

SONGBIRDS AT THE CROSSROADS OF MIGRATION

SECTION TWO – LESSONS

CHAPTER I - THE NEIGHBORHOOD

[Lesson 1 - SONGBIRDS: SO WHAT?](#)

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Lesson 1 - SONGBIRDS: SO WHAT?

BACKGROUND

Read *Songbird Significance* in Section One.

TIME

(1) 30-minute indoor session

SKILLS

Communicating, justifying, evaluating

CORE CURRICULUM CONTENT STANDARDS

Language Arts – 3.3A, 3.4A

Science – 5.1A,B 5.5B 5.10A,B

Social Studies - 6.8C,E

KEY WORDS

Songbird, ecosystem, conservation

PRIOR KNOWLEDGE / SKILLS

None

OBJECTIVES

Students will:

- Describe the role that songbirds play in local and regional ecosystems.
- State opinions about the relevance of songbird populations to the students' lives and justify their statements.

INSTRUCTIONAL METHOD

Classroom discussion

MATERIALS

- Photographs or slides of songbirds (Examples: Wood Thrush, Yellow Warbler, Rose-breasted Grosbeak, Scarlet Tanager, Baltimore Oriole)
- Photographs or slides of New Jersey forest types
- Bird song tape or compact disc with the songs of birds that are used in the photos
- Tape player or compact disc player

PREPARATION

Compile habitat and bird photographs with examples of their songs. Optional – create a PowerPoint presentation with the photos and songs.

SETTING THE STAGE

Ask students to think about the last bird that they saw and what it was. Discuss whether any of these birds fall into the “songbird” category.

THE ACTION

1. Immerse students in a photo collage, slide show, or PowerPoint presentation of songbirds along with the birds’ songs.
2. Discuss with the students the following questions:
 - a. What is your reaction to the birds and bird songs?
 - b. What roles might these birds play in the forest community?
 - c. What significance could these birds have in your life?
 - d. Many of these songbird populations are declining. Should we be concerned that this is happening? Why or why not?

RESOURCES

For bird photographs and songs:

- Cornell Laboratory of Ornithology – Bird of the Week
www.birds.cornell.edu/bow
- New Jersey Conservation Foundation - The Songbird Connection (flashcards of selected birds) – www.eirc.org
- USGS Patuxent Wildlife Research Center – <http://www.gotouring.com/birds>

Lesson 2 - LOOK AT NEIGHBORHOOD HABITATS: BE AWARE OF YOUR SURROUNDINGS

BACKGROUND

Every species of songbird requires its own specific habitat in which it finds its life needs – food, shelter, water, and space. Typically, a songbird exists in three different habitats during the year; a breeding habitat, a wintering habitat, and the habitat it uses during migration. How the bird utilizes the resources of these habitats depends on its needs at the time.

A songbird spending the winter in the tropics may share its habitat with a multitude of other species, including other Neotropical migrants and the resident tropical species. During this time of year the bird is solely concerned with finding food. During migration the habitats it seeks will be those that provide the most appropriate and readily available food as well as sufficient cover for the bird to rest and remain hidden from predators. These habitats may also be used by many other species, all migrating at the same time and all needing food and places to rest.

Upon arrival on the breeding grounds the habitat issue becomes very different for a songbird. It is here that the bird needs to establish and defend a breeding territory. This territory within a habitat must provide a suitable nest site and enough food not only to feed the breeding pair, but also the birds' young. Neighborhood habitats can meet these needs only if they contain the food resources and habitat structure that the birds require.

TIME

(2) 40-minute indoor sessions
(1) outdoor field experience
Independent research

SKILLS

Observing, communicating, comparing/contrasting, inferring, measuring, mapping, using technology, analyzing, synthesizing

CORE CURRICULUM CONTENT STANDARDS

Language Arts – 3.2B, 3.3A,B,D, 3.4A,B

Mathematics – 4.1C, 4.2D, 4.5A,E,F

Science – 5.1A,B, 5.3D, 5.5A,B, 5.8D, 5.10A,B

Social Studies – 6.8A-E

Technology – 8.1C,D

KEY WORDS

Land use, habitat, ground truth, GIS (geographic information system), satellite imagery, aerial photography

PRIOR KNOWLEDGE / SKILLS

An understanding of how to read a topographic map.

OBJECTIVES

Students will:

- Identify and explain the diversity of habitats found within their neighborhood.
- Create a neighborhood habitat map of these habitats using a variety of resources and technologies.
- Explain why some habitats may be more attractive to birds than other habitats.

INSTRUCTIONAL METHODS

Independent and cooperative research

Field investigation

Classroom presentations

MATERIALS

- Topographic map of the area (enough for every group of four students)
- Local map delineating the neighborhood area of investigation (should include both natural and built areas)
- Aerial photographs of the neighborhood area
- Habitat Assessment Sheet (Worksheet #1)
- Colored pencils, markers
- Optional: access to GIS technologies

PREPARATION

1. Collect maps and aerial photographs (see Resources).
2. Walk and/or drive the neighborhood investigation area to determine sites to take the students
3. Create a base neighborhood map that has the investigation site delineated with boundaries (roads, rivers, etc.) but little else on it.
4. Secure permission to take the students on a tour of the investigation area.

SETTING THE STAGE

Prior to the field experience, provide each group of four students with a topographic map. Have the students create a list of the types of things about which topographic maps tell. Discuss how topographic maps tell us how the land looks and in many cases how the land is used.

THE ACTION

Part 1 – Getting the Lay of the Land

1. Provide each group of students with a copy of the neighborhood map for investigation, a topographic map for the area, and a copy of an aerial photograph for the area.
2. Tell them that as a group they are to compare and contrast the topographic map and the aerial photograph to determine what land use and habitat types may be found within the investigation area.
 - a. Discuss land use (how humans use the land) and how these might look on a map.

- b. Discuss the differences/similarities between habitat types (forest, field, wetlands, river, etc. and how these might look on a map)
3. Have students draw the land use and habitat types on their neighborhood map and create a symbol key. This will be the primary map that they use during the field investigation.

Part 2 - Groundtruthing

1. Take the students on a field trip (either walking or by bus) to various sites within the field investigation area.
2. Have the students ground truth the maps they created from the aerial photos and topographic map. This process allows them to see if the aerial photos are correct or if there have been any changes (new development, habitat restoration, etc.) to the area (Note: aerial photos and maps may not contain up-to-date information).
3. As students are groundtruthing, ask them to observe various habitat sites that birds may use and take notes on how these sites look (Worksheet #1).
4. Create a master class list of the habitats within the investigation site. Discuss the students' visual observations and habitat component numbers.

Part 3 – Matching Birds to Habitats

1. Have each group select a migratory songbird from the Songbird List (Appendix A).
2. Ask the members in each group to research the bird to see what its habitat requirements are during migration and on the breeding grounds. This information can be found in some bird identification guides or on the Cornell Laboratory of Ornithology website at www.birds.cornell.edu/bow.
3. Have each group make a recommendation about whether its songbird would utilize any of the sites within the investigation area. Justify the answer based on their observations and the habitat assessment research done in the field. (*Example: A Grey Catbird requires dense thickets, brambles, and shrubbery in which to nest. During migration they need to have ample cover and places where they can find a lot of berries. If the habitat is an urban park with little underbrush and lots of open grass, there is little chance that a catbird will use this habitat.*)

PULLING IT ALL TOGETHER

- Have students create a journal with copies of the topographic maps, aerial photographs, group map, bird research, and their findings.
- Create a rubric for the songbird research paper and presentation.
- Have students use computers and or other means to create overlays of their findings onto the topographic map or aerial photograph of the area.

RESOURCES

For topographic maps and satellite images

- US Geologic Survey (USGS) - <http://mapping.usgs.gov>
- Microsoft Corporation MSN - <http://terraserver.homeadvisor.msn.com>
- LandNet Corporation - <http://www.landvoyage.com>
- New Jersey Department of Environmental Protection - i-MapNJ (interactive maps of New Jersey using Geographic Information Systems) - <http://www.state.nj.us/dep/gis>

Lesson 3 - QUALITY IS KEY: CONDUCT A HABITAT BIO-INDEX SURVEY FOR BIRDS

BACKGROUND

Habitat quality is probably the single most important aspect in the breeding success of a bird. Animals that live in good quality habitats, which provide all that the animal needs in order to live and reproduce, tend to live longer than those in poorer, less suitable ones. This is also true for migrants - the better the habitats they encounter during migration the more apt they will have a successful migration. Habitats utilized during migration provide a temporary home for animals to rest, refuel and reorient themselves. Without suitable habitat to breed in, to make stopovers in, and to winter in, animals cannot forage, rest and avoid predation.

The presence or absence of particular species also indicates about the health of that habitat. For instance, a healthy population of Swainson's Thrush indicates an intact woodland habitat that has all the right understory plants to encourage successful nesting. If certain species of birds such as American crows, Brown-headed Cowbirds, and House Sparrows are found within the habitat, it tells the ornithologist that there is a lot of edge areas to the habitat. These edge areas include power cuts through the forest, roads, fire cuts, and residential parcels of acreage that have been cleared. The results of these human behaviors allow birds and other animals that are not deep forest birds to penetrate into habitat where they previously have not been present. It also allows these animals to exploit resources that have been unavailable to them including forest-nesting birds' nests or young and to compete with some forest nesting birds for nest sites. All of these actions put extra stress on the existing species to be successful in raising their young.

TIME

(1) 90-minute outdoor session

SKILLS

Observing, gathering data, communicating, calculating, comparing and contrasting, drawing conclusions, making inferences, analyzing, synthesizing, justifying

CORE CURRICULUM CONTENT STANDARDS

Language Arts – 3.3A,B, 3.4A,B

Mathematics – 4.1B, 4.3C, 4.4A,B

Science – 5.1A,B, 5.3A,C, 5.10A

Social Studies – 6.8C,E

KEY WORDS

Habitat, diversity, bio-index, avian

PRIOR KNOWLEDGE / SKILLS

Use of binoculars and bird identification guides

OBJECTIVES

Students will:

- Identify a diversity of bird species.
- Draw conclusions about the general quality of a habitat based on the presence or absence of particular bird species during the breeding season.
- Make inferences about the quality of similar habitats based on similarities and differences between bird life.

INSTRUCTIONAL METHOD

Field investigation

MATERIALS

- Habitat Quality Bio-Index (Worksheet #4)
- Binoculars
- Clipboards, pencils
- Bird identification guides

PREPARATION

1. Select a habitat site (local park, school grounds, backyard, etc.).
2. Make one copy of the Habitat Quality Bio-Index sheet for each pair of students.

SETTING THE STAGE

Discuss the term “bio-index.” Have the students define each part of the term to understand that it means to catalog living things.

THE ACTION

1. Distribute copies of the Bio-index form, clipboard, binoculars, and field guides to each pair of students.
2. At the habitat site, have the students spend time watching and listening to the birds that they see and hear. As these different species are identified, keep track of them on the Bio-index form. Note: This Bio-index can be done once to get a snapshot of the habitat or done several times during the breeding season to get a fuller picture of the habitat health.
3. Note any other species on the bio-index form.

PULLING IT TOGETHER

1. Why do different bird species belong in different habitat quality groups? (*each species has different life needs and habitat quality needs; some species are more sensitive to changes in those basic needs*)
2. How would you define an indicator species? (*one that indicates a specific type of habitat*)
3. How could the Bio-index be used to monitor habitat health? (*If used over a period of time, one can compare bird species and numbers of individuals to the changes in habitat quality.*)

BIRD BIO-INDEX – ASSESSING FORESTED HABITAT QUALITY
Worksheet #4

Name: _____ Date: _____

Location: _____

DIRECTIONS: Make your observations of birds in the forested habitat. Check off any birds (seen or heard) during your allotted time.

GROUP 1

- _____ Ruffed Grouse
- _____ Sharp-shinned Hawk
- _____ Northern Goshawk
- _____ Red-shouldered Hawk
- _____ Barred owl
- _____ Whip-poor-will
- _____ Red-headed Woodpecker
- _____ Acadian Flycatcher
- _____ Summer Tanager
- _____ Yellow-throated Vireo
- _____ Solitary Vireo
- _____ Black-and-white Warbler
- _____ Prothonotary Warbler
- _____ Worm-eating Warbler
- _____ Northern Parula
- _____ Black-throated Blue Warbler
- _____ Yellow-rumped Warbler
- _____ Magnolia Warbler
- _____ Cerulean Warbler
- _____ Blackburnian Warbler
- _____ Black-throated Green warbler
- _____ Northern Waterthrush
- _____ Kentucky Warbler
- _____ Hooded Warbler
- _____ Canada Warbler
- _____ American Redstart
- _____ Winter Wren
- _____ Brown Creeper
- _____ Red-breasted Nuthatch
- _____ Veery

Number present: _____
Multiply by the index value of 4: _____

GROUP 3

- _____ Red-tailed Hawk
- _____ Eastern Screech Owl
- _____ Downy Woodpecker
- _____ Red-bellied Woodpecker
- _____ Blue Jay
- _____ White-breasted Nuthatch
- _____ Tufted Titmouse
- _____ House Wren

(next column)

- _____ Carolina Wren
- _____ Black-capped Chickadee
- _____ Carolina Chickadee

Number present: _____
Multiply by the value of 0: _____

GROUP 2

- _____ Wild Turkey
- _____ Cooper's hawk
- _____ Broad-winged Hawk
- _____ Yellow-billed Cuckoo
- _____ Black-billed Cuckoo
- _____ Hairy Woodpecker
- _____ Northern Flicker
- _____ Pileated Woodpecker
- _____ Chuck-will's-widow
- _____ Ruby-throated Hummingbird
- _____ Great-crested Flycatcher
- _____ Eastern Wood-peewee
- _____ Least Flycatcher
- _____ Rose-breasted Grosbeak
- _____ Scarlet Tanager
- _____ Red-eyed Vireo
- _____ Warbling Vireo
- _____ Yellow-throated Warbler
- _____ Pine Warbler
- _____ Ovenbird
- _____ Louisiana Waterthrush
- _____ Golden-crowned Kinglet
- _____ Blue-gray Gnatcatcher
- _____ Wood Thrush

Number Present: _____
Multiply by the index value of 3: _____

GROUP 4

- _____ American Crow
- _____ European Starling
- _____ Brown-headed Cowbird
- _____ House Sparrow

Number present: _____
Multiply by the value of -1: _____

TO CALCULATE THE FORESTED HABITAT QUALITY

- 1) Add the index values of each group together _____
 - 2) Divide by the total number of species from groups 1, 2 and 4.
This is your **RAW HABITAT QUALITY INDEX**. _____
 - 3) Add the total number of species from all 4 groups and divide by 69 (total possible species).
This is your **SPECIES DIVERSITY ADJUSTMENT**: _____
 - 4) Add the RAW HABITAT QUALITY INDEX to the SPECIES DIVERSITY ADJUSTMENT.
This is your **FINAL HABITAT QUALITY INDEX**: _____
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HABITAT QUALITY CODES

3.50-4.00	Excellent quality habitat
2.50-2.99	Fair quality habitat
2.00-2.49	Poor quality habitat

BIRD GROUP EXPLANATIONS

- Group 1 – Species inhabiting woodlands of the highest quality: generally unfragmented (at least 200 contiguous acres), mature (oldest trees at least 80 years), well-layered (clearly defined herb, shrub, mid-story, canopy, and super-canopy), distant from development (at least 100 meters). Species generally rare, threatened, endangered, declining.
- GROUP 2 – Species indicating woodlands of high quality. Habitat may have some alterations/degradation, including high deer browse of herb and shrub levels; may have some fragmentation, although belongs to a larger contiguous tract of forested habitat.
- GROUP 3 – Species found in all quality of forests, although present, these species do not give any indication of forest quality.
- GROUP 4 – Invasive or alien species generally indicating a negatively-impacted forest habitat.