

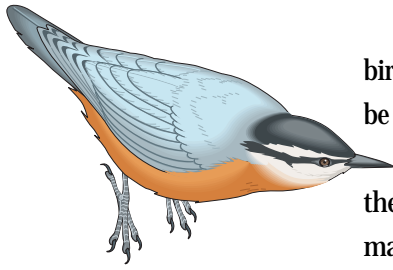
International Migratory Bird Day



Sharing a Passion for Birds

educator's supplement

Dear Educator,



Welcome to the International Migratory Bird Day Educator's Supplement. The Supplement provides activities and direction to additional resources needed to teach students about migratory birds. The activities are appropriate for grade levels three through eight and can be used in classrooms as well as in informal educational settings.

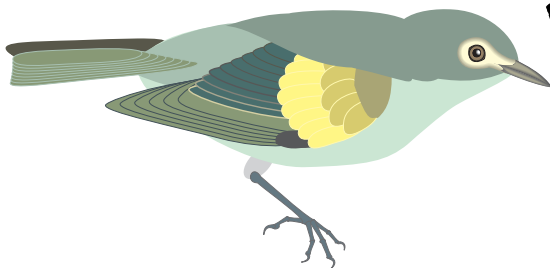
Birds offer virtually endless opportunities to teach and learn. For many, these singing, colorful, winged friends are the only form of wildlife that students may experience on a regular basis. Wild birds seen in backyards, suburban neighborhoods, and urban settings can connect children to the natural world in ways that captive animals cannot.

You may choose to teach one activity, a selection of activities, or all five activities. If you follow the complete sequence of activities, the Supplement is structured to lead students through an Adopt-a-Bird Project. Detailed instructions for the Adopt-a-Bird Project are provided (Getting Started, p. 9). Your focus on migratory birds may be limited to a single day, to each day of IMBD week, or to a longer period of time. Regardless of the time period you choose, we encourage you to consider organizing or participating in a festival for your school, organization, or community during the week of International Migratory Bird Day, the second Saturday of May.

The IMBD Educator's Supplement is a spring board into the wondrous, mysterious, and miraculous world of birds and their migration to other lands. There are many other high quality migratory bird curriculum products currently available to support materials contained in the Supplement. As a special bonus, to the first 300 orders, we are also enclosing the "Migratory Bird Issue Pac," (U.S. Fish and Wildlife Service, August, 1995) which includes a comprehensive introduction to migratory birds and a set of three self-contained lessons. Information on other curricula are listed in the *Resources* section.

Please take a moment to complete and return the Evaluation and Lesson Planning Form to let us know how this year's materials worked for you and about additional activities you developed as part of your unit. We hope to incorporate many of your suggestions and activities in future updates of the IMBD Educator's Supplement.

Get ready to enjoy the educational journey!
We hope it is rewarding for you and
for your students.



Acknowledgments

Development of this packet was coordinated by Susan Carlson, who was ably assisted by Julie St. Louis. The packet was beautifully co-designed by Laura Penington Jones (U.S. Fish and Wildlife Service) and the graphics wizardry of Dan O'Connor (USDA Forest Service). The following people contributed to the development or review of materials in the Educator's Supplement:

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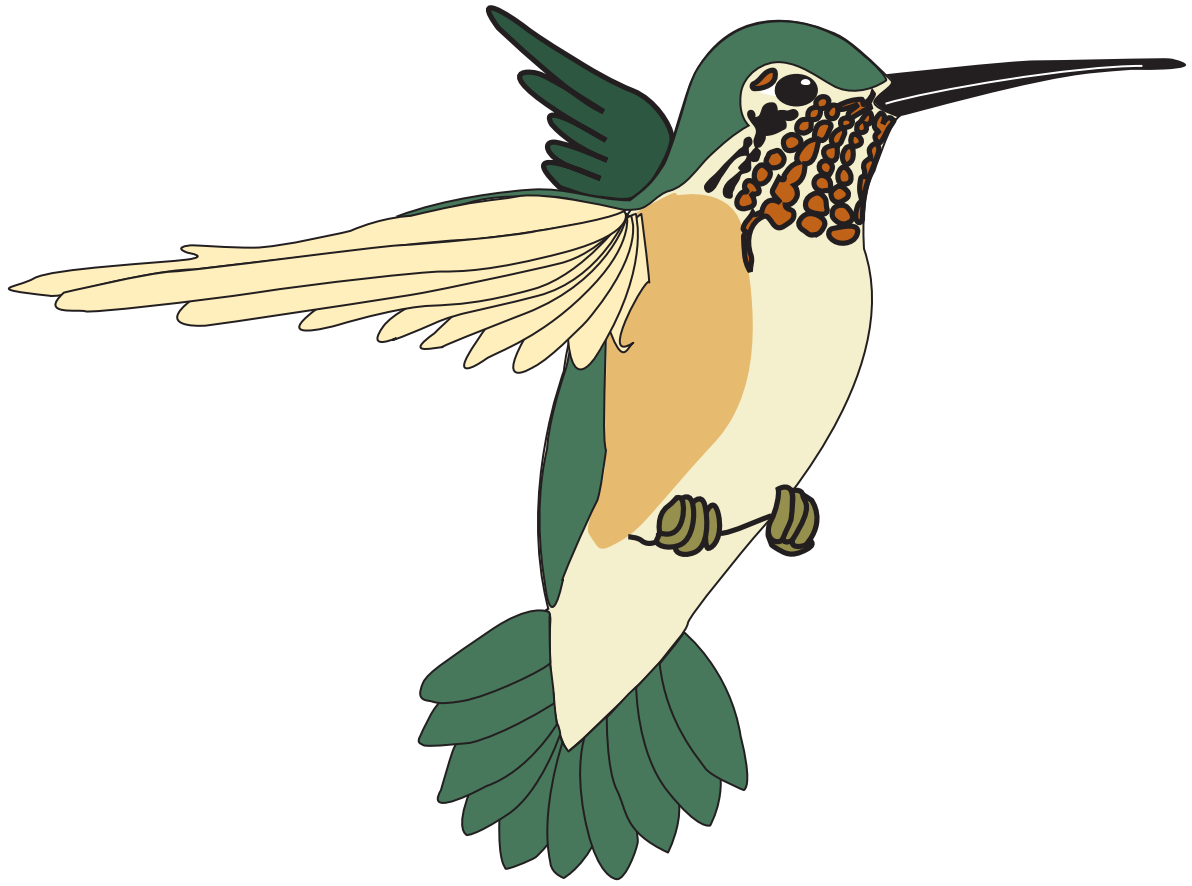
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Planning Guidelines

The following guidelines are offered to help you develop your migratory bird education unit, including an Adopt-a-Bird Project and an International Migratory Bird Day (IMBD) festival.

1) Review the Educator's Supplement in its entirety. Determine which activities you will teach and over what time period.

2) Identify activities included in this Supplement that help meet your curriculum requirements for the grade levels you teach. Suggested grade levels, learning objectives and related subjects are noted in each activity. To successfully incorporate migratory birds into your existing curricula, you may want to convene a group of classroom and resource teachers, including teachers of all subject areas you wish to integrate, to help plan your migratory bird unit.

3) If you teach all five activities in this Supplement, your students will complete an Adopt-a-Bird Project. The Adopt-a-Bird Project provides your students an opportunity to prepare an in-depth report on an "adopted" bird species. Each activity in this Supplement leads students through the research and preparation of one component of their Adopt-a-Bird Report. Your entire class can "adopt" your state bird or students can select a bird species of their choice. Detailed instructions for the Adopt-a-Bird Project and Report are provided (Getting Started, p. 9).

4) Consider culminating your migratory bird education unit with an IMBD festival for your school, organization, or community. IMBD, scheduled annually the second Saturday in May, provides an excellent event on which to focus your migratory bird education unit and projects. Obtain the *IMBD Organizer's Packet* for details on developing exciting, informative, and fun IMBD festivals that get the whole community involved in migratory bird conservation. Specific ideas for developing an education-based IMBD festival for your school or organization are also highlighted in each of the activities contained in this Supplement.

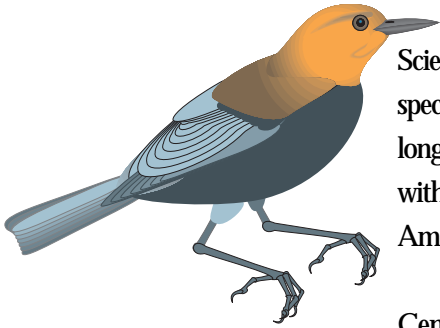


5) Develop a list of additional materials needed to teach the activities you selected. Required materials are listed in each of the activities. A list of state birds and commonly sighted migratory birds is included in this Supplement (Getting Started, p. 13). The *References and Resources* section (Resources, p. 1) includes entries for field guides as well as for additional curricula, background references, A/V materials, and related migratory bird programs with which to enhance your unit. You may also want to contact a National Wildlife Refuge, state wildlife agency, local bird club or chapter of the National Audubon Society, or local bird supply store to obtain a more extensive list of birds in your state and other information about migratory birds and their habitats.



Migratory Bird Overview

INTRODUCTION



Almost anywhere, any time of day, you can go outside and hear birds singing. Scientists estimate that about 9,000 species of birds exist worldwide. Approximately 660 species breed in North America. Some, termed resident birds, stay in one area all year long. Others migrate as the seasons change. Some travel short distances and remain within the United States. Others migrate longer distances and travel into South America.

Approximately 340 species of birds migrate to the tropical regions of Mexico, Central America, South America, and the Caribbean. These species are known as “Neotropical” migratory birds and include raptors, waterfowl, shorebirds, and songbirds such as orioles, tanagers, warblers, thrushes, hummingbirds, and others. “Neo” refers to the “new” world, or the Americas, and “tropical” refers to the latitudinal region between the Tropic of Cancer and the Tropic of Capricorn.

Although most birds are still common, populations of some migratory birds are declining. The Neotropical migratory birds are at greatest risk. Declines in some species are gradual while others are more dramatic. Such familiar species as the Wood Thrush, Cerulean Warbler, Bobolink, Grasshopper Sparrow, and the Western Bluebird are declining rapidly. Activity I, *Bird Identification* (p. A-1), provides students an opportunity to learn more about these amazing species and for students to select one “Adopted” bird species of their choice on which to concentrate their studies of migratory birds and develop a research project.

FEATS OF MIGRATION

Many animals migrate, including marine mammals, caribou, salmon, and monarch butterflies. Yet, the migration of birds is perhaps the most impressive. For example, the Blackpoll Warbler makes a nonstop, overwater flight of more than 2,300 miles lasting an average of 86 hours. The Blackpoll Warbler may journey up to 10,000 miles in one year. This represents the longest in distance and time, and highest, nonstop flight of any small bird yet observed. The Arctic Warbler, weighing a third of an ounce, breeds in Alaska but winters in the far-off Philippines. Some Bobolinks fly from the prairies of Canada to the pampas of Argentina, more than 6,000 miles. The Ruby-throated Hummingbird, weighing an eighth of an ounce, flies 500 miles across the Gulf of Mexico, a 25-hour nonstop flight.



Many shorebirds also demonstrate astounding migrations. The Arctic Tern breeds 450 miles from the North Pole, and flies nearly as far as Antarctica. Greater Shearwaters spend the spring and summer months in northern Atlantic areas and fly across 8,000 miles of ocean to the island of Tristan da Cunha in the South Atlantic. The Golden Plover leaves the coast of Labrador and Newfoundland to cross 2,800 miles of the Atlantic to Surinam and Brazil.

THE WHY AND HOW OF BIRD MIGRATION

Each spring, birds migrate in a south-north direction. When the weather warms in the Northern Hemisphere, migrating birds leave their wintering grounds in Mexico, Latin America, and the Caribbean, to return to the United States and Canada to breed. In the fall, migratory birds move in a north-south direction. When the weather becomes cold in the Northern Hemisphere, migratory birds return to their wintering grounds in Mexico, Central America, and the Caribbean. Although the original cause of bird migration remains somewhat of a mystery, we know that birds continue to carry out the biannual ritual of migration with the use of a complex array of sensory cues. Most birds rely on a variety of the following senses, depending on the species and the route traveled.



PHOTOPERIODISM

Photoperiodism, the lengthening and shortening of days in spring and autumn, affects the pituitary and pineal glands, which generate hormones that stimulate birds to become increasingly restless. Finally, they know it's time to go.

VISUAL AND AUDITORY CUES

Daytime migrants use vision to steer by the sun, aided by a precise sense of time. Night fliers take compass cues from star patterns. While in flight, birds may use geographic landforms to help orient direction and course. The outline of North American coasts, and the north-south direction of many large rivers and mountain chains, aid in migration. Homing pigeons and some migratory birds see ultraviolet and polarized light.

MAGNETISM

Many scientists believe that migratory birds tune into the earth's magnetic field in combination with gravity for direction.



WEATHER

Birds usually wait to migrate until the passage of weather fronts. They make use of the favorable winds that follow storms to aid their flights.

ANATOMY AND TOPOGRAPHY

Birds have a highly developed respiratory system, hollow bones, internal air sacs, and specialized body shapes. Birds' pectoral chest muscles, which power its wings, are much larger and better developed in relation to overall size than any similar muscle in a mammal. Before migration, most species build up layers of fat. The Blackpoll Warbler may nearly double its weight before setting off for migration. All of these features enable them to fly high, fast, and for long periods of time. Activity II, Bird Topography (p. B-3), provides students an overview of birds' external characteristics.

WHERE DO BIRDS MIGRATE?

The destination to which birds migrate is generally determined by the presence of food, water, and shelter. The term "migratory route" indicates the general direction of flight that is annually followed by migrating birds on their journeys between wintering and breeding grounds. Migratory routes do not refer to exact, specific routes. Rather, birds tend to follow general north/south pathways between major habitat types and avoid crossing obstacles such as mountain ranges.

TRACKING BIRD MIGRATION



Research and monitoring projects, including point counts, bird banding, nest records, recordings of bird calls, and radar imagery provide valuable information for conservation and management of Neotropical migratory birds. Bird banding provides information about migration routes, birds' life spans, population size, productivity, survival and mating habits. Bird banders trap or net birds and place a metal band with an identifying number, on each bird's leg. The number, along with a description of the species of the bird, its age, sex, and date of banding, is sent to the National Biological Service (NBS). After the banded bird is released, it may be caught again by banders, die of disease or other natural causes, or be shot by hunters. Information on recapture, or the band of a dead bird, is also sent to the NBS. By analyzing the reported bands, scientists can tell where birds breed and winter, how long they live, and the times, lengths, and routes of their migration. Activity III, *Migratory Mapping* (p. C-1), directs students to interpret hypothetical banding records developed for the Wood Thrush and the Swainson's Thrush in order to track the migration of two thrush species.



Point counts are monitoring programs in which birders record every bird species seen or heard at specified points. The Breeding Bird Survey (BBS), the oldest continuous point count breeding bird monitoring program in North America, detects population trends of species monitored over time. Another monitoring program, the Breeding Bird Census, measures the abundance and distribution of bird species in given geographic area. In Activity V, you and your students will have the opportunity to conduct a bird census of your school yard, or other designated area.

ENVIRONMENTAL THREATS TO MIGRATORY BIRDS

Numerous studies have indicated declines in populations of many migratory birds. A variety of factors impact bird populations throughout their range including pesticides, power lines, oil pits, parasitism by cowbirds, and predation by small mammals. However, the most significant factor impacting bird populations is loss and fragmentation of habitat across the breeding grounds in the United States and Canada, and destruction of wintering ground habitat throughout Mexico, Latin American, and the Caribbean.

POWER LINES

Many birds, particularly owls and raptors, are killed at the crossbars of high-voltage power poles. While not a neotropical migratory species, Golden Eagles, particularly young individuals, have been extremely vulnerable to electrocution on power poles. Many power companies are making necessary changes to avoid electrocutions.

OIL SPILLS

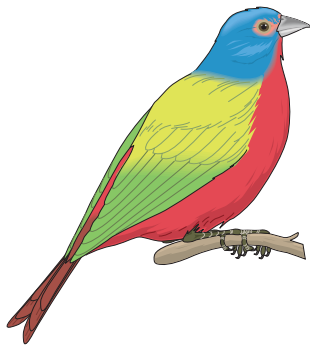
Large-scale oil spills kill thousands of marine birds. Smaller spills caused when oil tankers clean their tanks also put marine birds at risk. Many fresh water ponds are contaminated by oil and other industrial wastes. The playa lakes region of Kansas, Oklahoma, Texas, and New Mexico has many open ponds that appear hospitable to birds from the air but contain oil. Thousands of birds, particularly waterfowl and shorebirds, are contaminated in these ponds each year. The U.S. Fish and Wildlife Service requires screen covers on the pits but the problem remains a serious hazard to many species.



HABITAT LOSS IN BREEDING GROUNDS

From forests to wetlands, habitat on which migratory birds depend have been dramatically reduced. The United States has lost more than half of its wetlands, a land area equivalent to the state of California. Riparian zones, river and stream side areas bordering waterways support a great many migratory bird species and are highly endangered ecosystems. In the arid southwest, less than 1% of the native riparian woodland remain. In California, only 2-5% of the original riparian woodland still exists. Along the Colorado River within Colorado, more than 90% of the riparian habitats have been destroyed. More than 99% of the virgin forest that once covered the eastern United States has been cut. What remains is primarily second growth. Forest plantations containing a single species of trees maintain far fewer species of birds and animals than mixed growth forests.

HABITAT FRAGMENTATION



While the overall reduction of habitat has significantly impacted bird populations, habitat fragmentation, or the dividing of large habitat tracts into smaller areas, has had far reaching impacts particularly on successful nesting of many species. Fragmentation of once large forested areas increases the amount of “edge” habitat in a given area. Increased edge makes birds more vulnerable to suburban predators including opossum, raccoons, cats, Blue Jays, and crows. The open spaces in fragmented forest landscapes also attracts Brown-headed Cowbirds, a brood parasite that lays its own eggs in the nests of many Neotropical migrants, and further reduces their reproductive success. Domestic house cats are estimated to kill 3-4 million birds each day in the U.S. Activity IV, A Gallery of Homes, provides students an opportunity to investigate the similarities and differences between birds’ habitats and students’ habitat.

COWBIRDS

Formerly limited largely to the Great Plains, the Brown-headed Cowbird now occupies most of the North American continent. Brown-headed Cowbirds are recorded as “parasitizing” more than 220 bird species, 144 of them successfully. Brown-headed Cowbirds, generally larger and more aggressive than most Neotropical migratory birds, lay their eggs in the nests of other birds. Cowbird eggs usually hatch ahead of the host’s eggs, and the cowbird young develop very rapidly, usually out pacing the host’s young and taking far more than their share of the food brought to the nest. The host may abandon their nest when cowbird eggs are present.



HABITAT LOSS IN WINTERING GROUNDS

Tropical and subtropical forests of the Western Hemisphere are home to thousands of bird species. In addition to providing habitat to many resident species including quetzals, trogons, parrots, and others, tropical forests provide the winter home to hundreds of migratory species which breed in the United States and Canada. Tropical forest worldwide continue to be eliminated at the rate of nearly 50 acres/minute, amounting to an area the size of Cuba each year. One half of this destruction is in Latin America: By the year 2,000, only half of the pre-European settlement forest cover in Latin America will remain. In Latin America, the rate of deforestation is about 10 times as great as the rate of reforestation. Even in Costa Rica, 83% of the original forest had been removed by 1983. Because of the reduced land area available to northern migrants in wintering versus breeding grounds, the destruction of 100 acres of habitat in the tropics may have the same effect as a 1,000-acre loss of forest in the north.

CONSERVING NEOTROPICAL MIGRATORY BIRDS

Although populations of a variety of migratory bird species are declining, many migratory bird species are still abundant. The goal of the *Partners in Flight* program is to stem declines in those migratory bird species that are at risk and to keep common birds common. International Migratory Bird Day is designated as the *Partners in Flight* program's annual, keystone event to raise awareness of migratory birds through communications, outreach, and education programs. The IMBD Educator's Supplement provides a series of activities that introduce students to the wonders of migratory birds, the mysteries of their migration, and the need for conservation of their habitat. A Habitat for Birds (p. E-1), the last activity, directs students to conduct a survey of their school site and to write a letter to a natural resource professional requesting advice for developing a school yard habitat project. This activity provides a perfect interface to translate education about migratory birds into action for their conservation.



For more information on action-based activities for conserving migratory birds, obtain the IMBD Organizer's Packet containing many ideas, tips, and direction to additional resources on migratory bird conservation programs. As with the IMBD Educator's Supplement, materials contained in the IMBD Organizer's Packet can be used throughout the year. We hope you find the IMBD Educator's Supplement useful. Please let us know how you used these materials at your school or organization by completing the Evaluation Form.

From: Migratory Bird Issue Pac. 1995 U.S. Fish and Wildlife Service.



Adopt-a-Bird Project Instructions

By conducting all five activities in this Supplement, your students will complete an Adopt-a-Bird Project. The Adopt-a-Bird Project provides students an opportunity to focus in-depth on one selected migratory bird species. You may choose to have your entire class “adopt” your state bird or allow students to select a migratory bird of their choice. *Lists of U.S. State and Canada Provincial Birds and Commonly Sighted Migratory and Resident Birds* begins on Getting Started, p. 13.

Each of the activities included in the Supplement corresponds to a section of the Adopt-a-Bird Report. The following outline provides an overview of the activities in this Supplement as they relate to the Adopt-a-Bird Project. Many of the components of the Adopt-a-Bird Project, most notably students’ art work, can also be displayed at an IMBD festival.

ACTIVITY I BIRD IDENTIFICATION

Students will choose their bird for “adoption,” and describe and illustrate their bird’s five basic characteristics.

ACTIVITY II BIRD TOPOGRAPHY

Students will develop simple sketches of their bird’s external characteristics.

ACTIVITY III MIGRATORY MAPPING

Students will describe their bird’s breeding and wintering ranges and its migratory route. On a map, their adopted bird’s breeding and wintering range and its migratory route will be drawn.

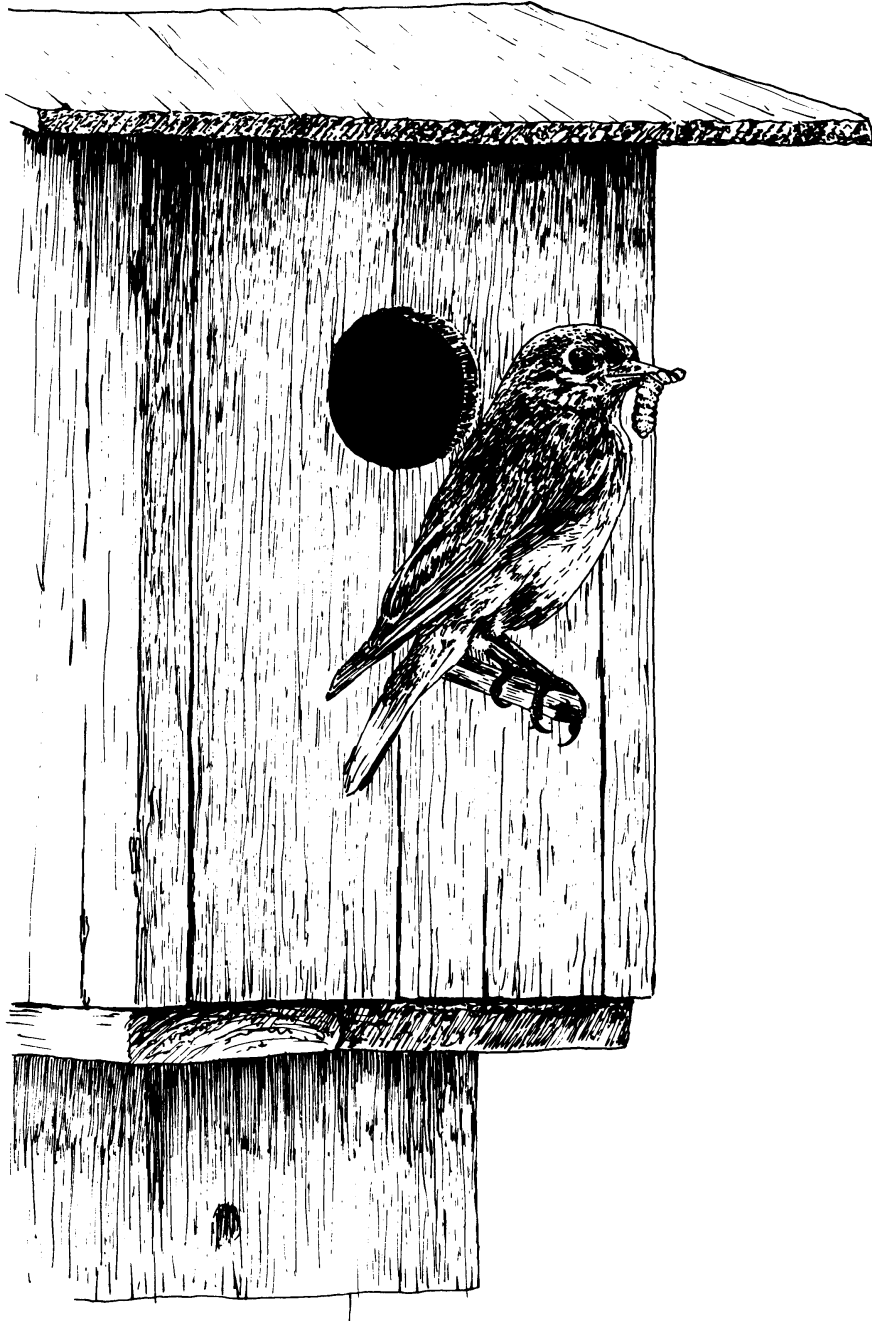
ACTIVITY IV GALLERY OF HOMES

Students will describe their adopted bird’s general habitat type and create a drawing or painting of that habitat.

ACTIVITY V A HABITAT FOR BIRDS

Students will identify actions that could improve the habitat around their school or organization for their adopted bird, based on their knowledge of its general habitat requirements for food, shelter, and water.





Adopt-A-Bird Report Form

(duplicate for each student)

My Adopted Bird's

Common name

Scientific (Latin) name

(Activity I)

1. Describe your Adopted Bird's basic characteristics including its:

A) Shape and Posture

B) Color and Plumage

C) Behavior patterns

D) Habitat type

E) Song



(Activity II)

2. Develop a simple sketch of your Adopted Bird's topography.

(Activity III)

3. Describe your Adopted Bird's breeding and wintering range and its migratory route.

Include a map which outlines your bird's breeding and wintering grounds and important stopover areas.

(Activity IV)

4. Describe your Adopted Bird's general habitat type and its needs for food, shelter, and water, and create a drawing or painting of your Adopted Bird's habitat.

(Activity V)

5. Describe what could be done at your school to improve the habitat for your Adopted Bird.

From *Migratory Bird Issue Pac*; United States Fish and Wildlife Service, National Education and Training Center.

From *Project WILD K-12 Activity Guide*; © 1983, 1985, 1992 Western Regional Environmental Education Council, Inc. Adapted with permission from Project WILD.



List of Commonly Sighted Migratory and Resident Birds

NEOTROPICAL MIGRANTS—LANDBIRDS

EAST

Baltimore Oriole
Barn Swallow
Chimney Swift
Gray Catbird
Prothonotary Warbler
Purple Martin
Ruby-throated Hummingbird
Scarlet Tanager
Yellow Warbler

WEST

Band-tailed Pigeon
Barn Swallow
Black-chinned Hummingbird
Black-headed Grosbeak
Bullock's Oriole
Chipping Sparrow
Green-tailed Towhee
Lazuli Bunting
Scissor-tailed Flycatcher

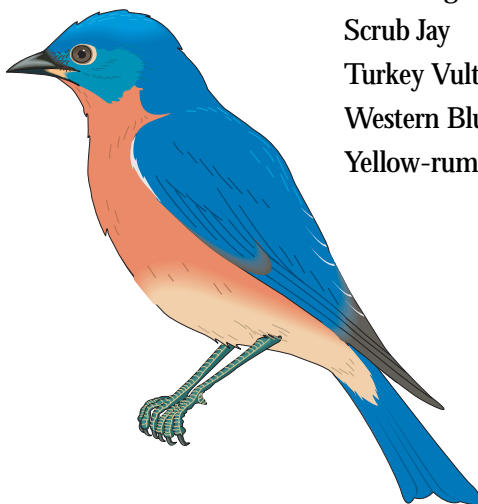
SHORT-DISTANCE MIGRANTS AND RESIDENT BIRDS

EAST

American Robin
Blue Jay
Eastern Bluebird
Northern Cardinal
House Finch
Mourning Dove
Red-winged Blackbird
Yellow-shafted Flicker

WEST

American Crow
American Robin
Black-billed Magpie
House Finch
Red-shafted Flicker
Red-winged Blackbird
Scrub Jay
Turkey Vulture
Western Bluebird
Yellow-rumped Warbler



SHOREBIRDS AND WATERFOWL

EAST

Blue-winged Teal
Canada Goose
Common Tern
Double-crested Cormorant
Great Blue Heron
Great Egret
Herring Gull
Killdeer
Lesser Yellowlegs
Mallard
Sanderling

WEST

American Coot
Black-bellied Plover
Canada Goose
Double-crested Cormorant
Forster's Tern
Great Blue Heron
Killdeer
Mallard
Northern Pintail
Western Sandpiper
Western Gull



U.S. STATE AND CANADA PROVINCIAL BIRDS

UNITED STATES

Alabama Yellow-shafted Flicker
Alaska Willow Ptarmigan
Arizona Cactus Wren
Arkansas Northern Mockingbird
California California Quail
Colorado Lark Bunting
Connecticut American Robin
Delaware Blue Hen
Florida Northern Mockinbird
Georgia Brown Thrasher
Hawaii Hawaii Goose
Idaho Mountain Bluebird
Illinois Northern Cardinal
Indiana Northern Cardinal
Iowa American Goldfinch
Kansas Western Meadowlark
Kentucky Northern Cardinal
Louisiana Brown Pelican
Maine Black-capped Chickadee
Maryland Baltimore Oriole
Massachusetts Black-capped Chickadee
Michigan American Robin
Minnesota Common Loon
Mississippi Northern Mockingbird
Missouri Eastern Bluebird
Montana Western Meadowlark
Nebraska Western Meadowlark
Nevada Mountain Bluebird
New Mexico Roadrunner
New Hampshire Purple Finch
New York Eastern Bluebird
New Jersey American Goldfinch
North Dakota Western Meadowlark
North Carolina Northern Cardinal
Ohio Northern Cardinal
Oklahoma Scissor-tailed Flycatcher

Oregon Western Meadowlark
Pennsylvania Ruffed Grouse
Rhode Island Rhode Island Red
South Dakota Ring-necked Pheasant
South Carolina Carolina Wren
Tennessee Northern Mockingbird
Texas Northern Mockingbird
Utah California Gull
Vermont Hermit Thrush
Virginia Northern Cardinal
Washington American Goldfinch
West Virginia Northern Cardinal
Wisconsin American Robin
Wyoming Western Meadowlark

CANADA

Alberta Great-horned Owl
British Columbia Steller's Jay
Manitoba Great Gray Owl
New Brunswick Black-capped Chickadee
New Foundland Atlantic Puffin
Northwest Territories Gyrfalcon
Nova Scotia Osprey
Ontario Common Loon
Prince Edward Island Blue Jay
Quebec Snowy Owl
Saskatchewan Sharp-tailed Grouse
Yukon Territory Common Raven





Activity 1 Bird Identification

SUGGESTED GRADE LEVELS 3 - 8

LEARNING OBJECTIVES

After completing this activity, students will be able to:

- identify their state bird
- know five or more migratory bird species found locally
- describe basic physical and behavioral characteristics of birds

MATERIALS

List of U.S. State and Canada Provincial Birds and List of Commonly Sighted Migratory and Resident Birds (*provided*)

Bird identification guides and any other identification materials including slides, charts, pictures from magazines, etc.

RELATED SUBJECTS

Science
Language Arts
Art

TEACHER BACKGROUND

1) You will want to know five to ten bird species found in your area. The *List of U.S. State and Canada Provincial and List of Commonly Sighted Migratory and Resident Birds* (Getting Started, p. 13) should help you identify a few. Also contact your state wildlife agency or local bird supply retail store for more information.

2) Determine whether to have your entire class adopt your state bird or to allow students to select an Adopted Bird of their choice. You will first want to determine whether your state bird is a migratory or resident species.

INSTRUCTIONS

1) Distribute the *List of U.S. State and Canada Provincial Birds* (Getting Started, p. 15) and have students identify their state or provincial bird. Ask students if anyone has seen and can describe the state bird. Describe its song? Its behavior? Is the state bird a Neotropical migrant? Can the state bird be found nearby?

2) Cluster students in small working groups. Distribute the *List of Commonly Sighted Migratory and Resident Birds* and identification guides. Have students identify several birds from the list that they may have seen in your area. On the chalk board, list five to ten species found locally.



3) Discuss the five basic characteristics bird watchers use to identify birds. These are: shape and posture; plumage and color; behavior; habitat; and song. Have students discuss with other members in their small group the basic characteristics of the five birds listed on the chalk board.

4) Introduce the Adopt-a-Bird Project. If your students will focus on your state bird, go to step 6.

5) In small groups have students review the *List of Commonly Sighted Migratory and Resident Birds*, and discuss birds they want to adopt. Ask them to choose their Adopted Bird. (You may want to assign this as an overnight activity.) Lead a discussion on why students chose their particular Adopted Bird. What do they particularly like about this bird? Have they seen this bird in the wild?

6) **Adopt-a-Bird Report:** Have students describe the bird's five basic characteristics on their Adopt-a Bird Report Form (Getting Started, p. 11). This can be done as a class exercise or as a take home assignment.

7) Have students draw their Adopted Bird. Do this in conjunction with your school's art program or as a classroom activity.

EXTENSIONS

1) Review with students a list of birds found locally. Identify which are migratory and which are resident species. Discuss with students the difference between resident and migratory birds. Have students develop two distinct lists of resident and migratory birds in your area.

2) Ask a local grocery store or supermarket to cooperate in the following project. Have students draw or paint images of familiar birds on grocery bags obtained from a grocery store or supermarket. Ask students to include the bird's five basic characteristics and two or three facts about these birds. Fill small baggies with sunflower seed or a standard seed mix. Obtain information on bird conservation, such as U.S. Fish and Wildlife Service brochures, literature provided by local chapters of National Audubon Society, or a bird supply store. Then, place the bird seed and literature in the grocery bags and return to the store for distribution. A local bird supply store may also be interested in working with your school or center in this activity.

IMBD FESTIVAL

Display students' Adopt-a-Bird art work at an IMBD festival. Display or sell bird grocery bags at the festival.



Activity II Bird Topography

SUGGESTED GRADE LEVELS 4 - 8

LEARNING OBJECTIVES

After completing this activity, students will be able to:

- describe the topography of a bird
- use their knowledge of bird topography to help identify birds

MATERIALS

Bird Topography Identification Sheet (*provided*)
Bird Topography Worksheet (*provided*)
Bird identification guides

RELATED SUBJECTS

Science
Art

INSTRUCTIONS

- 1) Distribute the *Bird Topography Identification Sheet and Worksheet* to your students. Review and recite the terms used to identify various parts of a bird's external topography. If your class is studying Spanish or has Spanish speakers, try reciting topographical terms in both Spanish and English.
- 2) Have students complete the *Bird Topography Worksheet* by filling in the spaces provided.
- 3) **Adopt-a-Bird Report:** On 8 ½ x 11" paper or poster board, have students draw an outline of their Adopted Bird selected in Activity I. Using the *Bird Topography Worksheet*, have them label their adopted birds topography. You may wish to cluster students in small groups and distribute bird identification guides to help them complete this activity.

EXTENSIONS

- 1) Obtain a slide show (or individual slides) of migratory birds. (See *References and Resources* for suggestions on slide sets). [Pause at each slide and have one or two students identify with a pointer as many of the bird's topographical characteristics as possible.
- 2) Invite a bird rehabilitation expert to conduct a presentation for your class. Explain that you are particularly interested in allowing students to observe a live bird and identify its topographical characteristics.



3) Have students make puppets or paper mache representations of their Adopted Birds. Encourage them to illustrate as many of their bird's topographical characteristics on their paper mache or puppet-birds.

IMBD FESTIVAL

Display Adopt-a-Bird Topography Worksheets, paper mache or puppet birds at an IMBD festival.

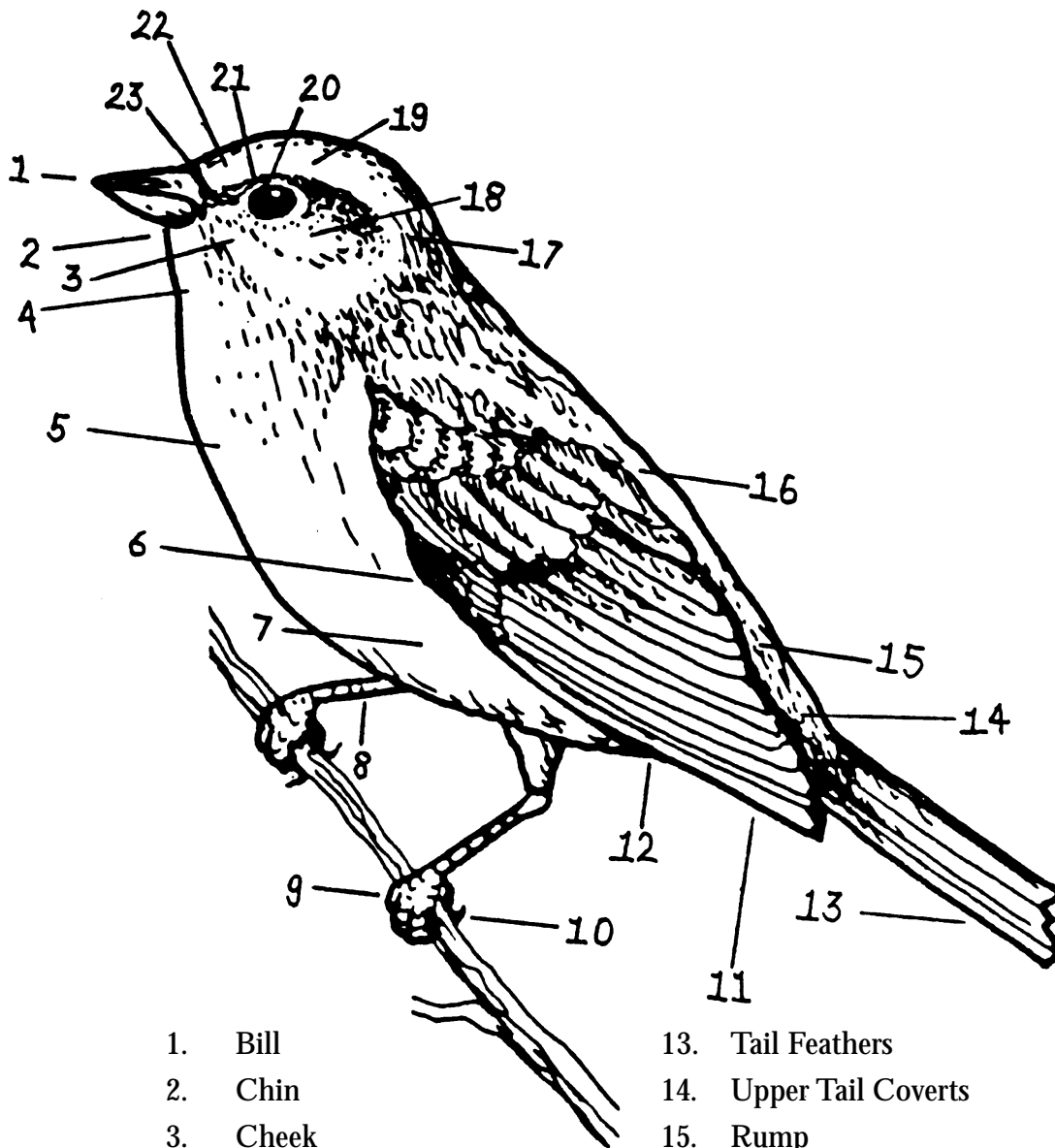
From *Birds Beyond Borders* © 1994 Colorado Bird Observatory

Adapted with permission from Susan Bonfield, Colorado Bird Observatory.



Bird Topography Identification Sheet

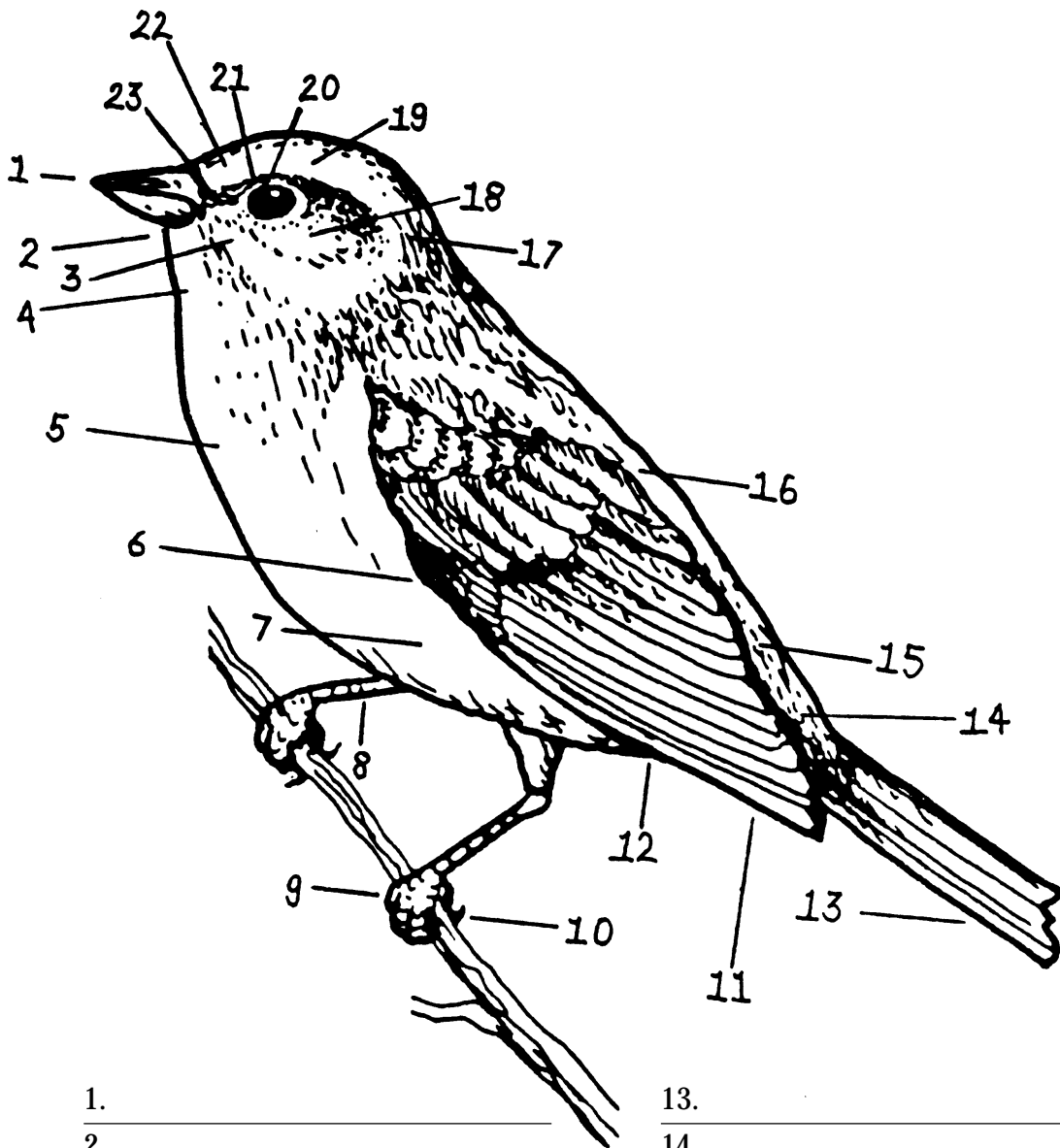
(Duplicate for each student)



- | | |
|----------------------------|-------------------------------------------|
| 1. Bill | 13. Tail Feathers |
| 2. Chin | 14. Upper Tail Coverts |
| 3. Cheek | 15. Rump |
| 4. Throat | 16. Back |
| 5. Breast | 17. Nape |
| 6. Flank | 18. Ear Patch or Auricular |
| 7. Belly | 19. Crown |
| 8. Tarsus | 20. Eye |
| 9. Foot | 21. Eye Line, Eye Stripe, or Superciliary |
| 10. Talon | 22. Forehead |
| 11. Wing, Primary Feathers | 23. Lore |
| 12. Under Tail Coverts | |



Bird Topography Worksheet



1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____

13. _____
14. _____
15. _____
16. _____
17. _____
18. _____
19. _____
20. _____
21. _____
22. _____
23. _____



Activity III Migratory Mapping

SUGGESTED GRADE LEVELS 6 - 8

LEARNING OBJECTIVES

After completing this activity, students will be able to:

- demonstrate a general understanding of bird migration
- list hazards to migrating birds
- outline on a map the range and migratory routes of the Wood Thrush, Swainson's Thrush, and Adopted Bird species
- explain the uses of bird banding in research and monitoring

MATERIALS

Two bags, hats or other receptacles

Colored pencils, pens or markers

Wood Thrush Banding Record Data Sheet (*provided*)

Swainson's Thrush Banding Record Data Sheet (*provided*)

Western Hemisphere map (*provided*)

paper and pencils

RELATED SUBJECTS

Science

Geography

INSTRUCTIONS

1) Copy *Wood Thrush Banding Record Data Sheet* and *Swainson's Thrush Banding Record Data Sheet*. Cut banding records into individual strips. Put all 25 Swainson's Thrush banding records into one container and all 25 Wood Thrush banding records into another container. (Note—band records are based on hypothetical data using actual ranges, migration routes, and causes of recoveries).

2) Have students divide into two groups—one representing the Swainson's Thrush and the other representing the Wood Thrush.

3) Have each student in each group take 5 or 6 individual records, or until all records have been taken.

4) Distribute one copy of the *Western Hemisphere Map* to each student.



5) Tell the students they will be Wildlife Biologists for the class period. They are being sent data on the banding and recovery locations of the Wood Thrush and the Swainson's Thrush. Their job will be to plot the banding records on a map and to determine each thrush species' migratory route based on the plot locations.

6) Have students plot the locations of banding and recovery records on their individual maps. Higher grade levels can use different colors representing each of the four seasons for banding and recovery locations. While color coding is not necessary, it will help indicate seasons when the birds are on their breeding grounds and times when they are on the wintering grounds. June and July records are from the breeding range; August to October records illustrate fall (southward) migration; November to March records are from the wintering grounds; and April and May is spring (northward) migration.

7) Once they have plotted their data on their individual maps, have students combine data of banding and recovery locations with others in their group to create one master map per group. The class should now have one master map of the Wood Thrush banding data and a master map of Swainson's Thrush banding data.

8) Discuss each map with the class. Can students distinguish the migratory routes based on the locations of the banding records? Draw an outline around the migratory routes. Discuss differences and similarities of the Wood Thrushes migratory route and that of the Swainson's Thrush. Have several of the students share their banding records with the rest of the class to see examples of how banded birds are "recovered."

9) **Adopt-a-Bird Report:** Assemble students in small groups. Distribute bird identification guides and clean copies of the *Western Hemisphere maps*. Have students describe their Adopted Bird's migratory range. Have students interpret and reproduce a map of their Adopted Bird's range and migratory route, including its breeding, wintering, and stopover areas.

EXTENSIONS

1) You can teach the Migratory Mapping activity to the entire class by using an overhead projector transparency to project the *Western Hemisphere map* on the wall. Simply copy the map of the Western Hemisphere on a plastic transparency. Plot all the band records on the map using small squares for the Wood Thrush and small circles for the Swainson's Thrush. Again, use different colors to indicate the seasons birds are found in their breeding and non-breeding ranges. When the locations are all plotted, draw lines in the appropriate colors around the breeding and non-breeding areas of each species and link the two to indicate migration routes.



2) Distribute bird identification guides and ask students to compare the ranges of thrushes indicated in the guides with those represented on your class map. How are similar are the two maps? Why might they be slightly different?

3) Arrange a visit to a nearby bird banding station. The opportunity to observe live migratory birds up close is certainly one of the most exciting experiences you can provide your students. Contact a nearby National Wildlife Refuge, state wildlife agency or the Institute for Bird Populations (415-663-1436), for information on banding stations near you.

4) *Journey North* - Now that you and your students have tracked the migration of two thrush species based on *hypothetical* banding records, why not participate in real world research to track migratory species as they move northward across the continent. *Journey North* is a comprehensive curriculum of lessons and activities that allow students to explore the phenomenon of migration through online, internet networks. A component of *Journey North*, the Internet Field Team, provides students online, daily news reports on various topics relating to migration. Internet Field Team news reports include interactive, online activities such as contests and challenge questions. Students in classrooms across the county communicate with one another on the internet to participate in these activities.

Journey North's Internet Field Team also provides a forum for students to submit their "sittings" of migratory species including Neotropical migratory birds, monarch butterflies, and others. Students' sittings are compiled to produce maps which depict a "migratory snapshot" of these species as they make their annual journey northward. Why not *Share Your Passion* for birds with the thousands of other teachers and students who are a part of *Journey North's* Internet Field Team. Online access to this adventure in learning through real science is completely free. For more information, see *Journey North*, in *Resources* (p. 13).

IMBD FESTIVAL

Display students' maps of their adopted bird's migration at an IMBD festival.

From Migratory Bird Issue Pac, 1995 United States Fish and Wildlife Service.



Western Hemisphere



Swainson's Thrush Banding Record Data Sheet

- 1 Swainson's Thrush banded in NW California 6/28/89
- 2 Swainson's Thrush banded in central Colorado 7/17/91, found dead in Peru by an indigenous person in the tropical forest in January of 1993. The band was eventually returned with a description of the recovery location to the Bird Banding Laboratory (BBL) in Laurel, MD.
- 3 Swainson's Thrush banded in SW Mexico 2/3/92.
- 4 Swainson's Thrush banded in SW Alaska in early July of 1986 was recovered in southeastern British Columbia after it flew into the window of a private residence in mid-September 1986.
- 5 Swainson's Thrush banded in NE Quebec 6/11/84.
- 6 Swainson's Thrush banded in Guatemala 12/19/93.
- 7 Swainson's Thrush that was banded with a unique combination of three colored leg-bands by a researcher studying bird behavior in central Saskatchewan on 6/11/89 was re-sighted by a bird watcher in NW Oklahoma on 4/26/91.
- 8 Swainson's Thrush banded 5/11/93 in West Virginia.
- 9 Swainson's Thrush banded in southcentral Montana on 6/11/88 was subsequently recaptured at the same site on the following dates: 6/27/89, 7/13/90, and 6/20/92.
- 10 Swainson's Thrush banded in northcentral New Mexico 9/29/93.
- 11 Swainson's Thrush banded in SW Northwest Territories in July of 1986.
- 12 Swainson's Thrush banded in western Oregon 5/31/81 is killed as it flies into a lighthouse on the central Californian coast 4/11/94.
- 13 Swainson's Thrush banded in northcentral Pennsylvania on 7/7/92.
- 14 Several Swainson's Thrushes found dead on an oil platform off the coast of Louisiana in early May following the passing of a cold front with heavy rains over the Gulf of Mexico.
- 15 Swainson's Thrush banded in central Ontario in June 1980 was recaptured at the same site many times over several years. It was last recorded 7/23/91.
- 16 Swainson's Thrush banded in N Wisconsin in early August 1993.
- 17 Swainson's Thrush banded in Massachusetts 6/17/91 recaptured in November of 1992 in Cuba.
- 18 Swainson's Thrush banded in N Nevada 8/3/92.
- 19 Swainson's Thrush banded in central Alberta during the summer of 1987 was killed by a cat in SW Colorado. It was discovered and reported by the cat's owner.
- 20 Swainson's Thrush banded in Columbia, South America in January 1994.
- 21 Swainson's Thrush banded in central Yukon in June 1991.
- 22 Swainson's Thrush banded in W Washington 7/7/94.
- 23 Swainson's Thrush banded in NW British Columbia 6/31/91 was recaptured 9/16/91 in southeastern Arizona, and again (amazingly!) 12/31/92 in El Salvador.
- 24 Swainson's Thrush banded in central Idaho during the summer of 1994.
- 25 Swainson's Thrush banded in central Manitoba 6/13/94.



Wood Thrush Banding Record Data Sheet

- 1 Wood Thrush banded 6/21/94 in central New Brunswick.
- 2 Wood Thrush banded in SE Ontario 6/12/93, recaptured in coastal Alabama 4/13/94.
- 3 Wood Thrush banded in central Wisconsin 7/18/92.
- 4 Wood Thrush banded in eastern North Carolina at a MAPS station during the summer of 1990, recaptured at the same site in 1992 and again in 1994. It was not captured in 1991 or 1993.
- 5 Wood Thrush banded in Honduras 1/17/91 recaptured in SW Pennsylvania 6/18/91.
- 6 Wood Thrush banded in E Nebraska as a juvenile 6/30/93 recaptured as an adult in E Kansas 7/1/94.
- 7 Wood Thrush banded in the summer of 1980 in NW Florida.
- 8 Wood Thrush banded in NE Texas 5/29/80 as an adult was recaptured at the same site 6/21/89.
- 9 Wood Thrush banded in S Mexico 11/21/94. The forest in which it was banded had begun to be cut down later that same winter. A large tract was completely cleared within six months.
- 10 Wood Thrush banded in Panama 2/17/91 recaptured in central Tennessee 6/9/91.
- 11 A biologist monitoring the nest of a pair of Wood Thrushes he banded during the summer of 1993 in central Minnesota found that, although no young Wood Thrushes were successfully raised, the pair did successfully raise one Brown-headed Cowbird.
- 12 Wood Thrush banded 6/29/94 in central New York recaptured 8/30/94 in SW Virginia.
- 13 Wood Thrush banded at a MAPS station in W Ohio during the summer of 1991 was recaptured in Costa Rica during December 1993.
- 14 Wood Thrush banded in E Georgia 8/5/94.
- 15 Wood Thrush banded in SE Quebec 6/17/91.
- 16 Wood Thrush banded 7/27/93 in Delaware recaptured 10/1/93 on the NE Texas coast.
- 17 Wood Thrush banded in central Oklahoma 7/19/83. The study site on which it was banded was not used after this year as construction for a residential development began in 1984.
- 18 Wood Thrush banded in southcentral Pennsylvania 8/11/87. The following summer, was found dead near the original banding location. It had been killed by a cat.
- 19 Wood Thrush banded at MAPS station in E Kentucky 6/1/94.
- 20 A Wood Thrush that was banded in central Mississippi on 6/21/85 with a unique combination of colored leg-bands was re-sighted by a bird watcher 8/29/85 in coastal Mississippi.
- 21 Wood Thrush banded 6/3/94 in central South Carolina.
- 22 Wood Thrush band sent in from Illinois during the summer of 1991 with no information about recovery or cause of death. It had been banded on 8/31/91 in NW Ohio.
- 24 Wood Thrush banded 8/9/89 in central Maine was later recovered after it flew into the window of a residence in Connecticut.
- 25 The nest of a banded pair of Wood Thrushes in SE South Dakota was monitored in 1989. No eggs were hatched as the nest was predated by a raccoon.



Activity IV Gallery of Homes

SUGGESTED GRADE LEVELS 3 - 7

LEARNING OBJECTIVES

After completing this activity, students will be able to:

- understand the term “habitat”
- name three elements required by birds in any habitat
- compare habitat requirements of birds with those of other wildlife

MATERIALS

Mural and drawing paper
Crayons, chalk, colored pencils, paint, markers etc.

RELATED SUBJECTS

Science, Geography, Art

INSTRUCTIONS

- 1) Ask students to think about where they live, their homes and neighborhoods. Ask them to consider all the things they need to live—kitchen appliances, washing machines, cars, etc. Have students draw pictures of their homes, including as many of these items in their pictures as possible.
- 2) Have several students discuss their pictures of their homes and why they need the illustrated items to live.
- 3) Introduce the term “habitat.” (See glossary definition, Resources, p. 2).
- 4) Ask students to describe their “habitat.”
- 5) Lead your class in a discussion of the different groups of migratory birds, including: shorebirds, waterfowl, songbirds, and raptors. (See glossary definitions, Resources, p. 1).
- 6) Ask students to consider what types of habitat they think each of these migratory birds needs.
- 7) Explain differences in habitat requirements of these groups. For example, shorebirds and waterfowl require wetland habitats, such as lakes, marshes, beaches and the ocean. Migratory songbirds often require broad expanses of forest, wetland, fields, and grassland.



8) Cluster students in groups representing shorebirds, waterfowl, raptors, and songbirds. You may wish to have three or four different songbird groups, one each to represent the habitat types noted in step 7 above. You may also wish to add a group to represent tropical forest wintering ground habitat.

9) Have groups discuss the habitat types required by their species group.

10) Distribute mural paper, drawing pencils, markers, or paints.

11) Have students create murals representing the habitats required by their species group.

12) **Adopt-a-Bird Report:** Have students describe their Adopted Bird's habitat including its requirements for food, shelter, and water, and create a drawing or painting of their Adopted Bird's habitat.

13) Discuss similarities and differences between various bird habitats and student's habitats (homes). Discuss the things every bird and animal needs in its home to survive: food, water, shelter.

14) Create a "gallery of homes" by displaying the drawings of student's homes (step 1), the habitat murals (step 11), and the illustrations of Adopted Bird habitats (step 12) around the classroom.

EXTENSIONS

1) Discuss the different types of habitat used by other wildlife—deer, racoons, bear, elk, etc. Ask the class to think about the connections between protecting habitat for birds and protecting habitat for these animals as well.

2) Discuss the value of bird houses and bird feeders in enhancing suburban and urban habitats for birds. Bring in examples of these items. Lead a mini-workshop for students to build bird houses or feeders. Contact a wild bird supply store or chapter of the National Audubon Society to assist.

4) Establish a bird feeding station. (Look for Cornell Laboratory of Ornithology's *Project Feeder Watch* program in the *Resources* section as one example of a feeder activity.)



5) Develop an observational activity in which students record birds they see at the feeders.

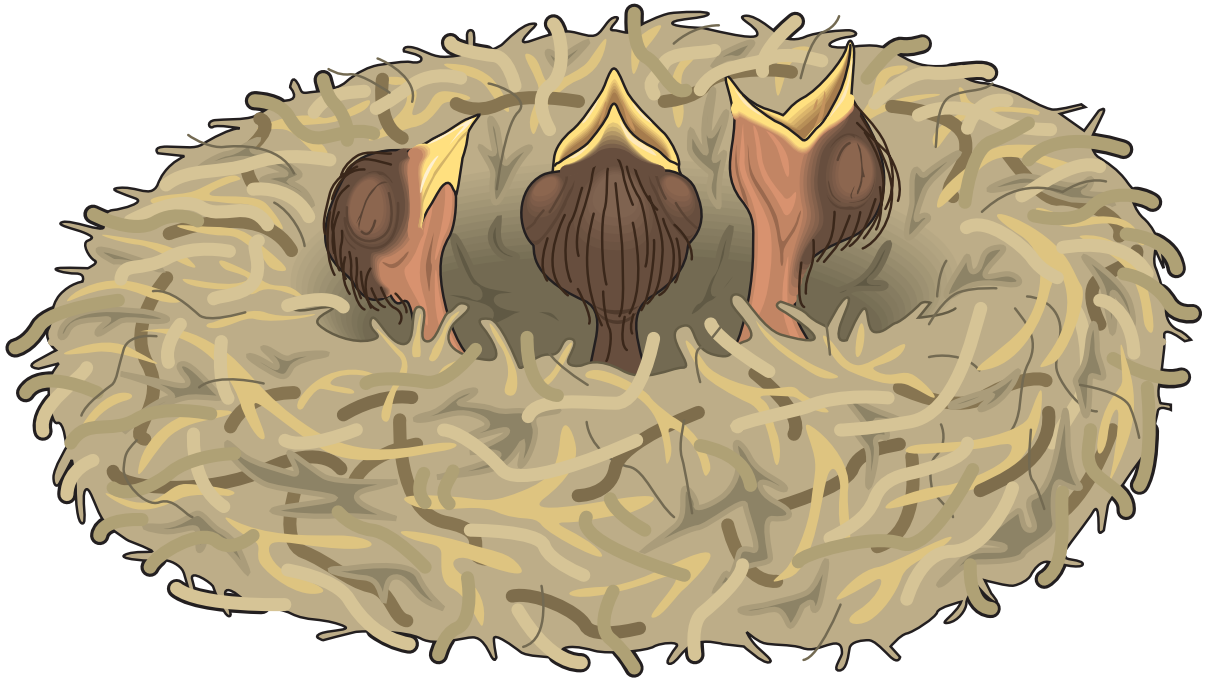
6) Develop a seed preference activity in which students record the types of bird seed particular species prefer.

IMBD

Display the Gallery of Homes exhibit at an IMBD festival.

From *Project WILD K-12 Activity Guide*, © 1983, 1985, 1992 Western Regional Environmental Education Council, Inc. Adapted with permission from Project WILD.





Activity V A Habitat for Birds

SUGGESTED GRADE LEVELS 5 - 8

LEARNING OBJECTIVES

After completing this activity, students will be able to:

- demonstrate observational and data gathering skills
- have a general understanding of food, habitat, and water requirements needed by birds
- identify on-site actions to benefit birds

MATERIALS

Habitat Survey Worksheet (provided)

Habitat Improvement Worksheet (provided)

Bird identification guides

List of local native plant species that benefit birds

RELATED SUBJECTS

Science, Math

TEACHER BACKGROUND

1) This activity involves a trip outside with your class in order to conduct a survey of your school or organization's property; make any advance preparations necessary to take your class outside.

2) Identify a section of your property for the habitat survey.

3) You may need assistance from an experienced bird watcher or naturalist to help students complete the *Habitat Survey Worksheet*; if so, consider combining this step with Step 4 and Extension 1.

4) You may want to know what native plants benefit birds in your area. A list can be obtained by contacting your state wildlife agency, county extension agent, or wild bird supply store.

5) Review the point scoring system on the *Habitat Survey Worksheet*. Total point values are assigned for each habitat component—shelter, food, number of birds, etc. Students will assign appropriate point scores based on how well they think your school's property provides for these components.



6) After completing the *Habitat Survey Worksheet*, most students will probably agree that there is much that could be done to provide more habitat for birds at your school or organization. Encourage students to recommend actions to improve habitat for birds at your school based on their knowledge of the general requirements of food, shelter, and water for birds.

INSTRUCTIONS

1) Explain to students that they will now put their knowledge of habitats to work at your school or organization. They will become biologists for the class period in order to develop a habitat survey of your property.

2) Distribute the *Habitat Survey Worksheet*. Explain the point scoring system to students in which each component of the habitat is assigned a score. Their job will be to assign the appropriate point score based on how well they think your school or organization's property provides these elements.

3) Prepare your class for the Habitat Survey trip. Tell them they will have a limited period of time (approximately 30 minutes) to complete the worksheet.

4) While outside, have students identify as many different types of birds as they can. Have them obtain small samples of various plants on your school or organization's property. Students will only be able to complete a portion of the *Habitat Survey Worksheet* while outside.

5) Once back in the classroom, cluster students in small groups and distribute bird identification guides and native plant lists. Work with students to identify birds and plants and complete the *Habitat Survey Worksheet*. Have students total their point scores.

6) As a large group, discuss the *Habitat Survey Worksheet* and students' points scoring for certain components.

7) Cluster students in small groups. Ask one member of each group to volunteer to be a "recorder." Ask another member to volunteer to serve as a "spokesperson."

8) Ask students to discuss among themselves ways they could improve the point scores they obtained for the habitat components on your property. Encourage them to try to be as specific as possible to identify ways to increase scores to "total possible points." Encourage them to think about what they have learned about birds' needs for food, shelter, and water.



9) Distribute the *Habitat Improvement Worksheet*. Have students complete the worksheets individually and then discuss their answers with their small group. Have the recorder summarize the answers generated by each member of the group to develop a master Habitat Improvement Worksheet. The “master” copy will then serve as the group’s habitat improvement plan. Ask the spokesperson from each group to present the group’s Habitat Improvement Plan to the class.

10) **Adopt-a-Bird Report:** Have students describe actions that could be taken around or on your school or organization’s property that could improve the habitat for their Adopted Bird.

EXTENSIONS

1) Ask students to write a letter to invite a natural resource professional to visit their school, and to discuss ways in which the habitat could be improved for birds. Make use of the model letter provided (Activities, p. E-7) or have students write their own. You will need to identify a natural resource professional to whom to send letters. Contact a National Wildlife Refuge, your state wildlife agency, county extension agent, bird club, or wild bird supply store to identify a natural resource expert. Many experts are willing to help with school yard habitat projects. Developing a partnership with a natural resource professional has proved to be an important factor in many successful school yard habitat projects.

2) Distribute graph paper. Working in small groups, have students create maps of the section of your property visited on the survey. These maps will represent your school or organization’s current habitat conditions.

IMBD FESTIVAL

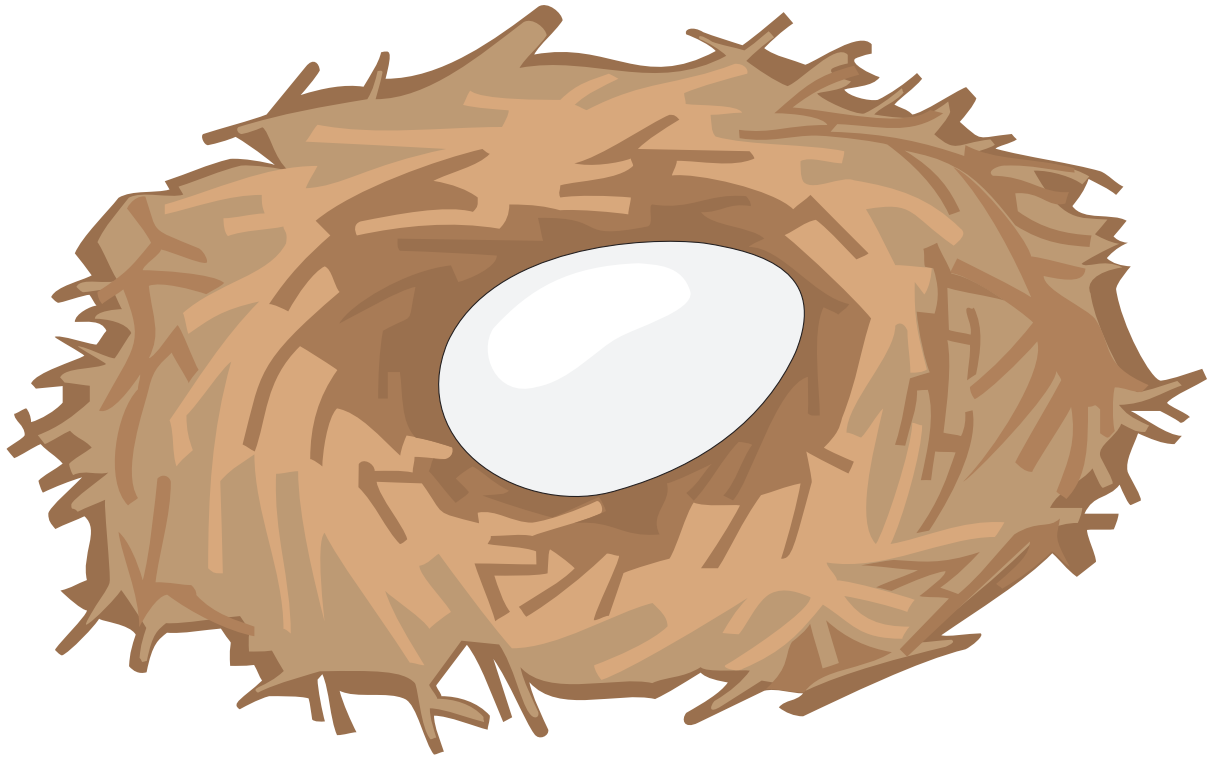
Display habitat maps at an IMBD festival.

From *Project WILD K-12 Activity Guide*, © 1983, 1985, 1992 Western Regional Environmental Education Council, Inc. Adapted with permission from Project WILD.

From *WILD School Sites: A Guide to Preparing for Habitat Improvement Projects on School Grounds*, © 1987, 1992 Western Regional Environmental Education Council, Inc./ Project WILD. Adapted with permission from Project WILD.

And from *Julie Tracy and Mary Roderick, Hollywood Elementary School, Maryland*





Habitat Survey Worksheet

(Duplicate for students)

ELEMENT	CONDITION OF SITE (POINT SCALE)			POINTS SCORED
---------	---------------------------------	--	--	---------------

WATER

Water at or near the site all year	Water at or near site only part of the year	No water at the site	<input type="checkbox"/>
10 _____	5 _____	0 _____	Water Points
(Highest Score)		(Lowest Score)	

SHELTER

More than 1/2 of the site has shelter plants	Some of the site (1/4) has shelter plants	There are no shelter plants	<input type="checkbox"/>
10 _____	5 _____	0 _____	Shelter Points
(Highest Score)		(Lowest Score)	

FOOD

At least 10 kinds of plants that provide bird food	At least 5 kinds of plants that provide bird food	No plants that provide bird food	<input type="checkbox"/>
10 _____	5 _____	0 _____	Food Points
(Highest Score)		(Lowest Score)	

TRASH

No trash was found	1 - 5 pieces of trash were found	5 - 10 pieces of trash were found	<input type="checkbox"/>
10 _____	5 _____	0 _____	Trash Points
(Highest Score)		(Lowest Score)	

BIRDS SEEN

Score 2 points for each kind of bird seen.

	Bird Points
1) _____	<input type="checkbox"/>
2) _____	<input type="checkbox"/>
3) _____	<input type="checkbox"/>
4) _____	<input type="checkbox"/>
5) _____	<input type="checkbox"/>
6) _____	<input type="checkbox"/>
7) _____	<input type="checkbox"/>
8) _____	<input type="checkbox"/>
9) _____	<input type="checkbox"/>
10) _____	<input type="checkbox"/>
TOTAL POINTS	
	<input type="checkbox"/>



Letter to a Natural Resource Professional

Date

Name

Organization/Agency

Address

Dear _____

I have adopted _____ (species) as part of an Adopt-a-Bird Project at my school. This species may be at risk because of loss of habitat. _____ (name of school or organization) could provide valuable habitat for _____ (species). As part of a class project, I conducted a habitat survey and learned that _____ (name of school or organization) has (list good things representing food, shelter, and water that are present on-site)

I think the habitat could be improved for birds by adding the following things. (Provide a summary of the actions your group identified in Part1) _____

I hope you will visit us and make a presentation to our class about beneficial things that could be done for birds at our school. _____ (name of teacher) will call in one week to try to set up an appointment. I am looking forward to meeting you.

Sincerely,

(your name)





Glossary

AVIAN

- of or relating to birds.

BIRD BANDING

- Research technique in which a small aluminum band is attached to a bird's leg. If the bird is captured again or found dead, and the band number is reported to the U.S. Fish and Wildlife Service, the bander and other researchers can learn about bird movements and longevity.

BREEDING GROUNDS

- environment where an animal mates and produces offspring.

CONSERVATION

- the use of natural resources in such a way that assures their continued availability.

CULTURE

- the arts, beliefs, traditions of a particular population of a region of country.

ECOLOGY

- the science of the relationships between living organisms and their environments.

ECOSYSTEM

- all living and non-living things within an area that are all linked together by their interactions.

ENDANGERED SPECIES

- a species which is in danger of extinction throughout all or a significant portion of its range.

ENVIRONMENT

- conditions in an area influenced by the climate, soil, terrain, and living components.

FLYWAYS

- general routes of travel used by birds when migrating between breeding and wintering grounds. Four major flyways are Atlantic, Mississippi, Central and Pacific.

FORAGE

- to search for food.

FRAGMENTATION

- division of large continuous tracts of habitat into smaller parcels that are divided by roads, housing developments, or other type of habitat.



GEOGRAPHY

- **study of the earth and its features.**

HABITAT

- **the place where an animal makes his home and meets all its needs for survival. Components of habitat are food, water, and shelter.**

INSTINCT

- **a natural impulse or motivation arising from within.**

INVENTORY

- **a detailed list of items or the process of making a list of items.**

MIGRATION

- **movement of a species from one place to another, often following a change of seasons.**

NAVIGATE

- **to follow a course to a destination.**

NEOTROPICAL

- **the area of the Americas which lies between the Tropics of Cancer and Capricorn.**

NEOTROPICAL MIGRATORY BIRD

- **a bird that moves seasonally between colder climatic regions of North America, where it nests, and warm tropical areas of Mexico, the Caribbean and other parts of Latin America, where it spends the winter.**

NON-BREEDING GROUNDS

- **environment where an animal spends the winter, also referred to as the wintering grounds.**

ORNITHOLOGIST

- **one who engages in the scientific study of birds.**

POPULATION

- **the group of individuals of a particular species in a given area.**

PREDATOR

- **an animal that kills and eats other animals.**

PREY

- **an animal that is killed and eaten by other animals.**



RAPTORS

- A bird of prey, as a hawk or owl.

RANGE

- the entire area within which a species can be found.

RESIDENT BIRD

- a bird that does not migrate, makes its home in same area all year round.

RIPARIAN

- bordering water; at the water's edge. "Riparian area or Riparian zone" refers to the vegetation that grows on or near the banks of streams, rivers, lakes and other bodies of water.

SHELTER

- provides protection or cover from the weather.

SHOREBIRD

- a type of bird that usually frequents coastal or inland shorelines and wetlands.

SHRUBLAND

- land covered by short shrubs.

SPECIES

- a population of individuals that are more or less alike and are able to breed and produce fertile offspring under natural conditions.

TEMPERATE

- area of the earth that lies between the tropical and polar regions and has a mild climate.

VEGETATION

- general references to the plants that are found within a given area.

WATERFOWL

- a swimming bird, as a duck or goose, usually frequenting freshwater lakes, rivers, and ponds, but also saltwater.

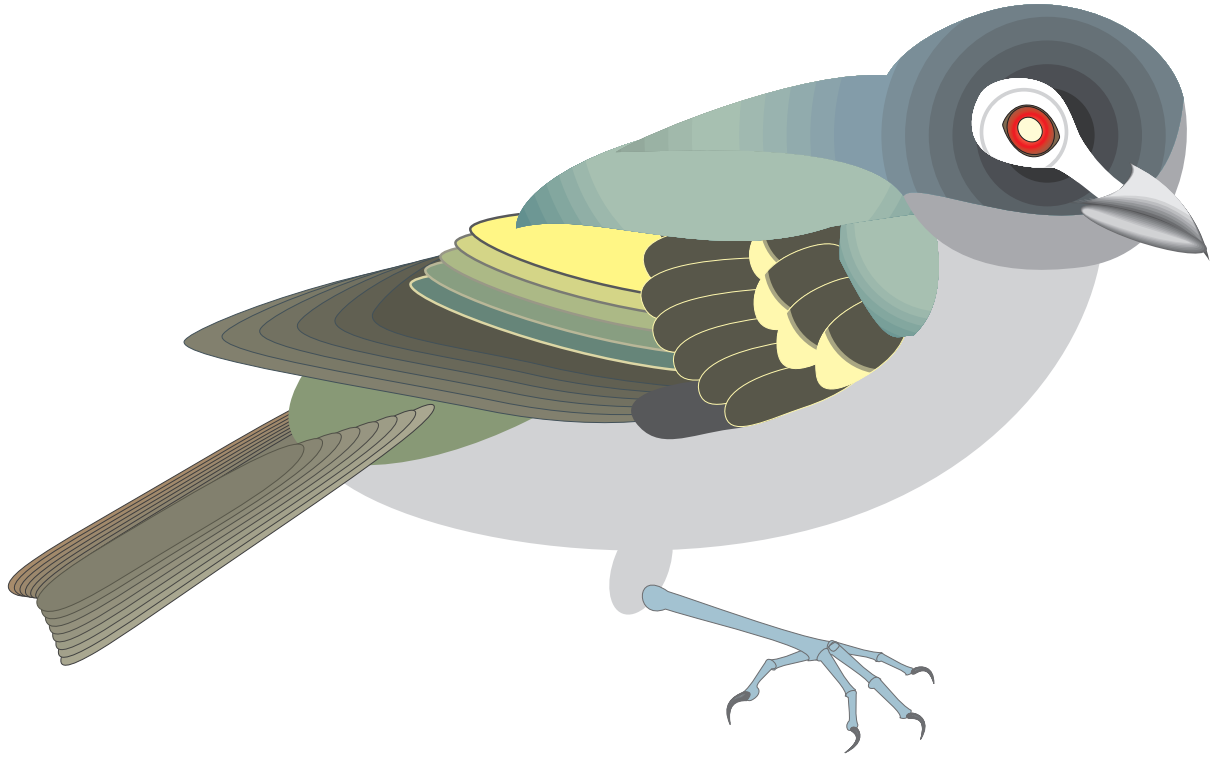
WETLAND

- land frequently covered by water (e.g. marshes, swamps, wet meadows).

WILDLIFE

- general term for a group of animals in their natural environments.





Educational Resources

(A selection of helpful and commonly used resources, not exhaustive)

MIGRATORY BIRD AND WILDLIFE CURRICULA

FEDERAL JUNIOR DUCK STAMP CONSERVATION PROGRAM

- Curriculum guide discusses waterfowl conservation and contest information for students to participate in Federal Junior Duck Stamp contest. Students work to design a duck stamp to be bought by duck hunters and other stamp collectors with revenue directed toward the preservation of waterfowl habitat in the United States. Contact Federal Duck Stamp Program, U.S. Fish and Wildlife Service, 1849 C Street, NW, Washington, DC 20240 (202-208-4354).

INTERNATIONAL CRANE FOUNDATION

- The foundation offers numerous curriculum packets including coloring books, activity booklets, study sheets, accompanying slide shows and more for grades K-12 and adults. Posters, books, photographs, films and slide shows also available. Contact International Crane Foundation E-11376 Shady Lane Road, P.O. Box 447, Baraboo, Wisconsin 53913-0447 (608-356-9462).

ISSUE PACS

- An education package that provides teachers and other educators with factual information about wildlife habitat and resource management. One pac of interest is the *Migratory Bird Issue Pac* put together with assistance of the U.S. Fish and Wildlife Service National Education and Training Center offers an overview of migratory bird education with lessons and activities. Other pacs offered are *Wetlands Conservation and Use*, *Rivers and Streams*, *Freshwater Marsh*, *Urban areas and Wildlife Conflicts*. Contact National Institute for Urban Wildlife, Box 3015, Shepherdstown, West Virginia 25443 (304-876-6146).

NATIONAL AUDUBON SOCIETY EDUCATIONAL RESOURCES

- *Audubon Adventures* provides a set of 32 kid's style newspapers on migratory birds with teachers guide to be used in a classroom setting (\$10). *Disappearing Habitat*, *Disappearing Bird* teachers guide (\$2) and poster (folded - \$2 or unfolded - \$4). Contact the Education Division, National Audubon Society, 700 Broadway, New York, New York 10003 (212-979-3183).



ONE BIRD - TWO HABITATS

- A program of twenty-two 6-8th grade activities, with background information and support materials, in a curriculum unit disseminated through workshops. Delineates issues surrounding declines of some neotropical migratory birds and illustrates the interconnectedness of the U.S. and Latin America. Contact Wisconsin Department of Natural Resources, 1350 Fernside Drive, Monona, Wisconsin 53716 (608-221-6350) or Darel Covell, UW Wildlife Ecology, 1630 Linden Drive, Room 226, Madison, Wisconsin 53706-1598 (608-265-8264).

PROJECT FEEDERWATCH

- A November through March project that involves participants watching and counting feeder birds. Teachers use *FeederWatch* in their science classes and as an interdisciplinary focus. Participants receive quarterly reports in the newsletter, *Birdscope* (\$15.00 annual fee). Contact Cornell Laboratory of Ornithology, 159 Sapsucker Woods Road, Ithaca, New York 14850 (1-800-843-BIRD).

PROJECT WILD

- An interdisciplinary, supplementary conservation and environmental education program emphasizing wildlife. Primarily for educators of K-12, but can be adapted for community youth groups and pre-school or after-school programs. Offers educator training workshops in every state. Contact Project WILD, 5430 Grosvenor Lane, Bethesda, Maryland 20814 (301-493-5447) or e-mail: natpwild@igc.apc.org.

SHOREBIRD MIGRATION GAME

- Booklet includes lesson plans and game rules; ages 9-12 (\$24 including postage). Contact Education Coordinator, Manomet Observatory, Box 1770, Manomet, Massachusetts 02345 (508-224-6521).

THE SONGBIRD BLUES TRUNK

- *Songbird Blues* is a comprehensive curriculum contained in a trunk. This mobile kit includes everything needed to teach a full unit on neotropical migratory birds and their conservation. The trunk contains a teacher's guide, lesson plans, student research packets, puppets, felt boards, books, posters, audio and video tapes, and study skins (Cost: Full Trunk - \$1,200; "Fledgling Trunk" with all the essentials - \$600; Felt Storyboard "My Changing Neighborhood" with script in both English and Spanish - \$30; Curriculum Guide - \$25; 3 week rental - \$20). Contact Montana Natural History Center, P.O. Box 8514, Missoula, Montana 59807 (406-243-6642).



THE SONGBIRD CONNECTION

- Videos, posters, and multidisciplinary lessons on bird ecology and forest conservation for grades K-12 (\$50). Contact New Jersey Conservation Foundation, 300 Medham Road, Morristown, New Jersey 07690 (201-539-7540).

TEACH ABOUT GEESE

- Teachers use relevant topics which motivate students and contribute to an education effort dedicated towards increasing goose populations and the awareness of wildlife management. Contact Yukon Delta National Wildlife Refuge, P.O. Box 346, Bethel, Alaska 99559 (907-533-3151).

WONDERS ON THE WING

- Video and accompanying curriculum on migratory bird natural history and conservation (\$14). Contact Colorado Division of Wildlife, 6060 Broadway, Denver, Colorado (303-291-7262).

BILINGUAL - SPANISH AND ENGLISH

BIRDS BEYOND BORDERS

- Project has developed lesson plans, and materials in Spanish for use in bilingual classrooms in Colorado and schools in Mexico. Birds Beyond Borders also provides training for teachers in the use of these materials. Contact Colorado Bird Observatory, 13401 Piccadilly Road, Brighton, Colorado 80601 (303-659-4348).

SAVE OUR MIGRATORY BIRDS

- This guide for middle school teachers provides a series of lessons and fact sheets that encourages students' global perspective on natural resources by focusing on birds which link countries through their seasonal migration. Unit themes include developing a cultural exchange, migration, monitoring, conservation and more. In English and Spanish. Contact Manomet Observatory, P.O. Box 1770, Manomet, Massachusetts 02345 (508-224-6521).

SAVE OUR SHOREBIRDS

- A teachers interdisciplinary guide to understanding shorebirds and their migration; upper elementary to middle school students and available in Spanish and English (\$10 includes postage). Contact Education Coordinator, Manomet Observatory, Box 1770 Manomet, Massachusetts 02345 (508-224-6521).



SMITHSONIAN MIGRATORY BIRD CENTER RESOURCES

- *Birds Over Troubled Forests* (\$5) *Migratory Bird Handbook* (\$5), *Bridging the Americas: Migratory Birds in Costa Rica and Panama* (Spanish and English) (\$5) and *Southern Mexico: Crossroads for Migratory Birds* (Spanish and English) (\$5). Contact Smithsonian Migratory Bird Center, National Zoological Park, Washington, DC 20008.

CANADA

BIRD QUEST

- A program for all ages consisting of six levels of classroom and field instruction that lead students from basic bird identification to independent studies. Contact Canadian Nature Federation, 1 Nicholas Street, Suite 520, Ottawa, Ontario, K1N 7B7 (\$49.95 plus tax) (In Canada 1-800-267-4088 or 613-562-3447 elsewhere).

SINGING IN THE RAINFOREST, FOR THE BIRDS—COMEBACK OF THE PEREGRINE FALCON, BIRDERS OF A FEATHER—BIRDERS MOVING FROM CANADA TO COSTA RICA, AND NIGHT MOVES—THE MIGRATION OF BURROWING OWLS

- Four videotapes suitable for upper school students to adults (\$26.95 each for individual use and \$49.95 included public performance rights for use by educators). Contact Missing Link Productions Inc., #400, 119 14th Street, NW, Calgary, Alberta, Canada T2N 1Z6 (403-283-6214).

MAGAZINES AND NEWSLETTERS

RANGER RICK, MY BIG BACKYARD, NATIONAL WILDLIFE, INTERNATIONAL WILDLIFE

- The National Wildlife Federation publishes four magazines. The first two are high quality children's nature magazines, the last two are aimed at a general audience and focus on wildlife issues. Contact National Wildlife Federation, 1400 Sixteenth Street NW, Washington, D.C. 20036-2266 (1-800-432-6564).

NATURE'S COURSE

- Environmental newsletter for teachers that provides reviews of children's books and curricula (\$12 subscription - 4 issues). Contact Center for Children's Environmental Literature, P.O. Box 5995, Washington, DC 20016 (202-966-6110).



PUBLICATIONS

COMMON FEEDER BIRDS POSTER

- Available for both eastern and western birds. For special pricing information for teachers, contact Cornell Lab of Ornithology, Crow's Nest Birding Shop, 159 Sapsucker Woods Road, Ithaca, New York 14850 (607-254-2400).

GUIDE TO VOLUNTEER OPPORTUNITIES

- Booklet lists projects in which volunteers can gain experience in migratory bird monitoring, habitat restoration and education (\$2 each). Contact American Birding Association, P.O. Box 6599, Colorado Springs, Colorado 80934 (719-578-9703).

NATIONAL GEOGRAPHIC SHOREBIRD MIGRATION MAP

- This popular map portrays shorebird migration routes between breeding and wintering grounds. Produced by the National Geographic Society (Free -small donation requested to cover shipping and handling). Contact American Birding Association, P.O. Box 6599, Colorado Springs, Colorado 80934 (719-578-9703).

RANGER RICK'S NATURE SCOPE - BIRDS BIRDS, BIRDS

- One publication in a creative education series dedicated to inspiring a child's understanding and appreciation of the natural world. Contact Nature Scope, National Wildlife Federation, 1400 Sixteenth Street NW, Washington, DC 20036-2266 (1-800-432-6564).

WILD BIRD CENTER OR WILD BIRD CROSSING STORE INFORMATIONAL FLYERS

- *Designing Your Feeding Station, Attracting Birds with Water, and Bird Feeding Preferences* are available through each store. Contact Wild Bird Centers, 7370 MacArthur Boulevard, Glen Echo, Maryland 20812 (1-800-WILDBIRD).

WILL WE LOSE OUR SONGBIRDS? MIGRATORY SONGBIRD CONSERVATION, BACKYARD BIRD PROBLEMS, HOMES FOR BIRDS

- Free brochures and other publications. Contact U.S. Fish and Wildlife Service, Publications Unit, 4401 North Fairfax Drive, Room 130, Arlington, Virginia 22203.



FIELD GUIDES AND OTHER GENERAL BOOKS

A FIELD GUIDE TO THE BIRDS EAST OF THE ROCKIES

- 1980. 4th edition. Roger Tory Peterson. Houghton-Mifflin Co., Boston.

A FIELD GUIDE TO WESTERN BIRDS

- 1990. 3rd edition. Roger Tory Peterson. Houghton-Mifflin Co., Boston.

A GUIDE TO FIELD IDENTIFICATION OF BIRDS OF NORTH AMERICA

- 1993. Chandler Robbins et al., Golden Press, New York.

THE AUDUBON SOCIETY ENCYCLOPEDIA OF NORTH AMERICAN BIRDS

- 1980. J.K. Terres. Alfred A. Knopf, New York.

THE AUDUBON SOCIETY GUIDE TO ATTRACTING BIRDS

- 1985. Stephen W. Kress. Charles Scribner's Sons, New York.

THE BACKYARD NATURALIST

- Eighty-plus page booklet discusses backyard habitat for birds including the use of native plant species to provide food, shelter and options for water sources. Good resource for initiating school yard habitat projects (\$6.95 plus \$3.50 shipping and handling, Item number 19737). Contact The National Wildlife Federation, 8925 Leesburg Pike, Vienna, Virginia 22184 (1-800-432-6564).

BIRD MIGRATION

- 1992. Robert Burton. Eddison Sadd Press, London.

BRING BACK THE BIRDS

- 1995. Russell Greenberg and Jamie Reaser. Stackpole Books, Mechanicsburg, Pennsylvania.

HOW BIRDS MIGRATE

- 1995. Paul Kerlinger. Stackpole Books, Mechanicsburg, Pennsylvania.

THE HUMMINGBIRD GARDEN

- 1990. Matthew Tekulsky. Crown Publishers Inc., New York.

WHERE HAVE ALL THE BIRDS GONE?

- 1989. John Terborgh. Princeton University Press.



VIDEO AND SLIDES

CORNELL LAB OF ORNITHOLOGY VISUAL SERVICES

- Catalogue of color slides of all North American Birds. Contact Cornell Lab of Ornithology, 159 Sapsucker Woods Road, Ithaca, New York 14850 (607-254-2450).

NEVER A SILENT SPRING:

NEOTROPICAL MIGRATORY BIRD CONSERVATION

- For more information on this 10 minute video contact U.S. Fish and Wildlife Service, Office of Public Affairs, 1875 Century Street, Atlanta, Georgia 30345 (404-679-7289).

PROJECT WILD—EXPLORING SCHOOL NATURE AREAS

- A 13 minute video designed to inspire students and educators to take positive action for the environment. Provides examples of outdoor classrooms around the country and demonstrates how science, social studies, math, art and other subject areas are reinforced in school nature areas (\$16 +\$3 shipping and handling). Contact Project WILD, 5430 Grosvenor Lane, Bethesda, Maryland 20814 (301-493-5447).

SINGING IN THE RAINFOREST, FOR THE BIRDS—COMEBACK OF THE PEREGRINE FALCON, BIRDERS OF A FEATHER—BIRDERS MOVING FROM CANADA TO COSTA RICA, AND NIGHT MOVES—THE MIGRATION OF BURROWING OWLS

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VIREO (VISUAL RESOURCES FOR ORNITHOLOGY)

- The world's most comprehensive collection of bird photographs, has over 85,000 slides and a smaller number of black and white prints of birds representing over 5,500 species. VIREO sells slides for lectures and leases slides for publication. Contact VIREO, The Academy of Natural Sciences, 1900 Benjamin Franklin Parkway, Philadelphia, Pennsylvania 19103 (215-299-1069) or e-mail vireo@acnatsci.org.



AUDIO

BIRD SONGS

- More than 25 different audio cassettes available for western and eastern migratory songbirds including some from Costa Rica and Mexico. For catalogue, contact The Crow's Nest Bookshop, Cornell Laboratory of Ornithology, 159 Sapsucker Woods Road, Ithaca, New York 14850 (607-254-2400).

KNOW YOUR BIRDS SOUNDS V. I & II, BACKYARD BIRD WALK, AND MARSHLAND BIRD WALK

- 1994. Elliot Lang. Bird sounds available on cassette (\$12.95) or CD (\$16.95) with accompanying booklet. Contact NorthSound P.O. Box 1360, Minocqua, Wisconsin 54548 (1-800-356-4465).

PETERSON'S BIRDING BY EAR

- 1989. Walton & Lawson. Houghton-Mifflin, Boston. Audio cassette or CD series with booklet.

SONGBIRD SYMPHONY

- Songbird calls with ambient music available on cassette (\$9.95) or CD (\$15.95). Contact NorthSound, P.O. Box 1360, Minocqua, Wisconsin 54548 (1-800-356-4465).



ON-LINE RESOURCES AND ACTIVITIES

JOURNEY NORTH

- This program from Hamline University's Center for Global Environmental Education, allows students, grades 4-12, access to wildlife migration via the Internet. Students write to species experts, track the migration of various wildlife, including birds, butterflies and humpback whales, and learn the concept of interdependent global ecological systems. Contact Journey North, 125 North First Street, Minneapolis, Minnesota 55401 (612-339-6959) or <http://www.learner.org/k12>.

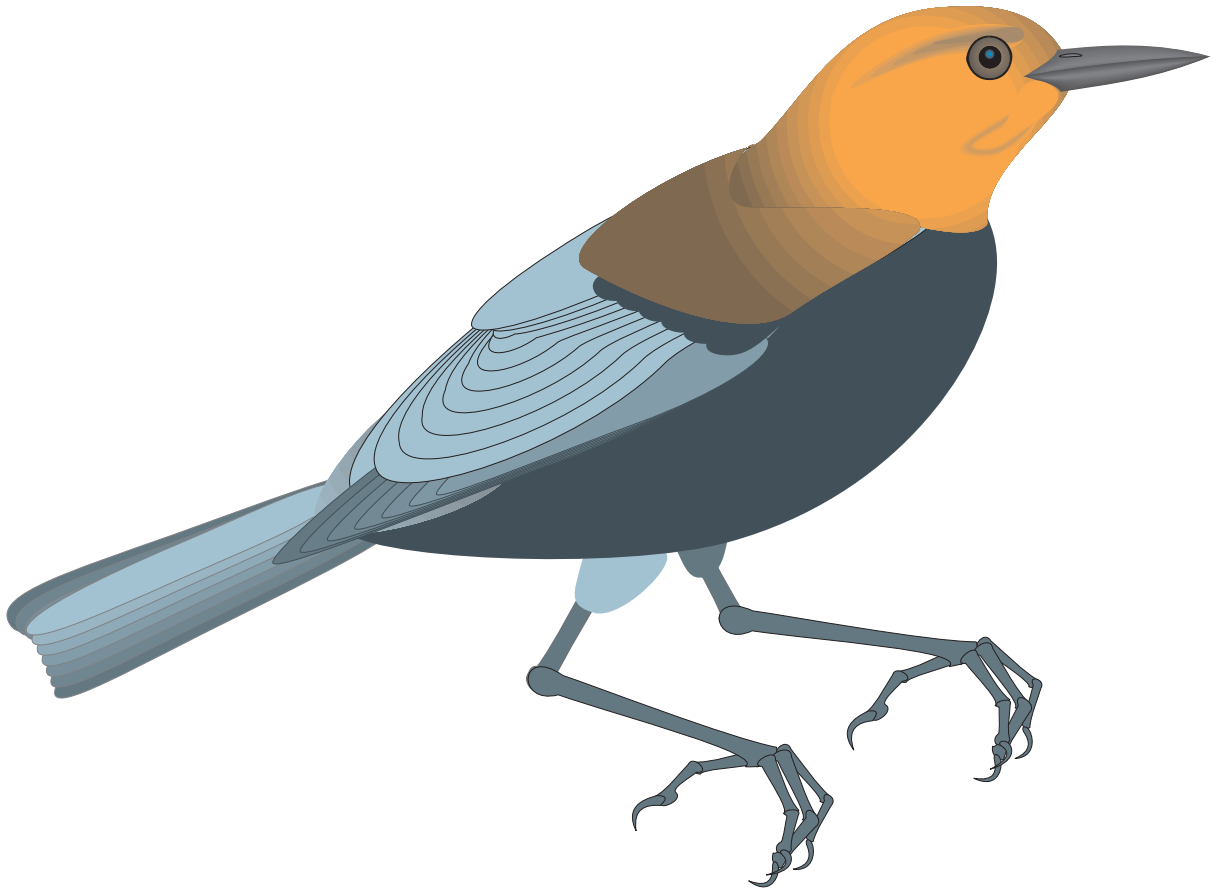
PROJECT WILD

- Offers information on the interdisciplinary, supplementary conservation and environmental education program. Displays products and ordering information and listing of educator training workshops and contact names for each state. Contact Project WILD, 5430 Grosvenor Lane, Bethesda, Maryland 20814 (301-493-5447) or <http://eelink.umich.edu/wild/>.

NATIONAL FISH AND WILDLIFE FOUNDATION

- Check out the latest conservation initiatives at <http://www.nfwf.org>.





Educator's Supplement Evaluation Form — 1996

Name _____

School or organization _____

Address _____

Phone (Day) _____

1) Did you use the Educator's Supplement as a unit (teaching all five activities) or did you teach only selected activities?

I used the Educator's Supplement as a unit

I used selected activities

2) With what grade level(s) did you teach the activities?

3

4

5

6

7

8

3) How many children (total) took part in the activities? _____

4) Through what subject(s) did you teach the activities?

Science

Social Studies

Language Arts

Spanish

Art

Physical Education

Other

5) During how many class periods (or sessions) did you conduct the activities? _____

6) In which months did you conduct the activities? _____

7) Did you conduct the activities in a classroom or in an informal educational setting?

Classroom setting

Informal educational setting

8) Which demographic description fits your students best?

Urban

Suburban

Rural

9) Please rank the activities you conducted on a scale of 1 to 5 in terms of their usefulness to you

(1 being the lowest and 5 being the highest possible score).

Bird Identification 1 2 3 4 5

Bird Topography 1 2 3 4 5

Migratory Mapping 1 2 3 4 5

Gallery of Homes 1 2 3 4 5

A Habitat for Birds 1 2 3 4 5

10) In order to help us improve next year's IMBD Educator's Supplement, please let us know what you liked best about the activities; what you like least; and what we could do to improved the activities. Your feedback is valued and will be used to develop future material. (Please use additional paper).

Thank you for completing this Evaluation Form. Please return to:

IMBD, Office of Migratory Bird Management, 4401 N. Fairfax Drive, Room 634, Arlington, VA 22203.

