska to the subtropical waters of the Caribbean and South Pacific. It is federal lands managed by the U.S. Fish and Wildlife Service.

The National Wildlife Refuge System began in 1903, when President Theodore Roosevelt established Pelican Island, near Sebastian Inlet Florida, the country’s first National Wildlife Refuge. In the early 1900s, market hunting was taking its toll on many birds and much of America’s native wildlife. The protection of this small three-acre rookery island on Florida’s east coast was vital for the well being of many wading birds (Egrets, Herons, Pelicans). Market hunters were killing the birds for their plumes in order to make feathered hats.

The first refuge manager for what is now the U.S. Fish and Wildlife Service was Paul Kroegel. Paul was a local boat builder who lived on the Indian River across from Pelican Island. He would watch the island and if he saw anyone out there he would take his boat to the island where he often encountered poachers. There are 28 different wildlife refuges operated by the USFSW in Florida.

You can visit most refuges but about 10 percent are closed to public visitation because they were established for the protection of threatened and endangered species.
Learning about the Wildlife Refuge

Federal Duck Stamp
Conservationist

Estuary
Low Tide
Wading birds

Federal Duck Stamp - Must be purchased by waterfowl hunters to attach to their license, a conservation tool, and as an entrance pass for National Wildlife Refuges. The money collected from the Duck Stamp goes back into conserving habitat for animals.

Mangroves - Trees that live in salt water, basis of the food chain in the marine environment.

Detritus - Decaying leaves, twigs, and animal remains in the water. When broken down, they are food for small organisms. This is the basis for the food chain in an estuary.

Adaptation - Something that an animal has or does that helps it survive in its environment.

Conservationist - Someone who works to protect the environment.

Flyways - Routes birds use to fly (migrate) from winter to summer grounds, four flyways in USA: Atlantic, Mississippi, Central, and Pacific.

Habitats - An animals home, a place where it lives.

Wildlife Refuge - “Safe place” for animals, land set aside to benefit wildlife, managed by USFWS.

Jay Norwood “Ding” Darling - Famous cartoonist and wildlife conservationist for whom the refuge is named.

Estuary - Place where fresh and salt water meet, very productive ecosystem.

Low Tide - The lowest level of the tide, many animals can be seen feeding at this time.

Wading birds - Birds such as the Herons, Storks, Ibises, and Spoonbills.
**NATIONAL WILDLIFE REFUGES ACTIVITIES:**

**Magnificent Mapping: Wildlife Refuge Map**

**Grade level:** K-8  
**Duration:** 60 min  
**Group size:** Any  
**Subjects:** Science, Social Studies, Math  

**Objectives:**  
1) Familiarize themselves with maps, legend, states  
2) Students will understand how to use a scale to determine distance on a map  
3) Students will be able to locate three National Wildlife Refuges in the U.S.A.

**Materials:**  
- Five National Wildlife Refuge Maps  
- Rulers  
- Paper

**Procedure:**

Put your students into small groups and use the National Wildlife Refuge map to teach a science, geography and math lesson.

Hold a general discussion about the USA map, how many states etc. Smaller children will need more explanation. How many states are in the USA? Locate the key on the map. Talk about wildlife refuges, that there are 545. Locate the scale. Explain how to measure distances on a map with a scale. Have them practice this skill. Write the following questions on the board and have your students answer.

1. How many miles is it from the JN. “Ding” Darling Refuge to San Francisco Bay NWR?  
2. How many refuges are found in our largest state? Number of refuges in the smallest state?  
3. If you add the number of wildlife refuges in California with the number of refuges in Montana, how many does that equal?  
4. Calculate the Georgia refuges – Iowa refuges = __________ ?  
5. How many refuges on the Mississippi River? Why?  
6. Which state has the most refuges?  
7. Name a refuge found in each of the four flyways? (See flyways lesson in bird section)  
8. Can you locate two major rivers?  
9. Where are the great lakes? Can you name them?

---

**Vocabulary Vision- FUN VOCABULARY GAME**

Play this game for your students to show their understanding of the vocabulary words above. This is an easy and fun way to review the words before your trip! Have them complete Refuge Word Search first to learn vocabulary words.

**Grade Level:** 4-8  
**Duration:** 30 min  
**Group size:** Any  
**Subjects:** Science and Language Arts

**Objectives:**  
1) Students should learn 12 Refuge Vocabulary words

**Materials:**  
- Vocabulary words  
- Board

**Procedure:**

Have a student volunteer come in front of the class, facing them, back to the board. Write one of the vocabulary words on the board behind them, making sure that they can’t see the word. Let the rest of the class see it, then erase it. Have the class give clues (phrases or words) to the student up front until they guess the word.

**Example:** Estuary (students’ clues: mixture, fresh, salt water, habitat, many animals)
Writing for Wildlife

Ask your students to write a story or make sentences using the vocabulary words below showing their understanding of the vocabulary words below. Complete the refuge word search first to familiarize them with the vocabulary words.

Grade Level: 4-8
Duration: 30 min
Group size: Any
Subjects: Science and Language Arts

Objectives:
1) Students should be able to utilize the vocabulary words in sentences and paragraphs.
2) Students should understand wildlife definitions and be able to utilize them in conversation.

Materials: • Paper

Jay Norwood “Ding” Darling - Famous cartoonist & conservationist for whom the refuge is named.

Estuary - Place where fresh and salt water meet, very productive ecosystem.

Low Tide - The lowest level of the tide, many animals can be seen feeding at this time.

Wading birds - Birds such as the Herons, Storks, Ibises, and Spoonbills.

Federal Duck Stamp - Must be purchased by waterfowl hunters to attach to their license, a conservation tool, and as an entrance pass for National Wildlife Refuges. The money collected from the Duck Stamp goes back into conserving habitat for animals.

Mangroves - Trees that live in salt water, basis of the food chain in the marine environment.

Detritus - Decaying leaves, twig, and animal remains in the water. When broken down, they are food for small organisms. This is the basis for the food chain in an Estuary.

Adaptation - Something that an animal has or does that helps it survive in its environment.

Conservationist - Someone who works to protect the environment.

Flyways - Routes birds use to fly (migrate) from winter to summer grounds, four flyways in USA: Atlantic, Mississippi, Central, and Pacific.

Habitats - An animal’s home, a place where it lives.

Wildlife Refuge - “Safe place” for animals, land set aside to benefit wildlife, managed by USFWS.
Color-by-Number

1-White
2-Tan
3-Orange
4-Yellow
5-Blue
6-Light Blue
Jay Norwood “Ding” Darling (1876-1962) was born in Norwood, Michigan. He attended college in Beloit, Wisconsin, and South Dakota after which he soon began work as a cartoonist for the Des Moines Register. He was one of the top ranked political cartoonists in the nation and his cartoons were syndicated to 130 daily newspapers.

He reached audiences all over the country with cartoons noted for their political satire and conservation messages. In 1934, the country’s leading newspaper editors named him the best cartoonist. He also was awarded the Pulitzer Prize in 1923 and 1942. **He drew over 15,000 cartoons in his lifetime.**

Darling’s love for wildlife and his concern about extinction led him to draw many cartoons about the conservation of our natural resources. Darling signed each of his cartoons with his nickname “Ding;” the first letter and last three letters of his last name.

President Franklin D. Roosevelt had appointed Darling in 1934 as chief of the Bureau of U.S. Biological Survey, a predecessor of the U.S. Fish and Wildlife Service. In that position, Darling was instrumental in the conception and development of a stamp to be bought by all waterfowl hunters that would generate funds to pay for acquiring and preserving habitat for ducks, geese and swans.

On March 16, 1934, Congress passed and President Roosevelt signed the Migratory Bird Hunting Stamp Act. Popularly known as the Duck Stamp Act, it required all waterfowl hunters 16 years or older to buy a stamp annually. The revenue generated was earmarked for the Department of the Agriculture, and then five years later transferred the authority to the Department of Interior and the U.S. Fish and Wildlife Service to buy or lease waterfowl sanctuaries. Since then, many stamps have been designed to help other wildlife: turkey stamp, trout stamp, etc.

“Ding” had a fish camp on the island, and was instrumental in establishing the Sanibel National Wildlife Refuge in 1945. After his death in 1962, his island neighbors pushed to change the name of the refuge on Sanibel Island after him.
This cartoon was created by Jay Norwood “Ding” Darling and was published in newspapers across the United States in 1921. **What do you think he is trying to show us?**

**What is deforestation?** Use the back of the paper or separate sheet to explain.
This cartoon was created by Jay Norwood “Ding” Darling and was published in newspapers across the United States in 1936. **What do you think Ding is trying to say?**

**What is utopia?** What island(s) do you think he might be talking about? Use the back or separate sheet of paper to explain.
Jay Norwood “Ding” Darling Activities:

Conservation Cartoon Contest

Have a Cartoon Contest at your school or in your class! Students should design an environmental cartoon for themselves in “Ding” Darling’s honor! Have them pick an environmental concern, research the subject, and draw a cartoon explaining/finding a solution!

Grade Level: 4-8
Duration: Few weeks
Group size: Any
Subjects: Science and Art
Objectives: 1) Identify local environmental problems in the community.
2) Brainstorm solutions to the problems.
3) Draw an editorial cartoon to increase awareness about the issue.
4) Explain the problem and write possible solutions.

Materials: ● Paper ● Art Supplies
Draw A Duck Stamp!
Florida Federal Junior Duck Stamp
For Rules & information: www.fws.gov/duckstamps/junior

Grade Level: K-12
Duration: Long-term art project
Group size: Any
Subjects: Science, Art, and Language Arts
Objectives: As a result of completing this activity, students will: develop field sketching techniques using any art supplies (ART), research and sharpen their skills of observation of the living and nonliving environment (SCIENCE), and write a conservation message about what they learned to go with their drawing. (LANGUAGE ARTS)
Materials: ● 9x12 paper ● Art supplies ● Pictures of waterfowl (ducks, geese & swans)

After your trip to the refuge, have the students draw and complete an entry in the Florida Junior Duck Stamp Contest. Also, students must write a one-sentence conservation message about what they learned about saving wetland and waterfowl. After studying waterfowl anatomy and habitat, students may articulate their newfound knowledge by drawing, painting or sketching a picture of any North American waterfowl species.

Who may participate?
Group 1 grades: K-3rd
Group 2 grades: 4th-6th
Group 3 grades: 7th-9th
Group 4 grades: 10th-12th

• K-12 students attending public, private, or home schools in the United States and the U.S. Territories are eligible to enter, so long as they are U.S. citizens, resident aliens, or nationals. U.S. Citizens attending schools abroad may enter through their state of residence.
• Any person who has won First Place in the National Junior Duck Stamp Contest during the preceding year may not submit an entry in the current year’s contest.
• Only one entry per student is allowed.

Design Regulations
• Designs must be horizontal.
• Do not make the design look like a stamp.
• Entries must be 9” x 12” and may not exceed ¼” in total thickness.
• No lettering, words, signatures or initials may appear on the front of the design. Inclusion of such items will result in disqualification.
• Design entry must be contestant’s original, hand-drawn creation and may not be traced or copied from photographs or other artists’ published works. See more details on website.
• Attach each students entry form to the back of artwork.

Deadline for contest is March 31 every year
Send the artwork to Park Ranger Toni Westland, 1 Wildlife Drive, Sanibel. FL 33907 239/472-1100 ext. 236
*Permitted Species to draw:*

Trumpeter Swan ● Tundra Swan ● Wood Duck ● Ruddy Duck ● Koloa
Laysan Duck ● Nene ● Greater White-fronted Goose ● Snow Goose (including blue phase) ● Ross’s Goose ● Emperor Goose ● Canada Goose Brant ●
Healthy Habitats

Habitat: The area where an animal lives, its home. Discuss how different plants and animals live in different habitats. Explain that there are many habitats but that we will talk about habitats including: Oceans, rivers, estuaries, meadows, ponds, jungles, forests, everglades, etc. There are **four essential things that animals need to survive in their habitat**: Food, Water, Shelter, and Space. Explain these four concepts. Habitats have everything that plants and animals need to survive - if one or many of these are missing they will not survive. Currently the number one reason animal populations are declining is habitat loss. Habitat (an animal’s home) is being destroyed with development and urban sprawl. Wildlife Refuges are critical habitat for animals around the world. Without these special places many animals would not have what they need to survive.

Ask the children “What is a habitat?” and explain, **Habitat: The area where an animal lives, its home**... Talk about how different animals live in different habitats. Explain that there are many different habitats on Earth including: Oceans, rivers, estuaries, meadows, ponds, jungles, forests, everglades, etc. What four essential things do animals need to survive in their habitat? Can you name them? If they don’t have one or many of these they will not survive.

Have students make symbols for each:
Food: Place hands over mouth, Water: Cup hands like drinking water, Shelter: Make a tent over head, Space: Arms stretched out from their sides.

Balancing Habitat Mobile

To help students understand the importance of habitat conservation along with the necessity of food, water, shelter and space in animal’s habitat. Make a mobile with these concepts. This is a great project that forces them to balance their ecosystem!

**Grade Level:** K-8  
**Duration:** 60 min  
**Group size:** Any  
**Subjects:** Science and Art  
**Objectives:**
1) Understand importance of habitats and how it effects animal’s survival.  
2) Students should be able to list the four things animals need to survive.  
3) Students should be able to understand what happens to the population when an element is taken out.

**Materials:**
- Mobile sheet attached  
- Crayons  
- Animal pictures  
- Yarn  
- Drinking straws  
- Tape or glue

**Procedure:**
Teach the lessons above about the importance of habitat. Ask the students to select an animal. They should color and cut out their animal and the words: food, water, shelter and space, using the color sheet attached. List their animal’s food, and shelter (where they live). Cross the 2 drinking straws and tape together to form the top of the mobile. Hang the wildlife from the middle of the straws and the food, water, shelter and space from each corner. Have students balance all the pictures. Was it hard? What if one thing is missing? Will it still balance?
Habitat Mobile

Cut out squares, and balance

FOOD

WATER

SHELTER

SPACE
Habitat is HOME

**Grade Level:** K-3  
**Duration:** 60 min  
**Group size:** Any  
**Subjects:** Science and Art  
**Objectives:**  
1) Students should understand and be able to list four things animals need to survive  
2) Students should understand and be able to explain importance of their animal’s home/habitat.  

**Materials:**  
- Paper  
- Crayons  

Places where we live are called communities. Animals live in communities, too! Have younger students draw their habitat - their home. Have them show all things essential in their habitat: shelter, family, food, etc. Each student’s idea of what home is and what they need is different.

Remind them: There are four essential things that animals need to survive in their habitat: Food, Water, Shelter, and Space. Explain these four concepts. Habitats have everything that plants and animals need to survive - if one or many of these are missing they will not survive.

**Habitat Song**  
(Tune - the farmer in the dell)

You need 4 things for a habitat (Hold up 4 fingers)  
You need 4 things for a habitat  
Hi Ho the Derry O  
You need 4 things for a habitat

Food is part of a habitat  
(Put both hands to mouth, like eating)

Water is part of a habitat  
(Put hand, shaped like a cup, drinking)

Shelter is part of a habitat  
(Extend arms over head, like a roof of a house)

Space is part of a habitat  
(Extend arms out at sides, to show space)

Food, water, shelter and space  
(Do each action for each word)

Additional verse:  
A habitat is a home
Habitat Lap Sit (Mature students activity)

Grade Level: 4-8
Duration: 60 min
Group size: Smaller group preferred
Subjects: Science
Objectives: 1) Students will understand the importance of teamwork.
2) Students will understand how things depend on each other.

Materials:  ● Mature Students

Introduce the four things essential for animals to survive. Have the students list these: Food, Water, Shelter, and Space. Make cards with these titles on them. Assign students to be the “cheerleaders” of their section - but remind them that all areas are needed. Have them yell out the different titles while the cheerleader holds them up. Then divide the groups into the four areas. Now they are each one of these groups. Select some students from each of the four groups. We must have some from each have them form a tight circle (huddle like a football team). Make sure their hips are touching each others. Have them ALL turn to the side so their toes are touching the heels of the person in front of them. Put their hands on shoulders of the person in front of them also. On the count of three, all students will try to BALANCE together to represent how all four of these things are essential to have the animal survive. They will sit on the lap of the person in front of them. *Key: Don’t just fall on the person’s lap work together to BALANCE.

If this activity WORKS, have them do it again but at the last moment take out all the food people. There will be huge gaps, it will be off balance and the whole group will fall. The animals will die. Possibly all the animals could go extinct.

Take out the FOOD: Development came into the area. Mangrove trees were cut down from the shoreline. Without the mangrove trees, there is no detritus, there is no food for the shrimp and small fish. The fishing industry crashes, the bird populations decline.

Take out the WATER: (or pollute the water!) Florida manatee, water birds, alligators etc. are all affected by loss of water or polluted water.

Take out the SHELTER: Development of houses in Cape Coral is causing habitat loss of open areas for burrowing owls that live there. Burrowing Owl populations are declining. (Now the city has designated un-buildable lots to save the owl and there is a festival in their honor started in 2003!)

Take out the SPACE: Good example is the Florida Panther! Without the needed Space for the panther to survive (hundreds of miles) this species will go extinct.

Have two groups compete to see if they can balance like an ecosystem. Girl group verses boy group. Depending on the age, keeping the sexes separate might work better.
Wetland simply put, a wetland is just as it sounds—wet land. Wetlands cover about six percent of the earth’s surface. They are found in all continents except Antarctica. To be a wetland, an area must have three characteristics during most of the growing season: hydric (saturated) soils, water tolerant plants, and enough water to saturate soil or cover the land to a shallow depth. Varieties of plants and animals call this unique environment home and have special adaptations to live in wetland. Who lives there? There are many types of wetlands: estuary, marsh, bog, fen, mire, peatlands, playa lakes, potholes, swamps, sloughs and wet meadows to name a few!

A wetland has these three characteristics:

- **It is covered by water** or has waterlogged soil for at least seven days during the growing season. Waterlogged soil is soil that contains so much water that there is no room for oxygen.

- **The plant life is adapted.** Special plants have adapted to life in the wetlands, and are called *hydrophytes* (this means that they are "water loving"). These special plants can grow without much oxygen from the hydric soil.

- **The soil is hydric.** *Hydric* soil is means that it does not have enough oxygen for some plants to grow, such as big evergreen trees.

Coastal Wetland is any land that is flooded or submerged during an average high tide. Estuaries are special ecosystems where the freshwater rivers meet the saltwater oceans. The mixture of fresh and saltwater is called brackish. Estuarine waters are usually full of nutrients and sediments that have been washed down from the rivers that feed them. They are some of the most productive habitats on Earth! About 70% of the sea food we eat gets its start in estuaries. Also called the “Nursery of the Sea” or “Cradle of the Ocean”

The refuge is a hotspot for birding because it is an estuary. Numerous animals are associated with mangrove estuaries here at the refuge, ranging from 220 species of fish, 24 species of reptiles and amphibians, 18 species of mammals, 181 species of birds and who knows how many invertebrate and plant species! The high diversity of animals here is not an accident, as one species often depends on another for survival - an idea usually referred to as a food web.

Discuss how wetlands have been perceived throughout history. They have been given a bad rap! People saw wetlands as wasteland because it was uninhabitable by people. These were wet, dark, unfamiliar places that could not be developed and used by humans. Thus people filled in these areas to be built on. It wasn’t until later that people began to see them as very useful habitat for wildlife.
Talk to students about wetlands. Have them list wetlands found in your area or around the world. (See list above) Take them on a trip using guided imagery! Have the students close their eyes… have them picture in their minds a wetland. What does it smell like? What sounds do you hear? What animals are there? Have them write five words describing their place they “traveled” to. Be descriptive and share them with the class. Have them list both negative and positive words describing wetlands.
Negative: dark, smelly, grim, desolate, wasteland
Positive: life, animals, nursery, diversity, green

**Benefits of an Estuary:**
- Provides Food for both humans and other animals,
- Provides Protection from predators for small and juvenile animals,
- Provides Recreation opportunities,
- Protects the mainland from storms,
- Filters pollutants from our waters.

Mangrove ecosystem and Salt Marshes are a special community of plants and animals.
List the types of plants and animals that live in these areas?

<table>
<thead>
<tr>
<th>Mangrove trees</th>
<th>Mangrove crab</th>
<th>Shrimp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red Fish</td>
<td>Blue crab</td>
<td></td>
</tr>
<tr>
<td>Alligators</td>
<td>Wood Stork</td>
<td></td>
</tr>
<tr>
<td>Crocodiles</td>
<td>Florida Manatee</td>
<td></td>
</tr>
<tr>
<td>Osprey</td>
<td>Sea grasses</td>
<td></td>
</tr>
</tbody>
</table>

**Let the Cat-tail Out of the Bag!**

**Grade Level:** K-8
**Duration:** 60 min
**Group size:** Any
**Subjects:** Science

**Objectives:** Students will be able to: 1) list different types of wetlands 2) Name different plants & animals that live there 3) describe a wetland community as a whole.

**Materials:** pillow case with “touchy-feely” wetland artifacts:
Cattail, flower, feather, shell, crab claw, fur, snake skin, bird’s nest, plastic animals (frog, fish, insects, duck, etc)

Have a brave volunteer come up in front of the room. Blindfold the student and have them reach into the bag and pull out the artifact. Have the student feel and describe what they are feeling. Have them guess what the object is. After they have correctly identified the object, have them describe how it fits into wetlands.
What is an estuary?
List some animals that live in the estuary.
Wetland Migration

Coastal wetlands are an important factor to ensure the success of bird migration. Ponds, lakes and marshes provide food and shelter for traveling birds. Without the wetlands, birds would not have the energy to make the trek from South to North. At the time of the European settlement of the United States there were 215 million acres of wetlands. Today there are less than 100 million. Besides providing habitats for waterfowl, wetlands help relieve flooding, filter pollutants and are an integral part of the ecosystem. Through increased education of their importance and beauty, children will become responsible stewards of the remaining 100 million acres of wetlands.

PURPOSE: To increase awareness for the need to protect our nation's wetlands.

Grade Level: 4-8
Duration: 60 min
Group size: Older groups, no preference
Subjects: Science
Objectives: 1) Students will be able to define migration.
2) Students will be able to visualize the dependence of wetlands for migrating birds.
3) Students will be able to explain how habitat destruction reduces animal population.

Materials: ● Chalk ● Open area to draw hopscotch outline

Procedures:
1. This activity will be best accomplished on a sandy section of the playground or a parking lot. The teacher will draw a large-sized hopscotch course. The course can be drawn on the pavement with chalk or drawn on the sand/dirt with a stick. The squares should be approximately 3'x3'. The hopscotch course should contain 10 squares.
2. Have students line up at the beginning of the course. Tell the students that they are birds starting there journey northward. Tell the students that each of the squares represents a wetland between Florida and Maine (it will be more dramatic using a migration path which includes your state. Specific migration patterns and bird species can be obtained from a bird field guide.). Students are then challenged to migrate northward on the course. They do not have to step on every square, however they must not go outside the course.
3. All students should be successful in the first migration. Now, tell the students you are a developer. You will destroy 2 wetland areas in order to build condos. Put an "X" on two of the squares. Tell students to make the migration once again. They may not set foot on the destroyed wetlands. If they do, they die and thus may not participate in any further migrations. After all students have run through destroy two more and repeat the procedure. Repeat this until all students fail to make the migration. Try to "X" off the squares in such a way that not all are destroyed but are so far apart students can not make the jump. This will help with the debriefing.

TYING IT ALL TOGETHER: At the end of the activity ask students the following questions: 1. Explain why some birds died earlier than others? 2. Why did the rest of the birds die? 3. Explain how this game represents migration. 4. Why did the birds die even though some wetlands remained at the end of the game? 5. Why is it important to save wetlands in all states? 6. How do migrating birds depend on wetlands during migration?
Extension: Have students investigate any developments in their community that threaten wetlands. Have students use field guides to investigate birds which migrate to and from their community.

Where Does Your Water Go?

Grade Level: 4-8  
Duration: 60 min  
Group size: Older groups, no preference  
Subjects: Science and Math  
Objectives:  
1) Students will learn how much water exists on earth and where it is located.  
2) Students will understand how much freshwater is available for use and how daily activities affect it.  
3) Students will understand and be able to utilize measurements.

Materials:  
- Seven two-liter bottles  
- Water  
- Graduated cylinders  
- Food coloring  
- Labels of volume  
- Calibrated droppers for 1 ml

Introduction: Earth as seen from space is clearly a water planet. About 71% of the surface of the planet is covered by water. Water is found in the oceans, rivers, ponds, lakes, groundwater, ice caps, glaciers, and in the atmosphere as water vapor and clouds. Water changes state and moves from place to place through the water cycle of evaporation, condensation, and precipitation. Although earth's water supplies seem almost limitless when viewed from an ocean beach, water forms only a thin film on the surface of the planet. The average depth of the oceans is about 3.5 - 4.0 km, while the average radius of earth is 6371 km.

What to Expect: Some of these volumes are so small the class will need to gather around the display to see the water being added. The clear bottles with blue colored water in them clearly labeled make a dramatic display for the school or community.

Procedure:  
1) Color about 2 liters of water blue with food coloring.  
2) For younger students: have students measure out the volumes, add each amount to a separate bottle. (For older students: Use these figures to calculate volumes. Students can fill the bottles and set up a display for the school in a prominent place.)  
3) Make cards with numbers on them.

<table>
<thead>
<tr>
<th>Type of Water</th>
<th>Percentage of Earth's Water Supply</th>
<th>Volume of Water to Use in Bottle</th>
</tr>
</thead>
<tbody>
<tr>
<td>All of the earth's water</td>
<td>100 %</td>
<td>2000 ml</td>
</tr>
<tr>
<td>All earth's salt water (oceans)</td>
<td>97.2 %</td>
<td>1944 ml</td>
</tr>
<tr>
<td>All earth's fresh water</td>
<td>2.8 %</td>
<td>56 ml</td>
</tr>
<tr>
<td>Fresh water locked up as ice</td>
<td>2.3 %</td>
<td>46 ml</td>
</tr>
<tr>
<td>Underground fresh water</td>
<td>0.4 %</td>
<td>8 ml</td>
</tr>
<tr>
<td>Surface fresh water</td>
<td>~ 0.05 %</td>
<td>1 ml</td>
</tr>
<tr>
<td>Water in soil and air</td>
<td>~ 0.01%</td>
<td>0.2 ml</td>
</tr>
</tbody>
</table>
Evaluation:
1. Students can make a bar graph showing the percentages of water in different forms.
2. Students can calculate volumes for each percentage, answering the question, "If ocean water volume is about, what is the volume of water in each of the other categories?"
3. Discuss how water affects your lifestyle and how we depend on it.

Extensions: Have students calculate the average volume of water used per person per day in your community. How much water is used by the community annually?
Amazing Mangroves!

Mangroves are tropical trees that have adapted to live in salt water. They are able to tolerate frequent flooding and are able to obtain freshwater from salt water. There are three different types of mangroves at J.N. “Ding” Darling NWR: red mangrove, black mangrove, and white mangrove. Buttonwood is another common native species that is commonly called a mangrove. It is in the same family as the white mangrove; however, it is not a true mangrove.

Benefits of Mangrove Trees:

- Provide nursery areas for fish, crustaceans, and shellfish.
- Function as the basis of the food chain for a multitude of marine life by providing detritus (decaying leaves and twigs broken down and eaten by small organisms).
- Animals find shelter in the mangrove roots and branches
- Branches serve as rookeries (nesting areas) for coastal birds.
- Migratory birds also depend on mangroves for food and shelter.
- Mangroves trap and cycle pollutants, chemicals and inorganic nutrients.
- Provide attachment for marine organisms such as barnacles and oysters. Many of these organisms, especially blue-green algae, filter water and trap and cycle nutrients.
- Protects uplands from storms, winds, waves and floods.

Red Mangroves (*Rhizophora mangle*) are found closest to the water with aerial "prop" roots from high on the trunk or even from branches. These roots arch out and extend down into the soil. The roots often develop prop roots of their own. The prop roots provide two adaptive functions. They form a massive support for the tree, and they also are an adaptation to hydric soils. In these soils, oxygen cannot get into the ground and therefore the prop roots are exposed to the air. Also because of these prop roots, the red mangrove is the most adaptive to salt water and the inter-tidal cycle.

Black Mangroves (*Avicennia germinans*) are also adapted to hydric soils, but live landward of the red mangrove. They can easily be identified by numerous finger-like projections called pneumatophores pointing upward, reaching as much as a foot above the surface where they exchange gases. The pneumatophores cover the forest floor surrounding the tree, and are similar to a cypress knee only much smaller and more numerous. The black mangrove is normally found deeper within a mangrove forest where the tidal action is less rigorous, although shallow flooding may be prolonged.

White Mangroves (*Laguncularia racemosa*) usually occupy higher elevations than do the red and black mangroves with no visible aerial root systems. They are most abundant on the edge of a mangrove swamp adjacent to the uplands. The most distinctive characteristic is the glandular system of two openings (glands) on the leaf steam where the leaf meets the stalk. These glands excrete the salt taken in by the roots.
Making a Mangrove Tree in Your Classroom

Students will better understand the characteristics, functions and uniqueness of the mangrove by building a life-sized model of one. Make a forest in the corner!

Grade Level: K-8  
Duration: 60 min  
Group size: Any  
Subjects: Science and Art  
Objectives: Learn the importance of mangrove trees and name the animals that depend on them.

Materials: • Craft supplies • Construction paper

Procedure:
Break students into three groups:

Trunk and Roots: Use brown construction paper to develop the trunk. What texture is it? Create long prop roots from the trunk and add water.

Canopy (Branches): Add branches and leaves. Add layers of paper to show depth. Add a nest!

Wildlife (Mangrove Animals): Make and show animals that live and use the mangrove estuary. Remember animals live in all sections of the tree.

Adding Animals: After the field trip add more animals (you saw or learned about on your trip) to your tree in your classroom. Were there more than you expected?
MAGNIFICENT MANGROVES ACTIVITIES:

Mangrove Song

Grade level: K-3
Duration: 30 min
Group size: Any
Subjects: Science, Music, & Art

Procedure:
After teaching about mangrove trees, try incorporating singing and movement to help your students remember the importance of the mangrove trees! Have your students form a circle as you lead the song below (to the tune of “Old MacDonald”). Have the kids make the movements that go along with each of the animals.

**Pelicans** live in the mangrove trees,
e-i-e-i-o
They build their nests among the leaves,
e-i-e-i-o
With a *flap-flap* here and a *flap-flap* there,
Here a *flap*, there at *flap*, everywhere a *flap-flap*.
Pelicans live in the mangrove trees,

**Rat snakes** prowl the branches high,
e-i-e-i-o
They gulp down eggs and birds they spy,
e-i-e-i-o
With a *gulp-gulp* here and a *gulp-gulp* there, etc.

**Mangrove Crabs** crawl in the mangrove trees,
e-i-e-i-o
They snip off bits of mangrove leaves,
e-i-e-i-o
With a *pinch-pin*ch here and a *pinch-pin*ch there, etc.

**Alligators** live in the mangrove swamps,
e-i-e-i-o
they catch their prey with a mighty chomp,
e-i-e-i-o
With a chomp-chomp here and a chomp-chomp there, etc.

**Oysters** cling to the roots below,
e-i-e-i-o
They filter out their food, you know,
e-i-e-i-o
With a *slurp-slurp* here and a *slurp-slurp* there, etc.

**Actions:**
*Pelicans* - Flap arms
*Rat Snakes* - Arms to sides & wiggle body
*Mangrove Tree Crabs* - Make pinchers with hands
*Alligators* - Arms out straight in front and clap
*Oysters* - Keep heels of hands together as rest of hands open and close
Label 3 types of Mangroves found at J.N. "Ding" Darling National Wildlife Refuge.

How does each excrete salt?

What important role does this tree have in the estuary?
Wacky Wildlife

**Wildlife:** Any animal that lives in a free condition supplying itself with food, water, shelter, and other needs in an environment that serves as suitable habitat.

**Domesticated:** Animals in which humans have tamed, kept in captivity, and bred for special purposes. The process of domestication takes place over a long period of time and usually involves genetic manipulation. All domestic animals have their origins in the wild world.

**Native:** A native species is one that normally lives and thrives in a particular ecosystem, and can be any species that develops with the surrounding habitat, and can be assisted by or affected by a new species.

**Exotic:** An exotic species, also known as a naturalized or introduced species, is an organism that is not indigenous to a given place or area. It has been accidentally or deliberately transported to this new location by different activities such as human, animal, storms, etc. Introduced species can often be damaging to the ecosystem in which they are introduced.

**Keystone Species:** A species like a gopher tortoise or an alligator that affects the survival and abundance of many other species in the community in which it lives. If a keystone species is removed, there can be a significant change in the composition of the community and even in the physical structure of the environment.

**Endangered:** A species which is in danger of becoming extinct in the foreseeable future.

**Umbrella Species:** A species that by virtue of being protected, protects many other species. The spotted owl is an example of an umbrella species because, but protecting its habitat (old growth forests in the Northwest), many other species will be protected. Another example is the Florida Panther.

**Background:**
Students should understand that a National Wildlife Refuge is different than Bush Gardens or Disney’s Animal Kingdom. The animals here in the Refuge are wild and living in their native habitat. They’re not fed by humans and they live by laws of nature. The strongest and most alert survive. Some become food for other wild animals.

An animal is any living organism that is not a plant. Wildlife is any animal that lives in a free condition supplying or itself food, water, shelter, and other needs in an environment that serves as suitable habitat. The U.S. Fish and Wildlife Service works to ensure that animals have habitat, but does not directly supply the food or water. Wildlife may be small like microscopic plankton or as large as a whale.
Color and label the wildlife above
What’s Wildlife?

Grade Level: K-3
Duration: 60 min
Group size: Any
Subjects: Science, Language Arts, and Art
Objectives: 1) Students will be able to distinguish between wild and domestic animals (pets)

Materials: • Glue • Poster board • Pictures of animals (old magazines)

Just remember a wild animal takes care of itself and domestic animals are dependent on humans to feed and care for them. Whereas domestic animals are suitable for pets, wild animals, even if tamed, are unsuitable and often illegal to have as pets.

1. Ask the students to bring in as many pictures of animals from magazines, newspapers, etc.
2. Discuss the differences between wild and domestic animals before putting them to the task of classifying. Have individuals or small groups classify the animal pictures as wild or domestic.
3. Once the students have finished classifying the animals, have them assemble collages, either individually or as a class. Supply them with glue and poster board.

What’s Wildlife Worksheet

Make a list of animals you saw today or during your field trip. List the animals into two categories: domestic and wild.

<table>
<thead>
<tr>
<th>Domestic</th>
<th>Wild</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example: house cat</td>
<td>Example: bobcat</td>
</tr>
</tbody>
</table>

Extension:
Discuss wild and domestic animals in Florida in the students’ backyards. Ask students to classify and list all the animals identified as wild or domestic to demonstrate their knowledge after the trip.

Discuss why not to release pets into the wild.

Review the list and ask the students where each animal can be seen. Are you more likely to find domestic animals in one type of area? Where were most of the wild animals?

This activity appeared originally in Project Wild.
### Animals in the Wildlife Refuge

| A | O | H | W | G | I | S | R | K | E | L | K | E | O | P | M | A | W | D | F | L | I | B | Z | O |
| B | D | O | L | N | P | R | U | A | C | V | E | O | A | V | O | N | K | L | P | I | W | G |
| S | W | E | O | I | S | F | U | I | V | G | E | O | I | N | M | T | Y | B | C | S | S | K | G |
| H | G | M | D | A | B | Q | I | O | L | D | C | R | O | P | A | A | L | K | T | P | Q | I | E |
| R | A | S | V | R | A | C | C | O | O | N | V | A | P | T | N | I | O | R | T | Y | H | N | R |
| A | N | T | E | D | H | I | O | P | N | G | H | U | P | E | G | V | B | U | I | L | M | O | H |
| B | E | G | O | P | H | E | R | T | O | I | S | E | R | A | S | I | O | U | W | O | E |
| B | N | R | M | O | U | T | Q | P | L | K | N | J | O | K | O | M | S | H | L | P | E | S | A |
| I | T | O | K | C | R | S | R | N | U | V | X | Q | D | R | E | V | C | M | L | B | V | J | O | D |
| T | R | V | N | A | S | K | P | G | R | E | A | T | B | L | U | E | H | E | R | O | N | R | T | S |
| K | E | E | H | B | E | A | O | R | W | R | S | O | Z | P | K | C | T | L | N | A | S | Q | O | E |
| D | E | T | P | B | S | L | Z | P | E | T | A | B | D | S | I | U | L | K | I | N | A | P | M | A |
| O | F | R | N | A | H | L | W | H | L | Y | K | O | G | A | T | C | D | B | R | T | O | D | P | T |
| L | R | E | L | G | O | I | H | N | R | N | P | N | K | B | O | K | L | O | S | K | N | L | K | U |
| N | O | E | T | E | E | G | O | L | D | E | N | S | I | L | K | O | R | B | W | E | A | V | E | R |
| R | G | C | Y | P | C | A | Q | M | S | B | D | O | N | T | B | O | B | C | A | T | I | O | N | T |
| W | R | R | O | A | R | T | O | A | P | J | M | F | B | O | T | S | K | P | R | E | B | B | U | L |
| P | E | L | I | C | A | N | R | C | O | Y | R | I | M | E | H | U | B | L | U | E | C | R | A | B |
| A | T | B | Y | P | M | P | G | U | M | B | O | L | I | M | B | O | E | U | O | E | J | K | C | A |
| N | F | Z | E | B | R | A | L | O | N | G | W | I | N | G | B | I | V | C | J | L | W | T | R | W |
| O | G | U | L | U | T | R | E | U | E | L | I | A | N | S | E | L | K | N | I | W | R | E | P |
| M | A | N | G | R | O | V | E | T | R | E | E | S | N | A | K | E | T | K | L | U | P | Z | O |

**Raccoon**  
**Alligator**  
**Great Blue Heron**  
**Mullet**  
**Horseshoe Crab**  
**Gopher Tortoise**  
**Zebra Longwing**  
**Pelican**  
**Marsh Rabbit**  
**Indigo Snake**  
**Manatee**  
**Roseate Spoonbill**  
**Wood Stork**  
**Periwinkle Snail**  
**Mangrove Cuckoo**  
**Gumbo Limbo**  
**Blue Crab**  
**Cabbage Palm**  
**Bobcat**  
**Osprey**  
**Green Tree Frog**  
**Ibis**  
**Mangrove Tree Crab**  
**Red Fish**  
**Mangrove Tree Snake**  
**Lubber**  
**Sea Grape**  
**Snowy Plover**  
**Loggerhead Sea Turtle**  
**Golden Silk Orbweaver**

**IDEAS:**
- Put a star by the wildlife you saw while on your trip.
- Research an animal from the list.
The Mangrove Cuckoo is in square B4.
The American Alligator is in square \underline{______}.
The Osprey is in square \underline{______}.
The \underline{________________} is in square A3.
The Roseate Spoonbill is in square \underline{________}.  
Draw a Minnow in square B1.

The \underline{____________________} is in square A4.

\underline{Draw} a Caterpillar in square C4.
The Wood Stork is in square A1.

\underline{Draw} a Shrimp in square A2.

\underline{Draw} a Sea Turtle in square B3.
Who Am I?

Grade Level: K-8
Duration: 60 min
Group size: Any
Subjects: Science

Objectives:
1) Students will learn about different native animals in our area.
2) Students will be able to list each characteristic of the animal.

Materials: Pictures of animals from old magazines or calendars

Students should be able to give clues to other students to have them guess the animal they are.
1. Select one student to be the “animal”. Tape an animal picture to the student’s back or write a name of an animal on a card - don’t disclose what animal he or she has become.
2. The student must show his or her back (animal picture) to the rest of the group to see.
3. The student then turns around and asks the group ONLY “yes” or “no” questions.
   “Am I blue?” “Do I have talons?” “Do I have fur?”
4. When the student guesses the animal, he or she must tell if it is endangered.
5. The teacher can lead a discussion about each animal after it is identified. What does it eat? Where does it live? Is it a predator or prey?

   List of Wildlife you can use:
   - Horseshoe crab
   - Alligator
   - Bald Eagle
   - FL Manatee (E)

   (E)=Endangered
There are more than 9,000 species of birds in the world. Around 300 species have been recorded on Sanibel Island throughout the year. Birds are warm-blooded vertebrates. They have three characteristics which distinguish them from other animals: feathers, hard-shelled eggs, and hollow bones.

**WARM-BLOODED:** Like mammals, birds are warm-blooded. This means their body temperature stays the same no matter how hot or cold it is outside. This characteristic allows birds to maintain high levels of energy needed to fly.

**FEATHERS:** Birds use their feathers in many ways; for flight, regulation of body temperature (thermoregulation), protection of the body, attraction of mates, and identification of species. Contour feathers cover the body of a bird and have a strong, hollow shaft and network of hooks. Down feathers are small and are located under the contour feathers. The purpose of these feathers is to insulate the bird from the cold.

**HARD-SHELLED EGGS:** Birds lay hard-shelled eggs. The hard shell keeps an egg from drying out and allows the parents to sit on the eggs during incubation. Even though bird eggs are hard-shelled, they have microscopic pores which allow oxygen to enter and carbon dioxide to exit the shell.

Eggs come in a variety of colors, patterns, shapes and textures. Colors and patterns on eggs vary depending on the need for camouflage. The shape of the egg depends on where the bird nests. Most eggs are oval. Birds that lay their eggs on ledges need eggs with a pointed end so they will not roll off the ledge. The texture of an egg may vary from smooth (hummingbird) to coarse (chicken).

**HOLLOW BONES:** It takes more than feathers to make birds creatures of the sky. Extremely lightweight bones are also necessary for flight. Bird bones are strong and hollow with inside supports.
Fascinating Feathers

Grade Level: K-8
Duration: 60 min
Group size: Any
Subjects: Science

Objectives:
1) List characteristics of birds (what makes a bird a bird?)
2) Students will be able to list the different parts of a feather
3) Student will understand the function of a feather

Materials:
- One feather for each student (Flight/primary feathers work best)
- Hand lenses or microscope
- A copy of the feather diagram for each student (previous page)
- Paper, pencils, crayons

Vocabulary:
Shaft: Central white part of the feather that provides support.
Quill: the hollow base of the shaft, anchors the feather in the skin.
Vanes: broad, flat surfaces on either side of the shaft.

Background:
What do all birds have in common? They all have feathers. Feathers have many uses. They help insulate a bird against the cold and the heat. They are aerodynamic, giving the birds the ability to fly. Their colors provide camouflage for protection or bright patterns that help birds attract mates. Feathers can do all of these things and more because of their special structure. They are lightweight but strong, delicate but durable. They are truly fascinating.

Feathers are made of a protein called keratin, which is the same material found in our hair and fingernails. Give students a feather, a hand lens and the diagram. Point out parts of the feather. The shaft, which is the central white part of the feather, provides support. The quill, which is the hollow base of the shaft, anchors the feather in the skin. Point out the broad, flat surfaces on either side of the shaft. These are called vanes. Have the students look at the vanes of the feather using the hand lenses. The vanes are a sort of mesh that gives the feather strength while keeping it flexible. This mesh is made up of interlocking strands called barbs. The barbs are like arms that extend outward from the shaft. The barbs are held together by rows of barbules. A barbule consists of a series of single cells linked end to end. Some have hook-like projections called barbicels. Have the students spread the barbs apart so they can see the barbules. The barbules appear like fuzzy projections on the barb. When they are finished examining the barbs have them “zip” the vane back together by running their fingers with the grain. Explain that birds do this also; cleaning straightening, stretching, and coating their feathers--this is called preening. Ask students to make a drawing of their feather and label it.
Match Up the Beak.
What Do I Eat?

Cut out each circle with scissors.
Match up the centers.
Insert metal clasp.
Match up the beaks with the correct birds!
# BIRD BINGO

J.N. “DING” DARLING NATIONAL WILDLIFE REFUGE

Search for items suggested in the boxes and cross them off once you find them. Get five in a row (down, across or diagonally) and you have BIRD BINGO!

<table>
<thead>
<tr>
<th>BIRD’S NEST</th>
<th>Cardinal</th>
<th>Bald Eagle</th>
<th>LISTEN FOR A BIRD CALL</th>
<th>Woodpecker</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yellow-Crowned Night Heron</td>
<td>TEACH SOMEONE A BIRD!</td>
<td>LIST IT HERE: FIND A SIGN THAT A BIRD IS NEAR</td>
<td>Roseate Spoonbill</td>
<td>White Ibis</td>
</tr>
<tr>
<td>SMELL THE ROTTING DETRITUS</td>
<td>BIRD TRACKS</td>
<td>FREE SPACE</td>
<td>Osprey</td>
<td>Crow</td>
</tr>
<tr>
<td>Red-shouldered Hawk</td>
<td>LOOK FOR A BIRD FLYING ABOVE</td>
<td>Brown Pelican</td>
<td>TELL THE DIFFERENCE BETWEEN AN ANHINGA &amp; CORMRANT</td>
<td>Willet</td>
</tr>
<tr>
<td>Reddish Egret</td>
<td>Great Blue Heron</td>
<td>FIND BIRD DROPPINGS</td>
<td>Seagull</td>
<td>WATCH A BIRD FEEDING</td>
</tr>
</tbody>
</table>
Bills, Beaks and How do they Eat?

**Grade Level:** K-8  
**Duration:** 60 min  
**Group size:** Any  
**Subjects:** Science,  
**Objectives:**  
1) Students will learn about different adaptations and bills for area birds.  
2) Students will learn different feeding behaviors of area birds.  
3) Students will demonstrate an understanding of how birds' unique food preferences require different bills or beak shapes and structures.  

**Materials:** pictures of birds (old magazines), kitchen utensils, field guides  

**Procedure:**  
1) Have students brainstorm about area birds. List area birds on the board.  
2) Use a field guide to determine how each bird feeds.  
3) Draw each bird bill on a piece of paper.  
4) Have students consider what types of food their bird eats based on its beak or bill shape. Does it "dabble" for underwater plants and other aquatic organisms? Does it feed on berries and seeds, insects while flying, worms from the ground, grubs from under tree bark? Have students develop a dance to represent their bird's feeding behavior based on the shape of its beak.  
5) Have students bring in different kitchen utensils that they use daily to make and eat meals to make an eating tool. Encourage them to be very creative and ask permission from parents first! (i.e., ladle, barbeque tongs, strainer) Discuss with the class what their man-made tool helps them do? What bird bill would represent this feeding behavior?  

**Extension**  
Have different types of seeds in bowls around the classroom and have students use their “bills” tools to try and pick up the seeds. What natural foods does your bird eat? How does their bill help them achieve this goal?
Moving Day--Bird Migration
More than one-third of the world's birds migrate. Migration is an instinct triggered by seasonal changes in weather and lack of food.

What causes the urge to migrate? Changes in the angle and amount of light rays may trigger migration. Low pressure areas in the fall trigger a southward migration. High pressure in the spring encourages movement to the north. A lack of food in the fall and winter may also send birds toward areas where food supplies are more readily available.

Birds migrate during the day or night. Daytime or diurnal migratory birds are generally larger (geese) or are predators (hawks). These birds navigate by sight and have few if any predators. Songbirds are nocturnal and migrate in the safety of darkness. Their daylight hours are spent searching for food and resting for the next leg of their trip.

The ability of birds to migrate great distances and return to the same general area year after year is a subject which has fascinated people for centuries. Diurnal migrators fly along broad air routes established by physical features such as major rivers, coastlines, mountains and lakes. The position of the stars and moon and the Earth's magnetic field are used by nocturnal migrators.

Birds encounter many hazards during their migration. Nocturnal and low-flying migrants risk flying into manmade objects such as tall buildings, power lines and towers, windows and aircraft. Songbirds may encounter predators (hawks) migrating at the same time. Habitat destruction and pollution are also migration hazards.

Storms during migration kill migrant birds. Hunting seasons are established to harvest abundant and desirable species (ducks, geese, mourning doves) during the fall migration. Even though birds are harvested, hunting is allowed within limits that a population can withstand.

There are four flyways in the U.S.A.: the Atlantic Flyway, up the eastern coast from Maine to Florida; the Mississippi Flyway; along the Mississippi River; the Central Flyway, from Montana to Texas; and the Pacific Flyway, along the Pacific coast from Washington to California.

**Extension:** Celebrate International Migratory Bird Day in your classroom each May!
Pine Cone Bird Feeders

Grade Level: K-8
Duration: 60 min
Group size: Any
Subjects: Science, Art

Materials:
- Large, untreated pine cones
- Peanut butter - Sugar-free/salt-free
- Birdseed
- Ribbon or string – nontoxic

Learn to make pine cone/birdseed/peanut butter animal feeders! Make friends with the local wildlife by attracting birds and squirrels from miles around with these tasty, fat-packed treats. Discuss with the students: why they should care?
Most backyard/schoolyard wildlife (like gray squirrels and house sparrows) are losing their space to live (habitat). Provide food for them while studying them.

Don't worry about enticing migratory birds into unwisely staying the winter at your house. The birds that visit in winter time (as you can notice from careful observation) are usually just passing through and supplementing their wild diet with your offerings.

What to do:
First, tie the string onto each pine cone. You'll be sorry if you don't have this to hang on to before you're finished.
Next, spread the peanut butter into all the crevasses of the pine cones. You want to coat the outside of them as well, so you can achieve ultimate birdseed adherence.
Finally, roll each gooey cone in birdseed (try to keep the string clean so your new friends will be less inclined to chew through it on their first encounter).
Endangered Species

The Endangered Species Act (ESA) became a law in 1973. This law regulates protected species and is administered by U.S. Fish and Wildlife Service.

Four Classifications of Wildlife (State & Federal)
- State - populations declining in Florida
- Federal - populations declining in many states

Species of Special Concern: State of Florida designation.
Threatened: Designation when laws are enacted to protect animals.
Endangered: A species that is in immediate danger of becoming extinct. The Florida Panther, Florida Manatee, and Wood stork are all endangered species found in Florida.
Extinct: A species that is NO longer living. The passenger pigeon and moa are examples of extinct birds.

How can we help save these animals? Have group guess/list reasons:
- Educate ourselves
- Obey hunting laws
- Stop pollution
- Help support land projects
- Don’t litter, pick up trash you see
- Save wetlands
- Recycle/clean up mono-filament fishing line
- Minimize agricultural runoff
- No interaction with wildlife
- Stop fertilizing our yards
- Plant native plants, provide food and shelter for wildlife
- Stop excessive human development

#1 reason species are declining? HABITAT LOSS
Habitat is an animal’s home. There are four essential things that animals need to survive in their habitat: Food, Water, Shelter, and Space. Explain these four concepts. Habitats have everything that plants and animals need to survive - if one or many of these are missing they will not survive.

Name success stories to ESA. What animals have been saved?
- Bald Eagle
- Brown Pelican
- California Condor
- Whooping Crane

Extension: Research an animal’s successful historic journey from endangered status to today.
Endangered Species Riddles

Grade Level: 4-8
Duration: 60 min (more time is better)
Group size: Any
Subjects: Science, Art

Objectives: 1) Students should be able to define endangered, and list some local endangered wildlife. 2) Students should be able to list what are some current threats to these animals and how they can help save them.

Materials:
● Riddles (below) on cards  ● Crayons
● Information sheets on animals (print off internet)  ● Large paper

1. Break students into six groups.
2. Give each group an index card with a riddle on it. Have the group work together to figure out which animal they are. (To make it easier for younger kids, list the animals on the board.)
3. Once they figure out what animal they are, give them an information sheet on their animal. (These can easily be printed off of the internet by doing a search on the animals listed.)
4. Hand out large pieces of paper for them to make a poster of their animal, its habitat etc. Give the students time to create their poster. This can be used as a lesson in both science and art classes.
5. Have each group come up to present their poster to the class. Have the group read the riddle and have the class guess which animal they are.

WILDLIFE RIDDLES—Cut and place on index cards:
I AM long, strong, and dark olive brown or black in color.
AND I LIVE in south eastern United States including Florida.
SOME PEOPLE THINK I AM fierce and will attack humans, but I am more afraid of you!
MY FAVORITE FOOD IS fish but I also eat birds and others of my kind.
WHEN I AM AFRAID I make a big splash in the water to get away and hide!
WHO AM I?

I AM large, slow and an endangered marine mammal.
AND I LIVE in shallow brackish water. (both salt and freshwater)
SOME PEOPLE think feeding me is good - but it’s not good for me.
MY FAVORITE FOOD IS aquatic plants - I eat about 100 lbs of them a day!
I AM AFRAID of boats so I dive to the bottom of the water to hide.
WHO AM I?

I AM a large cat, less than 100 left in the wild.
AND I LIVE in the middle of Florida - from the Everglades to Orlando.
SOME PEOPLE mistake me for bobcats.
MY FAVORITE FOOD IS whitetail deer.
I need hundreds of square miles for my territory.
WHO AM I?

Answers:
1. American Alligator - Threatened
2. Florida Manatee - Endangered
3. Florida Panther - Endangered
4. Ivory-billed Woodpecker - Endangered
5. Wood Stork - Endangered
6. Gopher Tortoise - Species of Special Concern
I AM the largest woodpecker in North America.
AND I LIVE in southern swamps and nest in cavities of trees.
SOME PEOPLE THOUGHT I was extinct for over 60 years. I was just found in Jan 2005 in Arkansas.
MY FAVORITE FOOD is grubs and beetles beneath the bark of trees. I use my jackhammer beak to get to them.
WHEN I AM AFRAID I fly away - I’m very secretive.
WHO AM I?

I AM a prehistoric bird and the only one of my kind found in North America.
AND I LIVE and nest in large cypress or mangrove trees by building a flimsy platform of sticks.
SOME PEOPLE call me “ironhead” because I have a dark featherless head and neck.
MY FAVORITE FOODS include small fish, frogs, snakes and other aquatic animals.
WHEN I AM AFRAID I will fly away.
WHO AM I?

I AM a Florida resident and very local to South Florida.
AND I LIVE in open woods and grasslands. I make a burrow in sandy soil and share my home with many other animals.
SOME PEOPLE THINK I AM easy to catch but I am actually one of the quickest of my kind.
MY FAVORITE FOOD IS wire grass but I also eat many different kinds of grasses.
WHEN I AM AFRAID retract my head into my rounded shell.
WHO AM I?
Oh, Panther!

Grade Level: K-8
Duration: 60 min
Group size: Any
Subjects: Science
Objectives:

1) Students should be able to list the four things animals need to survive in their habitat and act out the symbols that represent them.
2) Students should be able to discuss current threats to the endangered Florida Panthers.

Materials: ● Whistle ● Large area to play game.

Discuss with students the status of the Florida Panther. It is an endangered species with populations around 80-100 panthers left in the wild. Since the number one reason the Panthers are declining is habitat loss, the U.S. Fish and Wildlife Service has established a national wildlife refuge, Florida Panther National Wildlife Refuge near Naples, FL to help this species.

Ask the students “What is a habitat?” and explain Habitat: The area where an animal lives, its home. What four essential things do animals need to survive in their habitat? Can you name them? If they don’t have one or many of these they will not survive.

Have students make symbols for each: (Students need to know these for the game.)

Food: Place hands over mouth. Water: Cup hands like drinking water.
Shelter: Make a tent over head. Space: Arms stretched out from their sides.

Game Rules: Have students count off into groups of FOUR. All the ONEs are the panthers. Put them on one side of the playground facing the wall away from the other groups. They represent ALL the panthers left in Florida.

Have all of the others: groups TWOs, THREEs, and FOURs stand on the other side of the playground. They represent what the panthers need to survive: group 2=Food, group 3=Water and group 4=Shelter. (Space is already accounted for by the area you are playing the game in.) To review, have them act out their roles again. Have them remember their number and have them mix up.

On the count of three, have the panthers decide what they need in their habitat to survive and have them act it out. (Don’t let students change what they are.)

At the same time, have the other groups act out their role. Have both groups face each other making their actions. Panthers are to WALK down and carefully grab the resource they need to survive. The panther is to bring back their resource to their side of the room. What panthers died because they didn’t find the resource they needed? They become a resource. How many more panthers multiplied?

Continue future rounds of the game. What happened to the panther population? Graph data and study.

Adapted from the game “Oh, Deer” from Project Wild.
Fabulous Food Chains

Introduce the FOOD CHAIN concepts using the animals listed by the students. All animals must eat to survive. Have students draw food chain on board. (More Creative: Construct a paper Food Chain showing these relationships. Have students inter link chains with other students…)

“A cat eats a mouse, which is eaten by an owl, which eats a snake, which eats a frog, which eats a bug, which is eaten by a bird, which eats a seed, which needs sunlight, which grows a mangrove tree, which the mangrove crab is dependent on, which is eaten by a yellow-crowned night heron, which is eaten by an alligator…”

Remember: sunlight is essential to survival.

**FOOD CHAIN** - The routes along which energy flows through the community.

**FOOD WEB** - The complex of interrelated food chains in a natural community whereby food energy passes among organisms. Each consumer preys upon, and in turn, is preyed upon by others. Many ecosystems have multiple food chains.

**PRODUCER** - An organism that produces its own “food” using the sun’s energy to convert carbon dioxide and water into sugar. Green plants and some bacteria are examples of producers. Producers are the largest part of the food web.

**CONSUMER** - An organism that eats other organisms. All animals are consumers, whereas most plants make their own food (see “producer”).

**DECOMPOSER** - Organisms, such as bacteria and fungi, that feed on and break down dead plants, animals, and other organic matter.

**ESTUARY** - Where fresh water and salt water meet. Estuaries are among the most productive ecosystems of the world. They are also referred to as “Nursery of the Sea”or “Cradle of the Ocean”.

**HABITAT** - The area where an animal, plant or microorganism lives and finds water, food, shelter and space.

Construct a Food Chain:

**Grade Level:** K-8

**Duration:** 60 min

**Group size:** Any

**Subjects:** Science and Art

**Objectives:**
1) Define food chain
2) Name animals in it.
3) Understand animals’ dependence on each other for food

**Materials:**
- Pictures of animals, plants and the sun

**Procedure:**
1) Ask for volunteers to stand in front of the class.
2) Hand out pictures to students.
3) Have them construct a food chain with pictures provided (stand in order of who eats whom)
4) Explain food chains to the class.
Who eats what?

All living things in nature depend upon each other for survival. The Estuary provides food for land and water animals. Put arrows to make simple food chains. Remember: mangrove trees and detritus (decaying plants) are the basis of the food chain.
All living things in nature depend upon each other for survival. The Estuary provides food for land and water animals. Put arrows to make simple food chains. Remember: mangrove trees and detritus (decaying plants) are the basis of the food chain.
Post-Visit Activities

Field Nature Journals

Grade Level: 4-6  
Duration: 60 min  
Group size: Any  
Subjects: Science, Art, and Language Arts  
Objectives: As a result of completing this activity, students will develop field sketching techniques using pencil and charcoal (ART), and sharpen skills of observation of the living and nonliving environment. (SCIENCE).

Materials:  
- unlined notebooks for journals  
- pens, pencils, charcoal sticks  
- binoculars and field guides (optional)  
- Animal pictures

Procedure:  
Travel to a natural area outside of the classroom or draw after visiting the refuge. Create favorite thing learned about or seen. Write about why this was your favorite thing.

Field Journal Technique

Grade Level: 4-12  
Duration: Any  
Group size: Any  
Subjects: Science, Art, and Language Arts  
Objectives:  
1) Students will be able to identify and practice gesture drawing in the field.  
2) Students will learn and practice pure contour sketching in the field  
3) Students should be able to identify the birds/animals they are sketching. They may need to do research back in the classroom.  
4) Students will increase their awareness of bird’s behavior and feeding techniques.

Materials:  
- Journal  
- Pen/Pencil

Procedure:  
1) Introduce field journal-keeping by having students first work in the classroom. Practice gesture sketching in quick, timed (5-30 second) sketches of stationary objects.

2) A further exercise leading to wild bird sketching includes quick behavioral sketches at bird feeding stations. Your school may have a station already, or you may wish to set up a station for your class. Sketching from slides and videotapes also can give students good practice.

3) Pure contour sketching is another technique which emphasizes observation. Start by sketching hand-held objects while looking only at the object, not at all at the paper, and drawing one continuous line for the entire sketch. Process should be emphasized over product in the practice of field sketching. Students may gradually modify the technique, peeking at the paper, so that they are looking at the object being sketched 75% of the time, and their paper 25% of the time.
4) Introduce students to their journals by providing blank notebooks. Ask them to note at the top of the first page the date, time, location, weather conditions, and any background sounds they hear (natural or man-made). Students will include this information on every new entry to the journals.

5) If possible, take your class outside if birds are present. Have students develop quick sketches of three to five different bird species before settling in on their species of choice. Encourage students to develop quick, simple sketches using the following beginning techniques for drawing birds:
   • start by drawing two circles - one for the body and one for the head;
   • notice the size and position of the head relative to the body before starting;
   • add the tail, beak and legs. Finally, fill in the details of color, feathers, etc.

Field Journal Practice Exercises

Grade Level: 4-12
Duration: Any
Group size: Any
Subjects: Science, Art, and Language Arts
Objectives: 1) Students will be able to identify and practice gesture drawing in the field.
2) Students will learn and practice pure contour sketching in the field
3) Students should be able to identify the birds/animals they are sketching. They may need to do research back in the classroom.
4) Students will increase their awareness of bird’s behavior and feeding techniques.
Materials: ●Journal ●Pen/Pencil

Procedure:
1) Choose a specific place where birds are present. The important thing is that some birds are present to enable students to observe and sketch changes they witness over a period of time. This will help students develop an awareness of birds' appearance and behavior, as well as colors and textures of changing habitat conditions, and to record these changes in their sketches. (The location will most likely be your school yard and need not include a wetland or waterfowl, although this would be ideal.) Now, select one or more of the field sketching practice exercises below.

2) Ask students to draw all plants, or all insects, they can see in one square foot plot.

3) Have students identify a 5' x 5' plot in your school yard or at their home. Have them identify and sketch all they observe in the plot including weeds, leaves, flowers, fungi, seed pods, insects, etc.

4) Have students record stages of growth by sketching the same plant at different stages of development.
Nature Swap

**Grade Level:** K-6  
**Duration:** 60 min  
**Group size:** Any  
**Subjects:** Science, Art, and Language Arts  
**Objectives:** As a result of completing this activity, students will sharpen skills of observation of the living and nonliving environment. (SCIENCE), increase communication skills by presenting their objects to the class.

**Materials:** Tables for children to display their findings, paper to calculate student’s points.

Nature Swap is an activity where children collect and discuss things found in nature. This lesson can be done in two ways. Children hunt for objects at home and bring them into the classroom OR you can have the children “hunt” around the schoolyard for the nature objects. Objects should be found in nature, not purchased. Children then share their objects in the classroom, tell what they are, what they are used for etc.

**How does it work?**
Trading is based on points earned by students during an official swap session during class. Students can earn points by:
- Bringing in natural materials (no more than 5) = 1 point each (max 5 pts)
- Tell a story of their natural object or how it makes them feel = 2 points each
- Sharing their knowledge of the natural things they collected = 3 points each

Keep track of each student’s points on a sheet of paper or classroom board.

Once the students have earned points during the swap session, they can use them to trade for a prize chosen by the teacher. Other ideas: The teacher can have students accumulate points for end of the year party, purchase candy, no homework assignments, etc.

*This can be a great way for teachers to start their own classroom nature kit by having students collect objects that can later be studied!*

**Preparation:**
If you chose to “hunt” at school, find a safe area for the children to explore around the schoolyard looking for objects.

**Guiding Questions:**
1. What is your object?  
2. Where did you find it?  
3. Is your object part of an animal?  
4. Does an animal use or depend on your object?  
5. What can you share or know about the object you found?  
6. Are these the types of nature things we saw on our field trip at Ding Darling Refuge? Why or why not?  
7. Why does the Wildlife Refuge have laws not to collect anything from the refuge?  
8. How can these laws benefit wildlife and the ecosystem?
Follow up activities:

As a good lesson to the children, objects can be returned to nature so that other animals might use these objects.

**Important Collecting Information:**
Never collect in national and state parks, wildlife refuges, nature preserves or other areas where natural materials are protected. Never collect any natural materials that are protected by local, state, federal or international laws. **If you are not sure, ask!**
When collecting, choose your items carefully and leave lots of other items for others to find.

**Things you should NOT have students trade:**
- Purchased items
- Material found in the Wildlife Refuge
- Bird materials: feathers, eggs, or nests
- Living plants and animals
- Road kills (dead animals, if it’s gross or smells leave it in nature)
- Live shells

**Draw & Discuss**

**Grade Level:** 4-6

**Duration:** 60 min

**Group size:** Any

**Subjects:** Science, Art, and Language Arts

**Objectives:** As a result of completing this activity, students will develop field sketching techniques using pencils and charcoal (ART), and sharpen their skills of observation of the living and nonliving environment. (SCIENCE).

**Materials:** Paper & crayons

**Draw & Discuss:**

After your trip to the J.N. “Ding” Darling NWR have the students draw and discuss their favorite part of the field trip. Let them be as creative as possible! When completed the students must share their poster with the class. Also, students can be assigned to write a few sentences about their trip and post them on the bottom of their picture. Hang artwork on the wall.

**Guiding Questions:**
Use questions to stimulate curiosity, self-discovery, and thinking. Have the students close their eyes as you use guided imagery to take them back to the refuge. Close your eyes, feel the sun on your face, there is a light breeze….

Here are some sample questions:
1. How did you feel being out on Wildlife Drive observing the wildlife?
2. Were their any smells or sounds that you can remember?
3. How many different kinds of birds did you see?
4. Were there any signs of animals living at the refuge?
5. What was your favorite part of your field trip?

**Follow up activities:**

Have students write a short story about their trip and share it with the class.
Everyone is a Poet!

Grade Level: K-8
Duration: 60 min
Group size: Any
Subjects: Science and Language Arts
Objectives: As a result of completing this activity, students will express their creative skills by creating a poem about what they saw at the wildlife refuge. (LANGUAGE ARTS), and sharpen their skills of observation of the living and nonliving environment. (SCIENCE)
Materials: Paper, Pencils, Crayons, Nature Journals

Writing and sharing poems will give your students an opportunity to express their feelings, values, and beliefs about the environment and related issues in creative and artistic ways. Each student will be able to recognize the inspirational value of nature by having them create nature poetry after their field trip to “Ding” Darling NWR.

Preparation:
Teach the students about the different types of poetry.

**Haiku** is a Japanese form of poetry that consists of three lines: the first line has 5 syllables, the second line has 7 syllables, and the third line has 5 syllables again.

- The snow-covered tree
- Sparkles in the soft moonlight.
- The wind rushes by.

**Cinquain** poems consist of 5 lines, and each line has a mandatory purpose and number of syllables: 1. the title in two syllables, 2. a description of the title in four syllables, 3. a description of action in six syllables, 4. a description of a feeling in eight syllables, and 5. another word for the title in two syllables.

- Forests
- Graceful, growing
- Climbing among the clouds
- Calmly awaiting the sunrise
- Alive.

**Diamante** poems are diamond-shaped and consist of 7 lines that follow the following pattern:

<table>
<thead>
<tr>
<th>noun</th>
<th>seed</th>
</tr>
</thead>
<tbody>
<tr>
<td>adjective</td>
<td>small buried</td>
</tr>
<tr>
<td>participle</td>
<td>growing breathing living</td>
</tr>
<tr>
<td>participle</td>
<td>protection oxygen shade habitat</td>
</tr>
<tr>
<td>participle</td>
<td>dying rotting crumbling</td>
</tr>
<tr>
<td>adjective</td>
<td>moist rich</td>
</tr>
<tr>
<td>noun</td>
<td>soil</td>
</tr>
</tbody>
</table>

In **Acrostic** poetry the first letter in each line, when read vertically, spells out the name of something or conveys some other kind of message.

- Towering
- Reaching
- Extending
- Embracing the sky.
In *Picture Poetry* the words form a picture of what is happening in the poem.

A *windspark* poem has 5 lines with the following pattern: 1. “I dreamed”  2. “I was…” (something or someone)  3. Where,  4. An action, and  5. How.

```
I dreamed
I was a tree
On a hillside
Playing with the wind
Joyfully.
```

The Investigation
After taking a field trip to the J.N. “Ding” Darling Refuge, teach them about different poetry styles.

Have them select which one they will create. Take your students out in your schoolyard for this activity. Being out in nature may inspire them more to be creative. Sit in a quiet place (give them each their own space separated from each other) to observe nature around them but make sure they can hear your questions.

Guiding Questions
Ask them:
1. What was your favorite part of the trip to “Ding” Darling Refuge?
2. What animals did you see and learn about?
3. If you could be one plant or animal what would it be and why?
4. What was the weather like during the field trip?
5. Use all of your five senses as you observe.

Follow up activities:
- Revisit the refuge different times of the year to observe different seasons and wildlife. Take students to other natural areas around your school for more poetry adventures.
- Have them create a second poem for extra credit.
- Have them share their poems out loud in front of class.
Taking Action for the Planet!

Grade Level: 4-8
Duration: 60 min
Group size: Any
Subjects: Science and Language Arts

Objectives: As a result of completing this activity, students will develop problem-solving skills and persuasion techniques (LANGUAGE ART), along with sharpening skills of observation of the living and nonliving environment. (SCIENCE).

Materials: Motivated class that cares about the environment!
Class can be broken into groups to conquer small projects.

Environmental education action projects give students the opportunity to be an active citizen in helping to tackle an environmental or social issue. By taking part in an action project students gain knowledge about local environmental issues, as well as gain social skills, such as group cooperation and political participation.

Here are some examples:
- Implementing water saving strategies at home and school
- Writing a letter to elected officials
- Form litter patrols at school or in the community - coastal clean-ups
- Writing a letter to newspapers and magazines
- Writing a letter to business leaders
- Sponsor recycling drives
- Make displays for libraries and schools
- Encourage mass transit instead of driving
- Sponsoring hazardous waste community clean-ups
- Research Integrated Pest Management strategies instead of spraying
- Planting trees in urban areas
- Adopting area streams, rivers, lakes, ponds, highways, forests, or urban area
- Monitor water quality and sharing data
- Sponsoring awards programs recognizing the positive things people do to help the environment

Preparation:
Research local environmental problems
Cut out newspaper clippings

The Investigation
Investigate the Issues - Conduct research to find out more about environmental problems in general and local problems. Observing, interviewing, and developing a feeling for the problems. Look through local papers.
Define the Problem - Make a list of problems and discuss how the group feels about taking action to help solve any of them. Does the problem interest the group? How serious is the problem? Does it directly affect the community? What is your goal?
Brainstorm Solutions - Once the group has chosen a problem to work on, discuss possible projects that will help solve the problem.
Develop an Action Plan - Have students complete a step-by-step plan that includes goals and objectives for the project, as well as a general time line. This plan will be revised and adjusted throughout the project to reflect new information or feedback.
Who in the community can help? (University, government officials, parents, clubs)
Who in the community can help provide different points of view on the problem?
Who should be informed in the community about the project?
What material and resources are needed and where will they come from?
How much time will the project take?
What needs to happen for the project to be successful?
How will the project be evaluated?

Finalize the Action Plan - Evaluate the plan of action and set up checkpoints along the way to ensure that progress is made once the project starts. Create a huge time line on class bulletin board to remind students of progress that should be made.

Guiding Questions
1. Discuss the fact that changes are not made overnight. Sometimes it takes years to get something enacted. Everyone is responsible for their own part. What is teamwork?
2. A positive attitude and staying flexible is important for the success of a project.
3. What is feedback? All feedback should be positive from members.

History Lesson
Grade Level: 4-8
Duration: 60 min
Group size: Any
Subjects: Science, and Language Arts
Objective:
Materials:

Make a history lesson out of your field trip to the J.N. “Ding” Darling National Wildlife Refuge. The students will research and write a report about a conservationist. Have your students research President Teddy Roosevelt, Jay Norwood “Ding” Darling, Rachael Carson or any other conservationist.
Draw your favorite memory from the Wildlife Refuge!

Thanks for visiting J.N. "Ding" Darling National Wildlife Refuge
Biodiversity- The mix and variety of life of Earth, including the diversity of genes, species, and ecosystems.

Carrion- Dead, decaying animals.

Community- In ecological terms, a group of interacting plants, animals and microorganisms living in the same area at the same time. It is also referred to as a natural community.

Consumer- An organism that eats other organisms. All animals are consumers, whereas most plants make their own food (see “producer”).

 Decomposer - Organisms, such as bacteria and fungi, that feed on and break down dead plants, animals, and other organic matter.

Ecosystem - A complex of natural communities and their non-living environments, interacting as a unit. Rain forests, deserts, and coral reefs are examples of ecosystems.

Endangered species - A species that is in immediate danger of becoming extinct. The Florida Panther, is an example of an endangered species found in Florida.

Exotic species - Not native or indigenous to an area.

Extinct species - A species that is NO longer living. The passenger pigeon and moa are examples of extinct birds.

Food web - The complex in interrelated food chains in a natural community whereby food energy passes among organisms as each consumer preys upon, and in turn is preyed upon by others.

Habitat- The area where animal, plant, or microorganism lives and finds the nutrients, water, sunlight, shelter, living space, and other essentials it needs to survive. Habitat loss, which includes the destruction, degradation, and fragmentation of habitat, is the primary cause of biodiversity loss.

Introduced species - an organism that has been brought into an area where it doesn’t naturally occur. Introduced species often compete with and cause problems for native species. Introduced species are also called Exotic, Non-native, and Alien species.

Keystone species - a species, such as the gopher tortoise or alligator that affects that survival and abundance of many other species in the community in which it lives. If a keystone species is removed, there can be a significant change in the composition of the community and even in the physical structure of the environment.

Native species - Historically found in the area.

Niche - Function of a particular species in an ecological community; all aspects of an organism’s existence that enable it to survive and reproduce.

Producer - An organism that produces its own “food” using the sun’s energy to convert carbon dioxide and water into sugar. Green plants and some bacteria are examples of producers.

Scavenger - Animals that feed on dead or decaying matter. Lobsters, crows, vultures, and sharks are examples of scavengers.

Threatened species - a species whose numbers are low or declining. A threatened species is not in immediate danger of extinction, but it is likely to become endangered if it isn’t protected. The African elephant, bald eagle is a threatened species.

Umbrella species - A species that by virtue of bring protected, protects many other species. The spotted owl is an example of an umbrella species because, but protecting its habitat (old growth forests in the Northwest), many other species will be protected. Another example is the Florida Panther.

Wildlife Trade - The trade of wildlife and wildlife products. The wildlife trade threatens some species with extinction. The trade of wild parrots for pets and the use of ivory for jewelry, piano keys, and figurines are examples of the market that exists for certain species or products made from those species.
## Packet Evaluation

**J.N. "Ding" Darling NWR Environmental Education**

<table>
<thead>
<tr>
<th>Teacher (optional)</th>
<th>Who Participated?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre-school 6th</td>
</tr>
<tr>
<td></td>
<td>K 7th</td>
</tr>
<tr>
<td></td>
<td>1st 8th</td>
</tr>
<tr>
<td></td>
<td>2nd 9th</td>
</tr>
<tr>
<td></td>
<td>3rd High school</td>
</tr>
<tr>
<td></td>
<td>4th Family</td>
</tr>
<tr>
<td></td>
<td>5th Other</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Phone number to contact</th>
<th>Phone number to contact</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Location/School</th>
<th>Program/Subjects Taught</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Did you use the packet?</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-visit Lessons?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Post-visit Lessons?</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Was the information helpful?</th>
<th>Excellent</th>
<th>Good</th>
<th>Needs Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10 9 8</td>
<td>7 6 5</td>
<td>4 3 2 1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>How would you rate the lessons?</th>
<th>Excellent</th>
<th>Good</th>
<th>Needs Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10 9 8</td>
<td>7 6 5</td>
<td>4 3 2 1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>What lessons/activities did you teach?</th>
<th>Excellent</th>
<th>Good</th>
<th>Needs Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10 9 8</td>
<td>7 6 5</td>
<td>4 3 2 1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lessons</th>
<th>Choice of information</th>
<th>Excellent</th>
<th>Good</th>
<th>Needs Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10 9 8</td>
<td>7 6 5</td>
<td>4 3 2 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Accuracy of information</td>
<td>10 9 8</td>
<td>7 6 5</td>
<td>4 3 2 1</td>
</tr>
<tr>
<td></td>
<td>Appropriate for group</td>
<td>10 9 8</td>
<td>7 6 5</td>
<td>4 3 2 1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Audience Reaction</th>
<th>Participation</th>
<th>Excellent</th>
<th>Good</th>
<th>Needs Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10 9 8</td>
<td>7 6 5</td>
<td>4 3 2 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Questions</td>
<td>10 9 8</td>
<td>7 6 5</td>
<td>4 3 2 1</td>
</tr>
<tr>
<td></td>
<td>Attentiveness</td>
<td>10 9 8</td>
<td>7 6 5</td>
<td>4 3 2 1</td>
</tr>
</tbody>
</table>

| Overall Satisfaction of Packet (Comments) | 10 9 8 | 7 6 5 | 4 3 2 1 |

| Was the purpose for this packet clear? (Comments) | 10 9 8 | 7 6 5 | 4 3 2 1 |
What did you like BEST about this packet?

How do you think this packet could be improved? (Please list comments)

Additional Comments: (Please use the back for additional space)