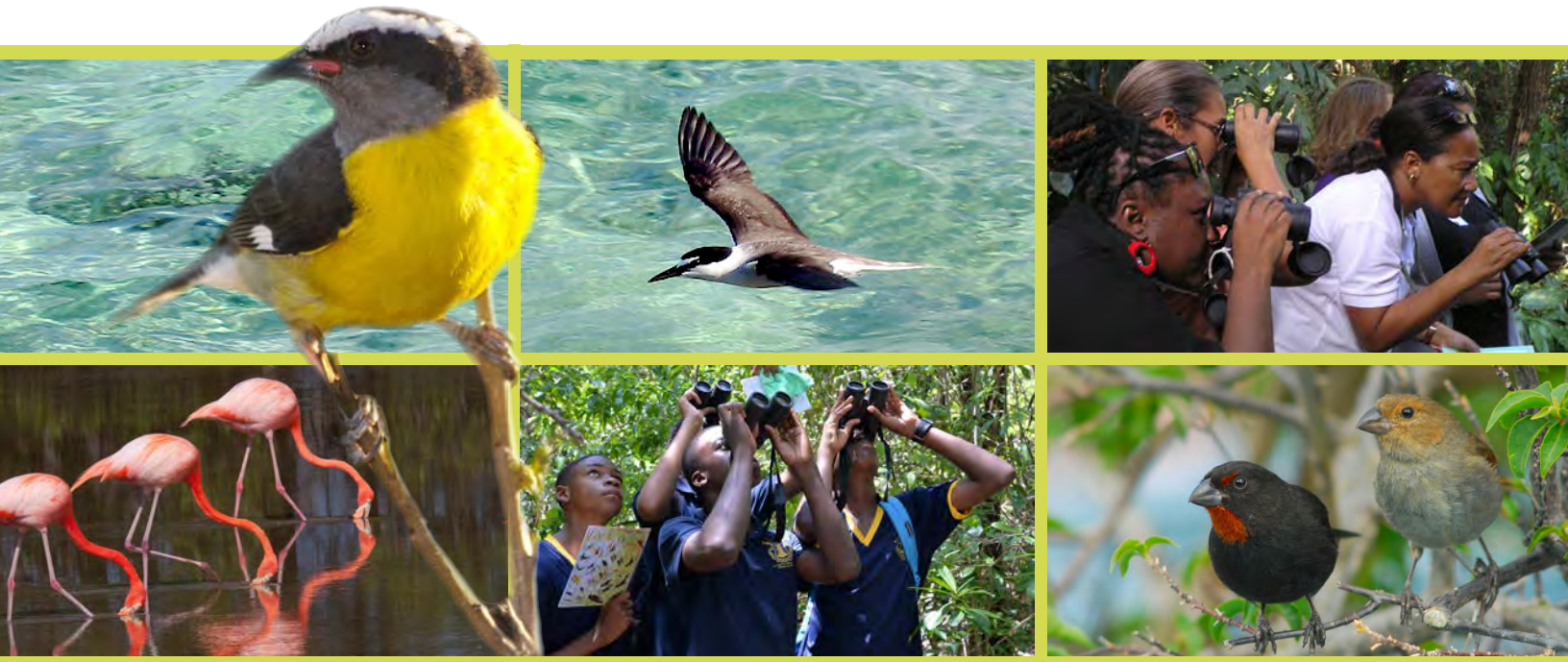

BIRDSLEUTH CARIBBEAN

Connecting Kids Through Birds

Teaching how to study, appreciate, and conserve the endemic and migratory birds of the Caribbean

Birds Caribbean

The Cornell Lab of Ornithology

BIRDSLEUTH CARIBBEAN

Connecting Kids Through Birds

This resource is part of the BirdSleuth K-12 curriculum developed at the Cornell Lab of Ornithology

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The Cornell Lab of Ornithology is a non-profit membership institution whose mission is to interpret and conserve the earth's biological diversity through research, education, and citizen science focused on birds.

BirdsCaribbean is a non-profit membership institution whose mission is to raise awareness, promote sound science, and empower local partners to build a region where people appreciate, conserve, and benefit from thriving bird populations and ecosystems.

BirdSleuth Caribbean Version 1.0

Welcome to BirdSleuth Caribbean!

You can connect young people to nature through birds and your local environment while building their scientific and environmental knowledge. Birds provide a unique and easy way to get children outside, observing first-hand the importance of their habitat and their interaction with it. Birds are part of our everyday lives and they capture imaginations through their flight, color, and song. Wherever you are, and whatever the season, you can find bird species in your area. While you can observe some bird species at any time of year, some species are international citizens, traveling between countries and continents on their yearly migrations. Through their migration, birds can connect us to other places, people, cultures and environmental issues. Because they depend on habitat in more than one geographic area, migrating birds depend on international conservation efforts. We hope that this curriculum will inspire you, and the young people you work with, to connect through birds and their conservation! Please visit www.birdsleuth.org/international and www.birdscaribbean.org for updates and to learn how these efforts are growing internationally.

Connecting Kids Lessons

BirdSleuth Caribbean Workshop Kit Contents

- BirdSleuth Caribbean curriculum
- Bird Spy Bingo cards (30)
- Habitat Scavenger Hunt cards (30)

- Bird Survivor cards (1 set)
- Bird Silhouettes poster
- Bird Body Parts poster
- Caribbean Bird Migration Poster (laminated)
- Wetland and Seabirds of the Caribbean Identification Cards (30-40 each)
- Migratory Birds of the West Indies Colouring Book
- *Birds of the West Indies* by Raffaele et al and other local field guides and/or bird identification resources (e.g., local posters, Landbird Identification cards), especially about your iconic, endemic or special bird species. Visit www.BirdsCaribbean.org for information on Caribbean birds.

How to use this Curriculum

BirdSleuth Caribbean is an inquiry-based science curriculum that engages children in scientific study and real data collection through participation in citizen science projects. The curriculum provides educational resources on topics such as bird diversity and identification, habitat, and migration, and it encourages local investigations and conservation actions. BirdSleuth and citizen science participation improves science literacy and connects people to their local environment. This is especially important for today's children, many of whom do not have opportunities to go outside and connect with nature in meaningful ways. By encouraging children to be bird "sleuths", i.e., "detectives," we can instill a life-long interest in science, nature, birds, and conservation.

The lessons in this curriculum may be taught in school, afterschool programs, science and nature clubs, 4-H, Girl Guide and Boy Guide programs, summer camps, and more. They are written for middle grade students, ages 9 to 13, but may be adapted for younger or older students. Hopefully, you will be able to deliver most or all of the lessons in the curriculum. But if time is limited, choose a subset of the lessons and activities for your program. Note that some of the activities in the curriculum are perfect for engaging children and families in bird festival events, such as the Caribbean Endemic Bird Festival (CEBF), celebrated in April-May, or International Migratory Bird Day (IMBD), celebrated in September-October in the Caribbean (visit wwwBirdsCaribbean.org and wwwbirdday.org).

Conservation is Key!

> ***LEADER TIP:***
>
> Think about your largest national and local conservation challenges. Which ones involve birds? Keep these issues—especially those connected to birds—in mind as you think about adapting and sharing this resource with your group.

Bird conservation—the preservation, protection or management of birds and their habitats—aims to ensure the health of bird populations and the habitats on which they depend. Habitat conservation is a key component of protecting our birds. Each habitat is unique, facing distinct threats and posing conservation challenges and opportunities. It's estimated that about one-third of North America's bird populations declined during the last half of the 20th century, and in the last 30 years, biologists have documented alarming declines in Neotropical bird populations as a result of habitat loss and fragmentation.

Cooperation between people in various countries is critical to meeting shared bird conservation goals since many species migrate across borders. Cooperation at a global level is needed as well, since climate change will affect habitats and the birds that depend on them. But while the problem is large, we don't want young people to get discouraged; there are reasons for hope and things we can all do to help!

These lessons aim to engage young people not only by helping them to understand habitats and bird migration, but also by empowering them to see themselves as part of the solution for bird conservation. These activities encourage children to consider the most significant bird conservation issues in their own area, how to address them, and implement projects to help birds in their own community. Such projects could improve habitat through tree-plantings, shoreline cleanups, and building bird boxes, or raising awareness amongst family and friends through community education campaigns (see Lesson 10). By engaging children in local environmental stewardship efforts, and explicitly teaching them about the importance of their actions, we can empower them to be part of a positive force that is working to ensure healthy ecosystems for birds and many other species now and into the future.

Citizen Science is Important!

Children can also make a meaningful contribution to bird conservation efforts—and learn a lot about birds and science in the process—by participating in citizen science projects.

What is citizen science? It is when ordinary people volunteer to help collect data for **professional** scientific research. It is also a partnership between scientists (like the ones at the Cornell Lab of Ornithology and BirdsCaribbean) and the public, including people like you! After all, there are not enough scientists to make observations and collect data everywhere. Through the Cornell Lab's citizen science projects, people around the world collect data about their local birds and contribute these observations to databases that are used by researchers, children, and the public to better understand bird distribution, abundance, and population trends. Citizen science is a powerful tool that helps scientists answer local and global questions.

Young citizen scientists in Antigua."

The eBird citizen science project is one of the world's largest and fastest growing biodiversity data resources. This project asks people to conduct a local bird count (for as long or short a time as desired) and report the kinds and numbers of birds they see. Because it is flexible, easy, and can be used anywhere in the world in any habitat, eBird is popular among educators. Children can use the outputs of the eBird database to investigate intriguing questions about bird abundance and distribution.

These lessons will help you teach your group how to observe and identify birds and how to enter data into eBird. Even if the children can't identify many birds at first, learning to observe carefully is an important skill. Doing a bird count, whether at a school, park, or elsewhere, can help kids understand local bird species and participate in the protection of birds. For children, participation

in citizen science projects is motivational because their data are put to use addressing real-world issues of local and global concern.

The Caribbean region has its own "portal" or home page on eBird called eBird Caribbean (http://ebird.org/content/caribbean/) – use this portal to enter your data and keep up to date on Caribbean bird news.

We understand that not everyone has easy access to the Internet and you may have difficulty submitting census data to the network. However, we encourage you to keep a record of your observations even if you cannot enter your checklists into eBird Caribbean. The bird monitoring remains a valuable and important educational experience in conjunction with conservation projects that can assess whether actions have an impact on local bird populations.

Connecting Kids

Migratory birds create a wonderful opportunity to connect kids from different countries. Though a child in the United States or Canada lives far away from a child in the Caribbean, Costa Rica, or Brazil, they share some of the same birds. These birds might breed in the northern countries of Canada and the United States, and spend their winters throughout the tropical habitats of Latin America and the Caribbean. This curriculum encourages children to make connections to other classrooms through the birds they share and to learn about other cultures, traditions, and languages in the process. Please visit www.birdsleuth.org/international and www.BirdsCaribbean.org for more information and updates.

Bird Journals

Each child will keep a "Bird Journal" throughout the following lessons, and hopefully beyond. This journal can be part of another notebook or written on scrap paper sheets kept together in one place. Children will use their Bird Journals throughout the lessons for drawing, reflecting, writing creatively, and recording bird observation data (including date, time, location, species, and number of individuals). We encourage you to keep a Bird Journal as well, to record a "master" tally of all the bird checklists your group collects during your citizen science efforts.

LEADER TIP:

One good way to create a Bird Journal is to lay down one piece of colored paper and about 10 pages of blank paper. Fold the stack of paper in half, so that the colored paper makes a cover for the journal. You can wrap a large rubber band in the crease of the book to help keep the pages together. Children can decorate their cover—and be sure to add their name to it!

Lesson 1: What Makes a Bird a Bird?

Big Idea: Birds are a unique and diverse group of animals, but they have several characteristics in common.

Location: Indoor and outdoor

Approximate Time: 1 hour and 30 minutes

Learning Objectives

Children will be able to:

1. List several characteristics of birds.
2. Observe birds in their natural habitat.
3. Compare and contrast characteristics of local bird species.

What do I need?

- ❒ Drawing paper and pencils
- ❒ Chart paper or a chalkboard
- ❒ Bird Spy Bingo cards (one per child or pair)
- ❒ Dry erase markers (one per child or pair)

Getting Ready...

- ❒ Gather the supplies and prepare to go outside

Background Information

Birds are distinguished by a unique combination of features that make them different from all other animals. They come in many sizes, colors and shapes, but all are endothermic (warm blooded), lay eggs, have feathers, hollow bones, and a beak with no teeth. Flight is not a characteristic that is unique to birds (for example, many insects and bats can also fly, and some birds cannot!).

Activity

1. Create your Bird Journals

In preparation for these activities, create your Bird Journals as a group. This journal can be part of another notebook, or created (see introduction). Designate a place to keep all the journals together.

2. What features make a bird a bird?

To find out what your kids know about birds and their physical characteristics, pass out drawing paper and colored pencils and ask the children to draw a picture of a real bird. Let them draw whatever bird they wish. Give them 10 - 15 minutes to complete this activity. Don't let them look at real birds or pictures of birds during this activity. Next to their drawings, ask the students to write down the characteristics they think are unique to birds.

Put up the drawings around the room—compare and contrast them. What similarities between these birds do you notice? What differences do you notice? What are the birds doing? What colors are there?

List the following characteristics of birds on a chart (with the help of your group):

- Feathers
- Hollow bones
- Lay eggs
- Endothermic (warm blooded)
- Beaks

Note: Many of these characteristics help birds fly! Feathers are light, beaks are light, and bones are light.

3. Bird Spy Bingo

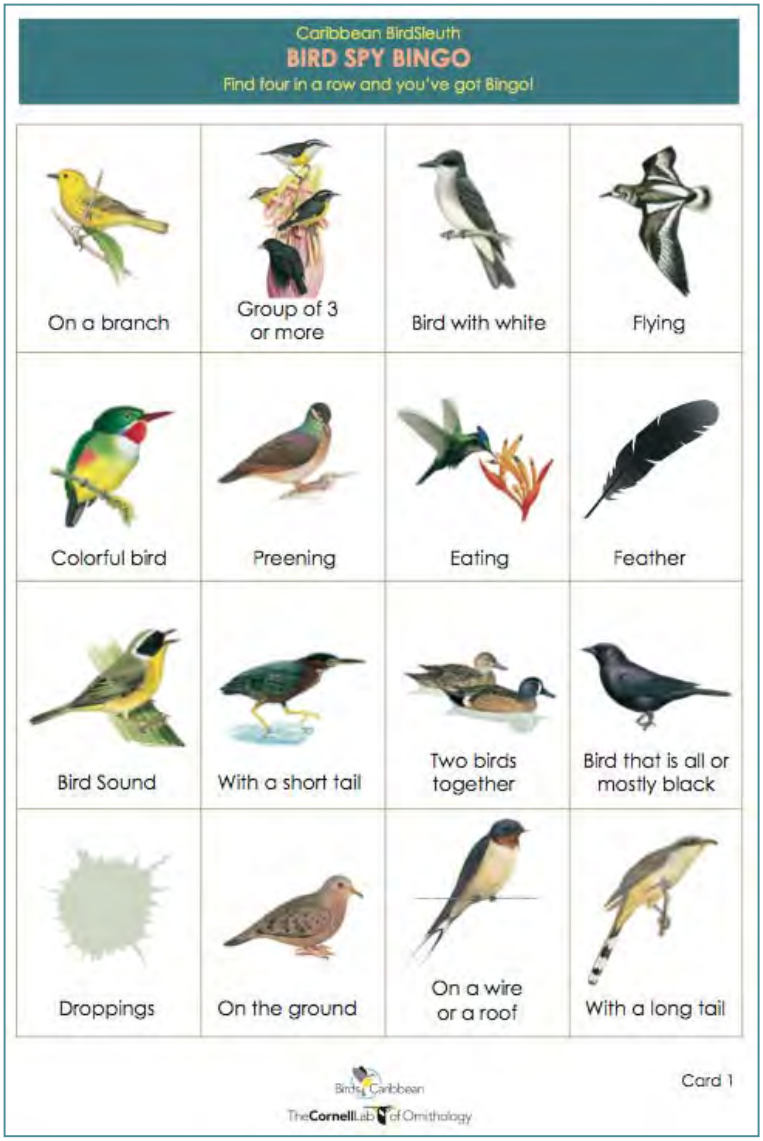
To find out what your children already know about the birds in your area, start by leading a short discussion. Ask questions such as:

- Where do you see birds?
- What kinds of birds are they?
- What are they doing?

Go outside to play a traveling Bird Spy Bingo game, checking off the things you see with a dry-erase marker. Try to get four in a row, to complete at least 8 of the 16 spaces, or to complete the whole card.

If you have enough time, have the children sketch one of the birds in their journals.

When you return to the classroom or when you are still outside, determine who successfully completed the bingo game.



Consider talking about:

- Who completed the card? What was hard to find? What was easy to find?
- What were the birds doing? How were the birds we saw similar? Different?

Wrap-up and Reflection

Try to leave some time at the end of this lesson to encourage the children to reflect on the things they learned about birds. Ask questions such as:

- What is something new you learned about birds?
- Did any of these activities make you think differently about birds or the environment?
- Are you interested in observing birds outside? Why or why not?
- What questions do you have?

Brown Noddy Chick

Lesson 2: Birds in My World

Big Idea: Birds have an impact on people, our society, and the environment.

Location: Indoor

Approximate Time: 45 minutes

What do I need?

- ❒ Chart paper or a chalkboard
- ❒ Bird Journals

Learning Objectives

Children will be able to:

1. List at least three ways birds have an impact on people, society, and/or the environment.
2. List at least three ways in which people impact birds.

Background Information

Birds are all around us, and they are a part of our culture and society, both historically and in the present day. You may have children in your group who ignore, dislike or even fear birds, while others find them a fascinating and beautiful part of life on earth.

Activity

1. Birds in our society

Encourage the children in your group to think about and list how birds are a part of their own culture and society. If possible, keep a group list of all examples mentioned as you go through this activity.

To start, ask questions such as:

- What do you think when you hear the word "bird"?
- What do people think of birds in general? (Birds might represent freedom with their ability to fly, beauty with their incredible plumage, and peace with their lovely songs.)
- What is your most recent experience involving birds? (A cartoon bird on TV? Birds near your home?)
- Can you think of any bird-related expressions or figures of speech?
- Can you think of any famous bird characters in movies and TV shows, sports teams named after birds, and anything else bird-related in popular culture?

Finally, create a list of all the things people do with birds. This might include watching birds, hunting birds, keeping birds as pets, feeding birds at a park, eating eggs and raising birds on farms. At the end, you will probably have an impressive list of ways that birds are part of our lives. Remind your group that although we may not realize it, birds are almost always around us wherever we are!

2. What has a bird done for you lately?

Challenge participants to share their ideas about birds through a "Moving Opinion Vote" or "Debate." Indicate that one side of the room is "totally agree" and the other side is "totally disagree." Between these two extremes is the range from agree to disagree. If you are undecided or neutral, the place to be is the middle. The statements to read aloud are below, ordered from most basic to most

complex. Read each short statement in *italics*, and once everyone is standing in the appropriate place, ask different children why they chose to stand where they did. If you wish, share the background information provided about each statement and encourage further discussions and critical thinking. Remind everyone that in this activity, there are no right or wrong answers. They can change their minds and move positions as they listen to their peers, and should try to explain why they found a classmate's argument so compelling.

1. Statement: "Birds are cool!"

Birds come in many amazing colors, shapes and forms, and have a lot of really interesting behaviors. Some (or a few) of our species are *endemic*, meaning they are found only in our island or just a few Caribbean islands. Others are *migratory*, fleeing the cold north and flying thousands of miles for warmer places where food is plentiful. They may spend up to nine months out of the year with us. On the other hand, some people are afraid of birds, find them to be a nuisance, or worry that they carry diseases.

2. Statement: "Caging, killing, or hurting one bird won't make a big difference."

On the one hand, one bird is just that—one bird—among millions of others. But if every person, even in just one town, decided to cage, kill, or hurt one bird, the numbers would start to add up very quickly, and the impact on bird populations would be significant. To successfully protect bird populations now and into the future, it is important to create a culture of being respectful to all birds.

3. Statement: "Plants and birds are equally dependent on each other."

Birds spread seeds. Our tropical forests would not exist in their current state without wild birds. This is because for many tropical forest shrubs and trees, birds are the most important seed dispersers. The Caribbean is rich with seed-swallowing and fruit-pulp feeding birds, such as pigeons, doves, parrots, warblers and grassquits that spread forest seeds, thereby helping the trees to reproduce.

Jamaican schoolboys playing "Birds in my World"

Birds also pollinate flowers. In the Caribbean, bats, insects and birds, including hummingbirds, Bananaquits and many warblers overwhelmingly dominate pollination. Pollination is a key environmental service provided by birds—without birds, numerous plants could not produce seeds and fruits. Without nectar many bird species would have no food.

In addition to providing food for birds either directly (through its seeds, leaves, flower, fruits, or nectar), or indirectly (through the insects living in the plants that birds may eat), plants also provide birds with places to build their nests and take shelter.

4. Statement: "Farmers love birds."

Some farmers dislike birds because they eat or damage their crops. For example, parrots on some islands eat fruit crops such as citrus and mangoes, causing loss of income and conflicts between farmers and those that wish to conserve the birds. However, many birds help control agricultural pests by eating them! The coffee berry borer beetle, the world's most serious coffee pest, is an excellent example of this. Research on Jamaican coffee farms has shown that migratory song birds, such as the American Redstart and Black-throated Blue Warbler, and resident birds, such as the Bananaquit and Jamaica Tody, feast on the berry borers during the critical period when the beetles are attempting to invade the maturing coffee berries. This research demonstrated that wild birds in the Caribbean increased the profits of coffee farmers by about 12 percent.

Endemic birds like the Narrow-billed Tody bring tourists to the Caribbean.

5. Statement: "Birds can help people earn money."

Bird watching is the fastest-growing outdoor recreational activity in the world. In Latin America, bird watching attracts thousands of tourists each year. In Costa Rica, for example, about 30% of tourists are there to watch birds. With training and education, people in bird-rich tourist areas can earn their living as a bird guide or an ornithologist.

Bird watchers and nature enthusiasts visit the Caribbean to see our rare and beautiful endemic birds and unique habitats. The United States Fish & Wildlife Service has calculated that birding and other wildlife watching is worth $32 billion per year (U.S. dollars) in the United States alone. Bird tourism, a growing segment of the international tourism market, now makes the Caribbean an important area for sun, sand, sea, and bird-watching!

Birding trails and hotspots are established on most Caribbean islands, attracting both casual cruise ship visitors and the more dedicated stopover birders in significant numbers. Birding tourism generates jobs and revenues for national parks and preserves, and hotels, restaurants and other small businesses. Promoting birding tourism during the peak migratory periods in the fall and spring may even help boost tourism during months that are traditionally considered the low season for tourism.

That said, it can be expensive to keep birds away from crops, fish farms, and airports, or out of hotel pools and outdoor restaurants where they can be a nuisance. Further, bird conservation efforts undertaken by governments and non-profit organizations can be expensive.

6. Statement: "For birds in desperate need of habitat, a small patch of forest is better than nothing."

For some species, it is good to have at least a small patch of forest in which to build a nest, find food, and raise a family. These species might even prefer living in "fringe habitat" that affords them easy access to resources in other nearby habitat types. However, in a small patch of forest, predators can also find birds more easily. Lower quality forest means less food and shelter for birds, and consequently, some of them just can't survive in patches that are too small.

7. Statement: "Habitat loss is the biggest issue facing birds."

Habitat loss is definitely a huge issue. As human populations increase, we destroy more and more of our forests and wetlands to build houses, businesses, hotels, roads, marinas, ports, power stations, and more. Without habitat, birds cannot survive. But birds are also harmed by poor quality habitat, such as habitats that are degraded by pollution (e.g., pesticides, chemicals, sewage and trash), introduced invasive predators like rats, mongoose, and cats, and climate change, which is expected to bring more frequent and severe storms, hurricanes and droughts. Birds may also be hunted or trapped and they face challenges on migration, including obstacles like power lines and glass windows.

Mangroves, a threatened habitat throughout the Caribbean, are important for many species of birds.

8. Statement: "Helping birds helps people."

Helping birds supports income-earning activities for humans, such as agriculture and ecotourism, and also provides a source of recreation. And if we conserve habitats and ecosystems for birds, humans are also benefitting from the ecosystem services these areas provide, such as clean water, flood control, and more. However, birds can also cause problems, such as those mentioned earlier.

9. Statement: "I can help birds in my community."

Creating habitat or helping birds in your own backyard or schoolyard is a great way for you to make a difference when it comes to bird conservation. It also sets a good example for family, friends, and neighbors, and can inspire them to help birds too! However, many birds migrate and need healthy habitats across many countries. Therefore, it's important for people in all communities to help birds and support international conservation efforts.

After facilitating this activity, summarize what children think through a short discussion. Ask questions such as:

- Why do you think some people love birds so much?
- Do you like birds? Why or why not?
- Do you think birds benefit you? Why or why not?
- Do you think birds benefit other people? Why or why not?
- How do birds benefit the environment?
- How might the planet be different if there were no birds?

Wrap-up and Reflection

Try to leave some time at the end of this lesson to encourage the children to reflect on the things they learned and write in their Bird Journals. Ask questions such as:

- What is something new that you learned about birds?
- Did any of these activities make you think differently about birds or the environment?
- Will anything you learned make you treat birds differently? If so, how?
- What questions do you have?

Follow-up at Home

Have the children ask a family member to tell them a traditional story, folklore, or legend about birds. Have everyone share the story they learned with the rest of the group. These stories add to our awareness and appreciation for local birds and the role they play in our cultures. Have a discussion and be sure to dispel any negative myths (for example, an owl flying over or screeching near someone's house or community means death is imminent) or misconceptions children have about birds.

Jamaican schoolboys learning about birds.

Lesson 3: Look, Listen, Learn!

Big Idea: We can improve our observation skills by listening to and watching birds and the rest of our environment.

Location: Indoor and outdoor

Approximate Time: 1 hour and 30 minutes

Learning Objectives

Children will learn:

1. To use their eyes and ears while outdoors.
2. That hearing and careful observation are important skills for naturalists and scientists.

What do I need?

- ❏ Various man-made small objects (see "Getting Ready...")
- ❏ Pencils, colored pencils, or crayons
- ❏ Bird Journals
- ❏ Clipboards or sturdy cardboard pieces

Getting Ready...

- ❏ Collect 10-15 small, miscellaneous human-made objects for the "What Doesn't Belong" activity. These could include items like a roll of tape, a T-shirt, a piece of garbage, or a toy – choose items of different sizes and colors.
- ❏ Find a short path about 20m long, ideally located in a natural setting, and place the objects along the side of the path (hanging from a branch, on a bush, on the ground, etc.), some obvious and some more hidden, varying the distance from the path but still visible from the path.

Background Information

Most of us spend so much of our time in very noisy urban environments that we forget how to listen to simple sounds. When we are quiet we hear more. In order to enjoy watching birds, one must be able to find them. Especially in forests, this can be challenging at times, even for experts. To find birds, it is important to always look and listen. Searching and listening for birds helps young people focus and pay attention to their surroundings in a fun and exciting way.

Activity

1. Sound map

Give each child his or her Bird Journal and a pencil. Go to any location outdoors where you can hear a variety of sounds, such as the schoolyard, a local park or natural area. Have children draw an "X" in the middle of a blank page to indicate their location. Give children a minute to find a place to sit that is spread out from one other. Ask them to remain as quiet and still as possible, and to close their eyes and listen to all the sounds in the surrounding environment for about 3-5 minutes. Every time they hear a sound, the children should open their eyes and indicate that sound on their "map" (using a symbol or picture to represent the sound), and marking the direction and distance from their "X" location. See the illustration below. Some of the sounds this child hears include a barking

dog and a car. The undulating lines at the top left of her page represent the sounds of a high-pitched cricket, while the curly lines on the bottom right represent the wind.

After about 5 minutes of listening and drawing time, bring the group together to share and discuss the different sound maps. Ask:

- How many different sounds did you hear?
- What sounds could you identify? Were there any unknown sounds?
- Were sounds heard from every direction? Why or why not?
- What sounds did you like best? What sounds did you like least?
- If you heard a bird call, can you identify the bird based on its call?

If you have time, try making sound maps in both quiet, natural places where there may be few non-natural sounds, as well as in more developed locations where non-natural sounds are common.

Children can compare the different sounds they heard between the two locations. Which location did children prefer? Which location do they think birds prefer and why?

2. What doesn't belong?

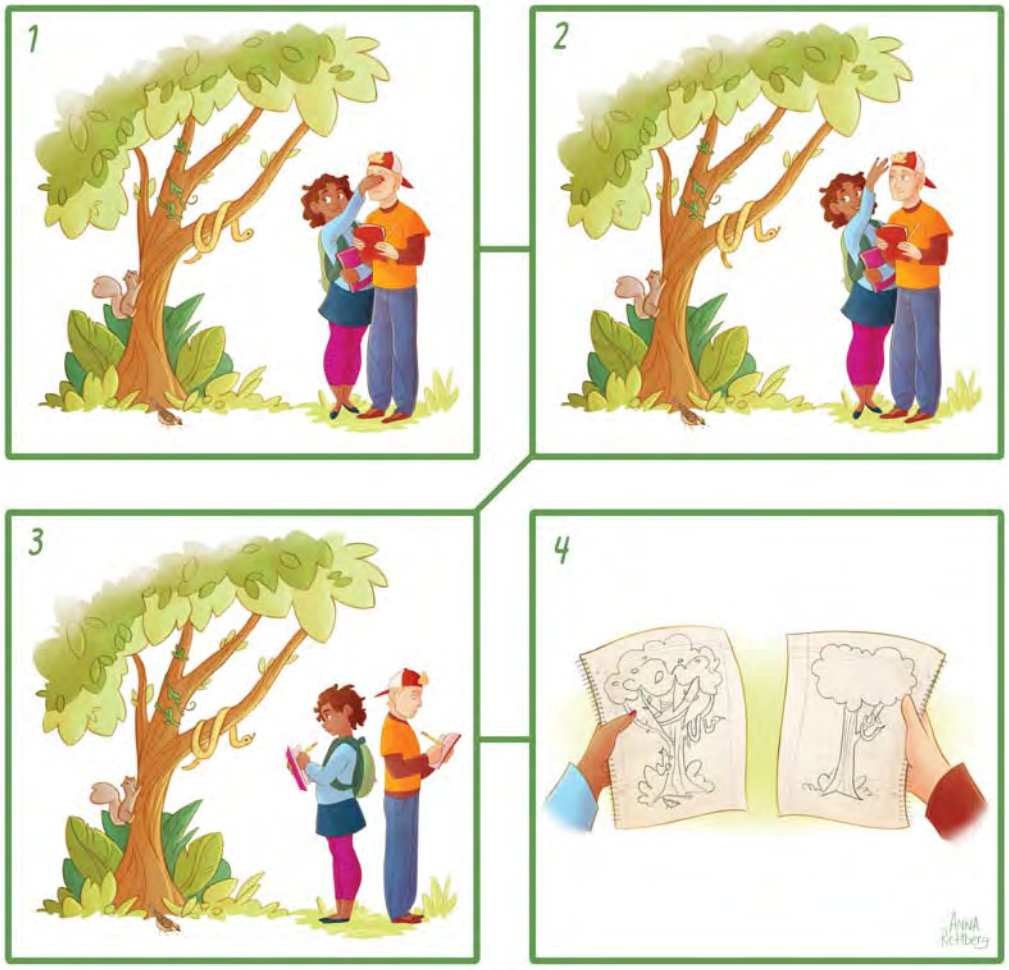
Take your group to the "What Doesn't Belong" path. Tell them that along this path are objects that don't belong. As they walk the path, they should try to find as many objects as they can, but should not say anything or show anyone else. Lead the group very slowly in a line along the path. When you are done, ask that each child make a list in his or her Bird Journal of all the objects he or she can remember finding.

Afterward, see who found the most objects and then walk them down the path again, pointing out all the hidden objects. At the end, talk about what objects were hardest to find and why, discussing factors like color (bright colors vs. colors that blend in, i.e., camouflage), size, whether the object was hidden by vegetation, and how close or far the object was to the path. Explain how this kind of observation is good practice for finding birds and that being a keen observer takes practice.

3. Camera eyes

In this activity, children will practice visual observation by pretending to be a human camera. At an outdoor site with various features (such as water, trees, grass), split into pairs and assign one child in each pair the role of "photographer" and the other the role of the "human camera." The photographers will cover the eyes of their cameras and carefully lead them to a spot where they want a "photo" to be taken. When ready, the photographers will let their cameras open their eyes for just a second and say, "click!" After a second, the photographers then cover their cameras' eyes again,

and turn their cameras away from the scene. The cameras will then draw as best they can what they saw when they "took their photos." The photographers should also draw the scene, except that they can look at it while they draw. When finished, have the pairs compare drawings. Did the cameras capture everything the photographers saw? What kinds of things were missed? Finally, have the pairs switch roles and repeat the activity.



4. Bird observation

Take your group outside to observe birds. Children should record details about their observations in their Bird Journals. What kinds of birds? How many? Tell children not to worry if they do not know the exact names of birds, but encourage them to include details about their size, color, and behavior. They should also get into the practice of writing down the date, time, and location.

Wrap-up and Reflection

Try to leave some time at the end of this lesson to encourage the children to reflect on the things they learned and write in their Bird Journals. Ask questions such as:

- Did any of these activities make you think differently about birds or the environment?
- What did you learn about observation?
- What questions do you have?

Lesson 4: Our Habitat is for the Birds

Big Idea: A habitat provides the food, water, cover and space that each living thing needs to survive and reproduce.

Location: Indoor and outdoor in a large, open space

Approximate Time: 1 hour 20 minutes

Learning Objectives

Children will be able to:

1. List the four main components of habitat.
2. Describe the importance of each habitat component and the necessity of obtaining all habitat components.

What do I need?

- ❏ Chart paper or a chalkboard
- ❏ Habitat Scavenger Hunt cards (beginner and challenging sides - one per child or pair)
- ❏ Dry-erase markers (one per child or pair)
- ❏ Clipboards
- ❏ Pencils

Getting Ready…

- ❏ Gather the supplies and prepare to go outside.

Background Information

All living things have a habitat—a place that provides the food, water, cover, and space that they need to survive. Cover includes nesting areas, places to sleep or rest, places to hide or escape, and shelter. Space means a big enough area to hunt and feed, find nesting areas, and for some bird species, to migrate safely. If a place does not provide the right food, water, space, and cover in a suitable amount, a plant or animal cannot live there.

Activity

1. Imagine life as a bird

Ask the students to imagine they are a bird—any wild bird. Tell them to close their eyes and imagine where they are and how they live there. Focus on habitat needs by slowly asking them these questions as students visualize:

- Where do you live? What are you doing? What do you see?
- What do you eat? How do you eat? Where do you find food?
- Where do you get water?
- Where do you sleep? Where would you hide if something scared you?
- Where do you lay your eggs? Are your babies hidden? By what?

Pair students and have them interview each other about their story, or each child could draw his/her adventure as an imagined bird. After plenty of time to exchange ideas with partners, share ideas as a class, drawing attention to how each of the imagined birds use their habitat.

2. Create a habitat list

As a full group, brainstorm a list of "What Birds Need for Survival" on the board. Group the suggestions into the following categories: food, water, cover, and space. If things in all four categories have not been mentioned, encourage deeper thinking. If other things, such as "love" or "parents" are mentioned, put them in a separate place on the board for non-habitat needs.

After the list is complete, summarize that all living things have a place that supplies it particular food, water, cover, and space needs—its habitat. If an animal, such as a bird, cannot find these things in an area, and in the right arrangement, it can't survive there.

3. Habitat scavenger hunt

Go outside to investigate your habitat using the Habitat Scavenger Hunt cards. Instead of collecting the items on the list, this is an observation scavenger hunt. Children check off the items (with a dry-erase marker), as they are located.

When everyone has had a chance to look for the items listed, come back together to chat about where they were located. Were any difficult or impossible to find? Why do you think that was? For example, it might be impossible to find animal tracks when it is very dry, or certain animals depending on the time of year.

4. Tag your habitat

Select students to play the roles for the "habitat tag" game: birds, plus the four habitat components - food, water, cover, and space.

If you have a group of fewer than 10 children, choose 2 birds, with 10 or more children, choose 3 birds, and with 20 or more children, choose 4 birds. Have the remaining children line up and assign them the role of food, water, cover or space - in that order—until you run out of students. Once the game begins, children who were assigned habitat components constantly make the motions of the component they represent so "birds" know what they are catching:

- FOOD: make eating motions with their hands to their mouths
- WATER: make wave motions with their arms
- COVER: keep their hands over their heads
- SPACE: keep their arms spread out wide

The object of the game is for each bird to "collect" the four habitat components by tagging them. Once a "bird" tags a habitat "component," that component links arms with that bird or with any component already linked to that bird. Together they continue to chase the remaining components needed.

Before starting the activity, set the boundaries (a small site will allow the game to conclude more quickly). Explain: "These birds are trying to survive in this habitat. They have 5 minutes to find one of their habitat needs – food, water, cover and space." Once a group has collected all four components, the group should sit down outside the playing boundaries.

Playing Habitat Tag game.

At the end of the first round, any birds that were able to collect all four components survived! Those birds get to reproduce (choose one of the children who previously played a habitat role to become a bird in the next round). Play again, with the increased number of birds. What happens? (There is more competition.) How does that affect bird survival?

If you have extra time: In the following rounds, remove some children with different habitat roles, to highlight that sometimes habitats are negatively affected or resources are scarce. You can use different scenarios, such as:

- "People started harvesting food or raising cattle on a patch of forest." Remove 1 space and 2 covers.
- "It's a dry year and the rivers are low." Remove 1 water.
- "A town has dumped garbage into the habitat." Remove 1 food and 1 water.
- "Additional land is set aside as a wildlife refuge." Add 1 food, 1 water, 1 cover, and 1 space.
- "People in a town feed the birds seed or fruit and build nest boxes." Add 1 food and 1 cover.

Play the game as many times as you want, adding new scenarios and modifying the habitat with each round. Any bird that cannot acquire all of its needed resources does not survive the round.

Wrap-up and Reflection

1. How does our schoolyard/site currently provide the food, water, and cover that birds need? What are one or more steps you would propose for improving our habitat for birds?

Children should mention all four factors (food, water, cover, and space, as well as give reasonable suggestions for improvement related to habitat, for example, to plant fruit-bearing trees or shrubs, clean up trash, or install nest boxes.)

2. Can all birds live in the same habitats? Why or why not? Give examples.

No. While all birds have four habitat needs—food, water, cover, and space—birds have different adaptations, and as a result their needs for food and water are different. For example, a penguin and an ostrich are both flightless birds but they have very different habitat needs.

3. Why do you think some bird species are so common in urban areas?

Just as with any habitat, the birds that live in urban habitats are able to do so because they have adaptations that help them survive under those conditions. Urban areas generally have certain characteristic features, such as tall buildings and lots of easily available food for birds that eat human food scraps. Those birds with the right adaptations are able to thrive. Rock Pigeons (the common urban pigeon), for example, are adapted to rocky habitats and use cliffs for cover, but tall buildings can also satisfy this habitat need.

Antillean Nighthhawk nesting in the Bahamas.

Lesson 5: Bird Survivor!

Big Idea: Birds face many challenges during their breeding season.

Location: Indoor or outdoor in a large open space

Approximate Time: 1 hour

What do I need?

- ❏ "Bird Survivor" game cards

Getting Ready…

- ❏ Cut apart the "Bird Survivor" game cards

Learning Objectives

Children will be able to:

1. Outline the six major steps of the breeding cycle in birds.
2. Describe at least three challenges that birds face during the breeding season.
3. Describe at least three things that contribute to birds' success in their breeding season.

Background Information

All bird species find mates, lay eggs, and raise their young in various ways. Though not every bird goes through these the same way or in the same order, the six major steps of breeding we'll use in this activity are:

1. Find and defend a territory: Birds need to select a breeding territory. Resident species may keep a territory throughout the year or look for a new one in spring. Migratory species begin looking for and defending a territory as soon as they arrive at their breeding grounds. Good territories provide nest sites, reliable food sources, and protection from predators, and they also help males attract the best mates.

2. **Find a mate**: While territories are being claimed, males and females are also trying to attract mates. Males of some species advertise themselves with bright breeding plumage and/or song. In most bird species, the female chooses her mate. This is one reason why males are often "showier" or more colorful. Besides physical appearance, females also may assess the male's singing, courtship displays, age, and ability to provide food. Many bird species form a pair bond, with the male and female staying together throughout the breeding season.

3. Build a nest and lay eggs: Nests provide a safe place for the eggs and young. Bird nests are very diverse. Some birds do not make a nest at all but simply lay eggs in a scrape in the ground. Other birds may make elaborate nests from natural or man-made materials. Nests can be found almost anywhere—on the ground, in trees, in burrows, on the sides of cliffs, or in or on man-made structures. The clutch, or number of eggs a female lays in one nesting attempt, varies depending on the species.

4. Incubate eggs: Birds incubate their eggs to keep them at the proper temperature to ensure normal development. Songbirds usually begin incubation after all the eggs have been laid so that they will hatch at approximately the same time. Other birds, such as herons and birds of prey, begin incubating as soon as the first egg is laid, and their eggs may hatch on different days. In some species both the male and female incubate eggs; in others, it is just the female. Incubation time varies depending on the species, but typically, the larger the bird, the longer the incubation period.

5. Feed and raise nestlings: Baby birds of some species are born naked, helpless, and blind; they must be kept warm and fed by the parents for the first days or weeks of their lives. These birds are called "altricial." This is an extremely dangerous time for the parents, who are constantly foraging for food, and for the young, whose noisy cries for food may attract predators. In contrast, birds such as ducks and many shorebirds are born covered in down, able to walk or swim soon after hatching and spend hardly any time in the nest. They are often seen wandering in search of food alongside their parents when only a few hours old. These birds are called "precocial."

6. Fledge from the nest: After leaving the nest, or fledging, the young birds typically remain close to parents for a short period of time. During this time, young birds must learn to survive on their own and are very vulnerable to predators and starvation.

Activity

1. "Fact or Fiction?" Nesting Birds Scramble

Establish "fact" and "fiction" sides of the room or outdoor space—at one extreme is the "fact" side, and at the other, the "fiction" side. As you read the following statements aloud, ask each participant to run to one side or the other depending on whether they think the statement is true (fact) or false (fiction). Read the answers after each statement.

1. All birds build nests. (Fiction! Some birds don't build a nest, for example, cowbirds lay their eggs in the nests of other birds.)
2. All birds lay eggs. (Fact—sort of: All species lay eggs, but of course males don't—only females!)
3. Most birds live in their nests year-round. (Fiction! Nests are mainly for laying eggs and raising young. They are usually not used after the end of the breeding season.)
4. Most baby birds are fed seeds and berries by their parents. (Fiction! Most birds are fed insects by their parents—insects are high in protein that nestlings need to grow.)
5. Birds can breathe inside their eggs before they hatch. (Fact! The egg is porous to allow gas exchange.)
6. Eggshells are made of the same materials as chalk. (Fact! Both are made primarily of calcium carbonate.)
7. The egg yolk (yellow part) grows into a baby bird. (Fiction! The yolk provides food for the growing baby bird.)
8. If you find a baby bird, you should try to feed it. (Fiction! If you find a tiny nestling, try to put it back in the nest as soon as possible! Its parents may be nearby and still helping the chick. If you find a fledgling, you should put it back in its nest or leave it alone!)
9. If a bird smells human contact with its nestling or fledgling, it will abandon it. (Fiction! While it is better not to handle a nestling or fledgling if you can avoid it, in some circumstances it is necessary. However, most birds do not have a sense of smell, and the young will not be abandoned its parents.)

You may want to note any widely held misconceptions and review the facts at a later time.

2. Share and learn about breeding birds

Share stories about experiences with bird nests and young birds. Consider the following questions:

- Why do birds build nests? (Nests protect eggs and young.)
- What do bird nests look like? Where are they found? What kinds of materials might a bird use to build a nest? (Bird nests are varied and can be found on the ground, in bushes, or high in trees or in nest boxes or tree cavities. Birds make nests of sticks, leaves, moss, vines, feathers, rocks, spider webs, mud, bark, and human-made materials such as string or scraps.)
- Have you seen a bird build a nest? At what time of year? At what time of year have you seen nests? Did it have eggs in it at that time of year? (Nests are used during the breeding season. Birds don't live year-round in nests, so nests seen at other times of the year are abandoned or will not be used until next year, if ever again.)
- Some animals, such as humans, can have babies any time of year. Most birds, however, only breed in the spring and summer. Why do you think that is? (Food and water availability is highest at those times of the year.)
- Have you seen a baby bird? Where was it? What did it look like?

Write the following "Stages of the Bird Breeding Cycle" on the board. Breeding birds go through six major steps, though not every bird goes through these the same way or in the same order. The six major steps of breeding are:

1. Find and defend a territory
2. Find a mate
3. Build a nest and lay eggs
4. Incubate eggs
5. Feed and raise nestlings
6. Fledge from the nest

3. Game - Bird Survivor!

Ask for five volunteer "birds" to stand at one end of the room, and name them Bird 1, Bird 2, Bird 3, Bird 4, and Bird 5. To avoid competition and disappointment, tell the children before starting that this is not a competition. Instead, they are acting out a story of five birds attempting to breed, and not all of them will be successful.

Shuffle the Bird Survivor cards and distribute ALL of the cards to the remaining children, even if some children receive more than one card. At the top of each card, one of the breeding stages is listed. Below that is a breeding event that will be read aloud and directed to one of the 5 volunteer birds. (NOTE: if you have a group with fewer than 12 kids, only use 4 volunteer birds and eliminate the specially marked cards—one of each of the six kinds of cards is marked with the words “extra card.”)

Pick one of the five children who have a "Find and Defend a Territory” card. Ask the children to read his or her card to Bird 1, who follows the instructions on the card. Have the remaining four children holding the "Find and Defend a Territory" cards each read their card to a "bird," continuing with Bird 2 and progressing through the remaining "birds." Continue the game by repeating this step, picking cards in the following order:

1. Find and defend a territory
2. Find a mate
3. Build a nest and lay eggs
4. Incubate eggs
5. Feed and raise nestlings
6. Fledge from the nest

If a bird is told that the game is over for them, they should step out of the playing area. During the game, be sure to discuss any terms that are unfamiliar to children. Continue the game until all 24 cards are read.

Educators playing Bird Survivor game at BirdSleuth Caribbean Training Workshop

After the game, ask:

- Which birds do you think were the most successful? *The most successful is the bird that raised the most young.*
- Which birds were the least successful? *Possible answers include: the bird that died early, or the bird that did not raise any young. Emphasize to the children that in order for a nesting attempt to be successful, at least one young must survive.*
- Do you think all birds raise their young in the exact same way? If not, how do some differ? *Some species, like many geese and ducks, have precocial young, meaning that their babies can walk and gather their own food just hours after hatching. Some species keep their mate year-after-year, so they don't have to find a new mate every year.*
- What were some of the challenges the nesting and migrating birds faced?
    - Habitat destruction
    - Invasive/non-native species
    - Bad weather
    - Predators such as falcons and snakes
    - Pesticides
    - Dead mate
    - Mites
- What are some positive or "lucky" things that happened to some of the birds?
    - Protected habitat
    - Nest boxes
    - Good weather
    - Good mate
    - Lots of food

Wrap-up and Reflection

Try to leave some time at the end of this lesson to encourage the children to reflect on the things they learned and write in their Bird Journals. Ask questions such as:

- What is something new that you learned about birds?
- Did any of these activities make you think differently about birds or the environment?
- Will anything you learned make you treat birds differently? If so, how?
- What questions do you have?

Lesson 6: Migration Obstacles!

Big Idea: Migratory birds face many obstacles during their journeys between their breeding and wintering grounds.

Location: Indoor or outdoor in a large open space

Approximate Time: 90 minutes

Learning Objectives

Children will be able to:

1. Define migration.
2. List at least three potential hazards that birds face during migration.
3. Identify at least two ways to help reduce negative impacts on migrating birds.

What do I need?

- ❏ Clear plastic wrap, and chairs or poles to which to attach plastic wrap between (windows)
- ❏ Heavy string or rope, 5-6 pieces, each 1.5-4.5 meters long (various uses: start line, power lines, to designate an area for a wildlife refuge)
- ❏ Tarp or plastic bags with yellow road lines marked on them or tape on the ground (road)
- ❏ Cardboard boxes (buildings)
- ❏ Pieces of paper (2-3) crumpled into balls (slingshots or guns)
- ❏ Cat ears head band or costume (optional, for a student to represent a cat)

If you want to time the migration obstacle course:

- ❏ Stopwatch or wristwatch
- ❏ Dry erase board and marker

Getting Ready…

- ❏ Gather the materials
- ❏ Set up the course in a large, flat location, such as a school gym or a lawn, with clear boundaries, using the materials outlined above. You can add or take out any obstacles depending on group size and materials—feel free to be creative!

Possible course set-up:

1. Start Line

2. **Shrinking Habitat** - hula-hoops or rope circles to outline good habitat patches

3. **Storms and Other Bad Weather** - rope outlining a large area (Atlantic Ocean) and a student moving around with arms out to represent a storm that can knock birds off course

4. **Windows** - clear plastic wrap, hung between chairs or poles, or held by students

5. Field Sprayed with **Pesticides** - hula hoop or rope circles

6. **Power Lines** - two lengths of heavy string or rope; may be strung between two poles or held taut by students

7. **Wind Turbine** - a child who stands in place and rotates his/her arms

8. **Hunte**r – a child standing at the side throwing slingshot or bullet balls

9. **Car on the Road** - tarp, plastic bags, or lines of tape on the ground, with one student "car" walking back and forth on the road

10. **Buildings** - cardboard boxes

11. **Cat** - a child who patrols a rope circle "backyard" wearing a cat headband or costume

12. Finish Line

Alternatives for older students, sites without an open space, or groups with mobility challenges:

1. Create stations, placing the obstacle cards on separate tables and invite students to visit the stations in groups to discuss each obstacle.

2. Break the class into groups of 2-3 students that will each research a different hazard. These "expert" groups can then create a poster to share information with the class.

Background Information

Migration is the regular movement of animals between two areas to take advantage of changing resource abundance and seasonality. It is a complex system, and migratory birds have a number of adaptations, for example, longer wings for longer flights, putting on huge fat reserves to power non-stop flights, navigation by stars which allows for night migration which may help cut the risks of predation, and more. Not all birds migrate, but those that do migrate do so to take advantage of good nesting locations with abundant food supplies, often in the temperate zones. They migrate back to their wintering grounds in late summer/ early fall when shorter days indicate a decrease in the availability of insects and other food sources in the coming winter. In most long-distance migrants, the urge to migrate is triggered by day length, but the exact timing is fine-tuned based on environmental conditions, such as storms and prevailing winds, or the bird's body condition.

Some birds migrate only a few hundred miles, while others travel nearly pole to pole. Either way, migration is not just a simple flight. It requires a great deal of energy, and both natural and human-caused factors create many challenges along the way. Whether it's a tall building, loss of habitat, or a storm, birds must navigate a changing landscape in order to safely reach their destinations. To model these challenges, this lesson features a migration obstacle course.

Activity

1. Introduce migration

Ask, "What is migration?"

Explain that when scientists speak of migration, they are usually referring to seasonal migration, or the large-scale annual movement of all or part of a population between its breeding (spring and summer) and nonbreeding (fall and winter) grounds. Migration is a cycle that birds repeat each year in response to the change of seasons, allowing some bird species to take advantage of the huge quantities of food available during the breeding season in temperate and arctic regions.

2. Migration obstacle course

Tell the students that summer is coming and they are birds that need to migrate north. It won't be an easy flight, and they will have to navigate obstacles in order to reach their summer breeding habitats. Explain the RULES of the game:

1. PRETEND: You can pretend you're a bird all the way through by flapping your wings or calling like a bird.
2. DON'T TOUCH: If you touch any of the obstacles, you instantly fail to migrate! Stand to the side.
3. STAY IN BOUNDS: If you go out of bounds, you instantly fail to migrate! Stand to the side.
4. CHEER: Students waiting in line can urge each "bird" through the course by clapping and cheering—preferably using bird-like sounds!

Ask students to be a part of the course:

1. A "storm" that moves around slowly in circles with arms out in the "Atlantic Ocean"
2. A "car" moving back and forth slowly on the road tagging birds as they cross
3. A "wind turbine" standing in one place with arms swinging to lightly tag birds that pass within reach
4. A "cat" that roams in a space representing a backyard (hula hoop or other boundary), trying to tag birds
5. A "hunter" that tries to shoot migrating birds from the side of the course with "bullets" made of crumpled paper.

Review the obstacle cards one-by-one, placing them next to (or in place of) their corresponding obstacle. Play the game doing the spring migration from "south to north." You may want to be the first bird that goes through the obstacle course to playfully demonstrate how to attempt to conquer the obstacles.

For example:

1. Begin at the start line.
2. Hop between patches of **shrinking habitat**.
3. Try to cross the Atlantic Ocean without being knocked off course by a **storm**.
4. Move under **windows**.
5. Walk or jump around the **pesticide field**.
6. Duck under the hanging **power line**.
7. Fly around the **wind turbine** and avoid getting tagged by student.
8. Try not to get shot by the **hunter**.
9. Come to a full stop before the road, look both ways, cross without being hit by the **car**.

Migration Obstacle game: "windows" pose a threat to migrating birds.

10. Fly around or over **buildings**.

11. Try not to get caught by the **cat**.

12. Cross the finish line—you have successfully migrated!

Depending on how much space you have, one to four children can go through the course at a time. For added excitement, you can time the race.

If a bird is tagged by or touches any of these obstacles, it does not survive migration and must step to the side. After each group has completed the course, note or record how many students successfully completed the north-bound migration. You may also wish to highlight or note which of the obstacles was the one that caused each bird's failed migration. Repeat the course if other students want to try.

Change the course by making positive and/or negative modifications to it. You may wish to ask students to suggest their own modifications, for example, you might:

1. Set up "wildlife refuges" or a school garden with rope or tape that represent safe havens for migratory birds.

2. Take away obstacles such as the cat. (The cat's owners have learned to keep the cat indoors.)

3. Remove the hunter. (New laws are in place to limit hunting and discourage poachers). Do more students migrate successfully now?

3. Have students migrate again (from "north to south"), timing the race if desired.

3. Discuss obstacles and actions

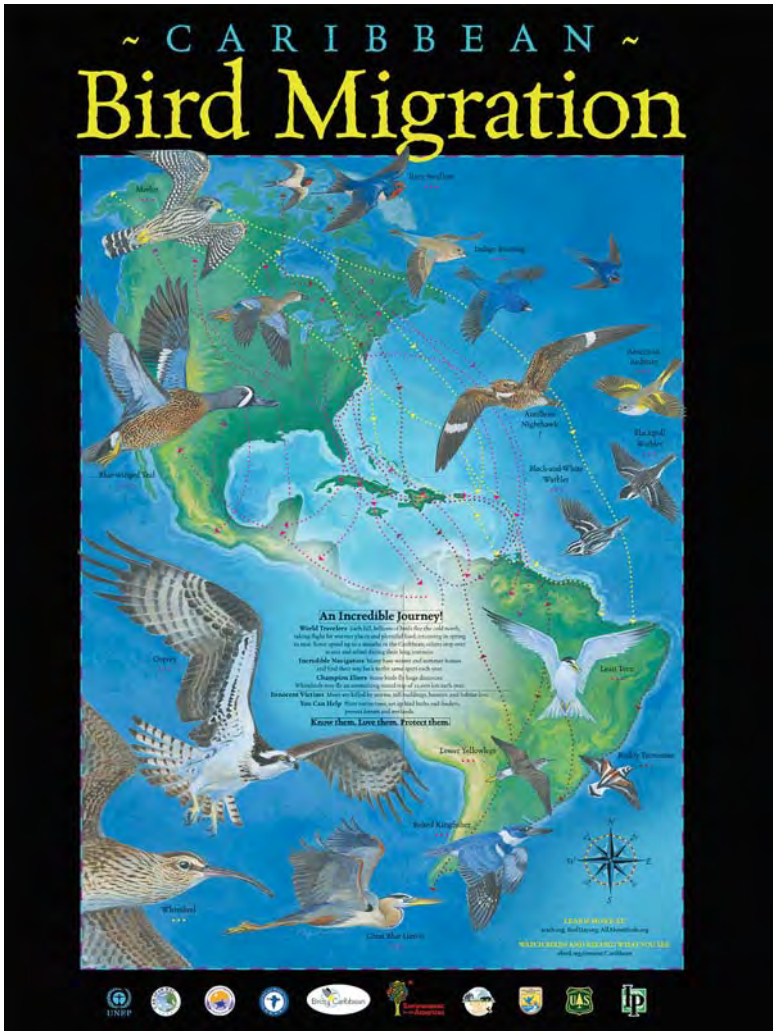
Ask your group:

- What obstacles do birds encounter during their migration? What else do you think makes it hard for birds to survive migration? **Possible answers:** confused about their direction by bright lights; fly into buildings, bridges and towers; die from eating foods laced with pesticides; competition with invasive species (e.g. European Starlings, House Sparrows); eaten by predators (e.g. cats, raptors, mongoose, snakes); having insufficient energy to go the distance; storms and bad weather.
- Of the obstacles you experienced, in which do humans play a role? **Possible answers:** many of them! For example, windmills, tall buildings, pesticides, hunting, and even cats are obstacles that ultimately are caused by humans.
- What can you do to help? **Possible answers:** create more bird habitat by planting native shrubs, flowers, and trees; putting out bird feeders, birdbaths, and nest boxes; clean up polluted or littered habitat; don't use pesticides on lawns; remove invasive species and plant bird-friendly plants; turn off lights at night; use bird-friendly building design[1], don't disturb or hurt birds; keep cats indoors, especially during migration and the breeding season.
- What do you think might happen to birds that migrate latest or slowest? **Possible answers:** the latest arriving birds have the last choice in food, territory, and mates and they might have to fight for these things.

[1] *http://www.abcbirds.org/abcprograms/policy/collisions/pdf/Bird-friendly_Building_Guide_WEB.pdf*

4. Introduce real bird migrants

Show children a map of Caribbean bird migration[2] and point out how far different species migrate. Discuss what obstacles the children think these species might face along the way.



- The Ruddy Turnstone, a shorebird, migrates from breeding grounds in northern Alaska and Arctic Canada to the southern tip of South America, with many individuals wintering on coastlines along the way.
- Blackpoll Warblers leave eastern Canada and New England each fall and fly nonstop over the Atlantic first heading in a SE direction often out as far as Bermuda and then come streaming in with a tail wind boost from the trade winds which helps them fly into the Caribbean, where they stopover to rest and feed, and then head to northern South America.
- The Antillean Nighthawk is what is known as a *summer migrant*. They breed in the Greater Antilles in the summer and are thought to spend the winter in South America, but nobody knows where!
- The Arctic Tern holds the record for the farthest yearly journey of any bird. It flies up to 42,000km between the South and North Poles every year. Remind the children how it feels to travel in a car or bus for more than two hours. If you had a perfectly straight road from the North Pole to the South Pole, it would take you 280 hours straight in the car (that's almost 12 full days!) driving at highway speed without stopping, eating, or drinking.

Wrap-up and Reflection

Try to leave some time at the end of this lesson to encourage the children to reflect on the things they learned and write in their Bird Journals. Ask questions such as:

- What is something new that you learned about birds?
- Did any of these activities make you think differently about birds or the environment?
- Will anything you learned make you treat birds differently? If so, how?
- What questions do you have?

[2] *Caribbean Bird Migration posters are available from BirdsCaribbean.org.*

You Can Be a Citizen Scientist!

This section of lessons will help you guide children as they learn to observe and identify birds. We invite you to become citizen scientists through the eBird project, and to do other positive things for the birds in your area, and share your actions in your community and beyond.

Whether you live in an urban or rural area, you can find birds. After you become familiar with the bird species that are common in your area, you can begin making scientific observations. Through the Cornell Lab of Ornithology's citizen-science projects, children can join forces with people in all walks of life in observing birds and contributing data to central databases. One such project, eBird, accepts observational data related to any bird, seen at anytime, anywhere in the world. Children are welcome to send in data. As one 12-year-old put it, "Scientists can't be everywhere, so kids from all over can record data and send it in."

Professional scientists use citizen-science data to determine how birds are affected by habitat loss, pollution, and disease. They trace bird migration and document long-term changes in bird numbers across continents. Results have been used to create conservation management guidelines for birds, to investigate the effects of acid rain and climate change, and to advocate for the protection of declining species. Please tell us what birds are found in your area!

We understand that not everyone has easy Internet access and might have difficulty submitting bird count data online. However, we encourage you to keep records of your bird observations and counts, even if you are unable to enter this data into eBird soon after recording it. It can be a valuable educational experience, and it is also important to monitor birds in conjunction with your chosen conservation project to evaluate whether your conservation action projects impact local bird populations (see Lesson 10). Since there is no due date for entering eBird data, you could submit it weeks or even months after collecting it, so long as you have carefully recorded all of the necessary information!

LEADER TIP:

Do you want your eBird data to make a difference to science and conservation? You need to submit it! Consider the technology to which you have access. Does your school or organization have computers and Internet access? If not, there are several approaches you can take to engage children in the eBird data entry activity, including:

- Bring the children to a library or the headquarters/offices of another institution to enter eBird data.
- Collect bird data with the children's help, but enter the data into eBird yourself without their participation.
- Encourage children to collect bird data and keep records in their Bird Journals. Do not enter it into eBird in the short-term, but explain the importance of monitoring and data collection and try to enter your bird counts at a later date.
- Mail your bird count data to someone with Internet access who would be willing to enter it for you.

Lesson 7: Discover Bird Diversity

Big Idea: We have birds in our local area that we can learn to identify and observing birds is fun.

Location: Indoor and outdoor

Approximate Time: 2 hours 30 minutes

Learning Objectives

Children will:

1. Be able to recognize at least bird groups by their silhouettes.
2. Observe and record observation data.
3. Discover the joy and fun of birdwatching.

What do I need?

- ❏ Stopwatch or wristwatch
- ❏ Dry erase board and marker
- ❏ Bird Silhouettes poster
- ❏ Bird Journals
- ❏ Chart paper or a chalkboard
- ❏ Colored pencils
- ❏ Binocular diagram
- ❏ Binoculars (if available—enough for each participant or pair, if possible)

Getting Ready...

- ❏ Prepare to take children outdoors to watch birds. Decide where you will go, and survey the area before class to see where birds might be found. Recruit extra helpers if possible.
- ❏ For the binoculars lesson, make sure that all binoculars are clean and functional before handing them out.

Background Information:

Silhouette Groups

1. Woodpecker/woodcreeper: these birds have short legs that help them hold onto trees while they peck holes with their strong, pointed beaks searching for food. They have a stiff straight tail they use to support themselves on the sides of trees.

2. Perching bird: this bird group is very diverse and includes birds like tanagers, finches, sparrows, flycatchers, thrushes, swallows, warblers, and many others. They have an upright posture and tails of varying lengths and shapes that hang below them when perched on a branch. Their beaks can be many lengths and shapes depending on their diet.

3. Bird of prey: this bird group includes birds such as hawks, eagles, ospreys, vultures, and falcons. They have keen vision that allows them to detect prey during flight, and powerful talons and curved beaks for catching, tearing apart, and eating prey.

4. Owl: like birds of prey, these birds also use curved beaks and powerful talons for catching and eating other animals. However, nearly all owls are nocturnal, meaning they usually sleep during

the day and hunt at night. They are characterized by a distinctive facial disk, a large head, huge eyes that allow them to see in the dark, and silent flight.

5. Hummingbird: these birds are very small with long narrow beaks used for reaching inside of flowers to feed on nectar. Their wings beat very quickly in flight, and they can hover, fly backwards, or move erratically.

6. Waterfowl: this group of swimming birds is made up of ducks, geese and swans. They are found near or in fresh, brackish or salt water bodies. They have webbed feet, thick bodies and flattened beaks. Their necks can be short, like most ducks, or very long as in geese and swans.

7. Wading bird: this group includes herons, egrets, flamingos, ibises, night-herons cranes, and storks. Their beaks are generally long and pointed for reaching under water to feed while their long legs allow them to wade in the water without their bodies getting wet. They prefer marshes, swamps, mud flats, salt ponds, and mangroves and other shallow bodies of water.

8. Shorebird: these birds are like miniature wading birds. They also have long legs for walking in shallow water and many have long beaks that they stick into the mud or sand to catch invertebrates. They feed in shallow water along the beach or muddy wetlands. This group includes sandpipers, plovers, stilts, avocets, jacanas, snipes, oystercatchers, and others.

9. Parrot: these tropical birds have a strong, curved and extremely powerful beak that they use to break open and eat nuts, seeds, fruit, and buds. Most parrots are vividly coloured. They are usually noisy, social birds, with raucous calls, often seen flying or feeding in groups.

10. Dove/pigeon: these birds have small bills and plump bodies. Their wings make clapping or whirring sounds in flight and most species are strong flyers. They are often seen walking on the ground in cities and villages, although there are many different species that live in a variety of habitats.

11. Others: Don't forget, there are thousands of species and hundreds of groups of birds in the world! These are just some of the most common groups, but there probably others near your home you could easily find. That's part of what makes bird watching so cool!

Activity

1. List common local birds

Let the children know that in this lesson they will go outside to look and listen for birds. Ask:

- What kinds of birds have you seen around here?
- What did you find interesting or exciting about these birds?

List these "common birds" on the chalkboard and in Bird Journals.

2. Bird silhouettes

At the front of the class, display the large poster with ten unlabeled bird silhouettes. Define "silhouette" (which is often described by children as a "shadow"). Note that these pictures are not drawn to scale (i.e. these particular silhouettes do not give clues to bird size—all the birds are about the same size here, but in real life they are different). Once they become more familiar with local birds, have them choose three particularly common ones (one small, one medium, and one large) that they can use as a comparison when describing the actual size of other birds. For example, "The bird I saw was about as small as a bananaquit."

Have children share their ideas about these silhouettes. Ask:

- Can you identify any of these birds? *Children probably can't identify specific species of birds from these pictures, but they may be able to correctly identify the group. For example, they may be able to recognize one silhouette as a "woodpecker," but not know what kind it is; they may recognize a "bird of prey," but not know whether it is a hawk or a vulture.*

Accept all ideas at this time. Then ask:

- What clues did you use to determine the kind of bird for each silhouette? *For example: body shape, length of neck, kind of beak.*

Reveal the groups pictured, and share the characteristics that identify each group. Ask:

- What other clues might be helpful when we go outside to look for birds? *For example: colors, behaviors, calls/songs.*
- What should we try to notice about the birds we see? *Any of these clues could be important in identifying a bird.*

Make a list of these ideas entitled "Clues to Identifying Birds" on the board, or large poster paper. We can also pay attention to the kind of habitat they are found in.

3. Introducing binoculars

Before handing out the binoculars, explain the most important **rules** of binocular use to your group: **always** wear the neck strap to avoid dropping the binoculars, and **never** touch the glass parts of the binoculars or walk while looking through them. After handing out the binoculars, make sure the children look through the smaller end while holding onto the sides. Tell them they can use the adjustment ring in the middle to focus, and can bend the binoculars up and down until there is a circle of light with no black inside. Take the children through the one-time process of focusing the binoculars for their eyes using the diopter ring, instructions here:
http://www.birdwatching.com/optics/diopter_set.html

Finally, demonstrate the three steps of actually finding and looking at birds with binoculars.

1. Find the bird <u>without the binoculars first</u>.

Binoculars are not usually used to find birds. It is actually much easier to find birds by looking without binoculars and watching for movement. Binoculars may let you see closer, but you can see much more looking around without them.

2. Raise the binoculars to your eyes while continuing to look at the bird.

Once you have found a bird with your bare eyes, don't take your eyes off it! While keeping your eyes on the bird, slowly raise the binoculars to your eyes. If you do this correctly, you should still be able to see it.

3. Focus the binoculars with the knob.

The last step is to focus the binoculars so that you can see the bird clearly. All you should have to do is rotate the focus knob left and right until you can see the bird the clearest.

Before looking at birds in the field, practice these steps. In an open space, have your group stand shoulder to shoulder and walk about 5 meters away from them. Hold up the bird silhouette poster and walk through the three steps above until everyone says that they see the images clearly. Next, take about ten steps away from the kids and hold up the poster. They will have to refocus their binoculars in order to read the print. Take about 20 steps forward, and have kids focus on the poster one last time from a close distance. Hopefully, it is now clear that everyone can see clearly through their binoculars and knows how to focus. You are ready to go birdwatching!

> ***LEADER TIP:***
>
> Young children can have a hard time understanding how to focus binoculars. Make sure that the binoculars fit their eyes and that they know the difference between a blurry and focused image. They may be too shy to tell you that they cannot see anything with their binoculars in the field, so practice using binoculars before looking at real birds.

4. Outdoor bird observations

Review your expectations for bird-watching behavior (such as: walk quietly and slowly, look in all directions, and point instead of shouting when you see a bird). It is also important to emphasize again that they should keep the straps around their necks, and not walk while looking through binoculars.

Remind the children to record in their Bird Journals notes about birds that they see outside. Emphasize that this is just the first bird count: they may not know all the birds, but they should describe, count, and if they can, name the birds they see. They should also write down the date, time, and location. Invite the kids to sketch birds if they want, and ask them to pay attention to what different birds are doing.

Take the children to an area where they can sit and watch birds or walk slowly to look for birds. For any bird they see, they should certainly try to note its silhouette group. Emphasize patient observation rather than finding and naming birds. Encourage children to record as much data as they can in their Bird Journals, even if they can only write down descriptions of birds, and/or sketch them, rather than record their names or even their group.

Wrap-up and Reflection

When you return to the classroom, have the children share their experience, data, and sketches. Ask questions such as:

- What silhouette groups were represented by the birds you saw today?
- What were they doing?
- How were they interacting with each other?
- Where did we see the most birds?
- Why do you think so many birds were found there?
- Where did we find fewer birds? Why do you think this is?
- What questions do you have?

Review the clues that children used when trying to identify birds outside (such as size, sound, shape, color, behavior). Add any new ideas to the "Clues to Identifying Birds" list.

A child spotting birds in Jamaica.

Follow-up at Home

Ask that each child observe birds for at least 10 minutes outside their homes. They should record details about their observation in their Bird Journals. (Date? Time? Location? What kinds of birds? How many?)

Next time you meet, review the children's experiences conducting their home observations, and the groups and numbers of birds they saw. Ask questions such as:

- Was it easier to find birds here or at home? Why do you think this is the case?
- Did anyone notice any birds they had never seen or heard before? Can you describe them?
- Did anyone notice any interesting bird behaviors? Can you describe them?

Lesson 8: Get to Know your Local Birds

Big Idea: It is easy and fun to identify bird species based on their appearance, sound, and behavior.

Location: Indoor and outdoor

Approximate Time: 2 hours and 30 minutes

Learning Objectives

Children will be able to:

1. Describe bird field marks using the correct names of body parts.
2. Determine why field marks are important in identifying birds.
3. Recognize and name some common birds in their neighborhood and country.

What do I need?

- ❏ Bird Silhouettes poster
- ❏ Bird Body Parts poster
- ❏ Set of laminated bird pictures (10-12) of common and special birds in your country for Bird Detective game; these can be laminated onto foam core board to make them extra sturdy (optional)
- ❏ Bird Detective Game list of local birds (photocopies, see example in Part 6 below)
- ❏ Binoculars, if available (1 per child or small group)
- ❏ Field guides (one per child, pair, or small group)
- ❏ Bird Identification Cards or other hand-held guides (optional)
- ❏ Bird Journals
- ❏ Dry-erase markers
- ❏ Colored pencils or crayons
- ❏ String and/or strong tape

Getting Ready...

- Gather all of the supplies listed above. For the Bird Detective game, place all laminated birds in branches of trees and shrubs, on tree trunks and on the ground. Hang the birds with a string secured to the back of the bird or use strong tape to keep them from being blown away. Label each bird with a large letter or number.

Activity

1. Bird body parts

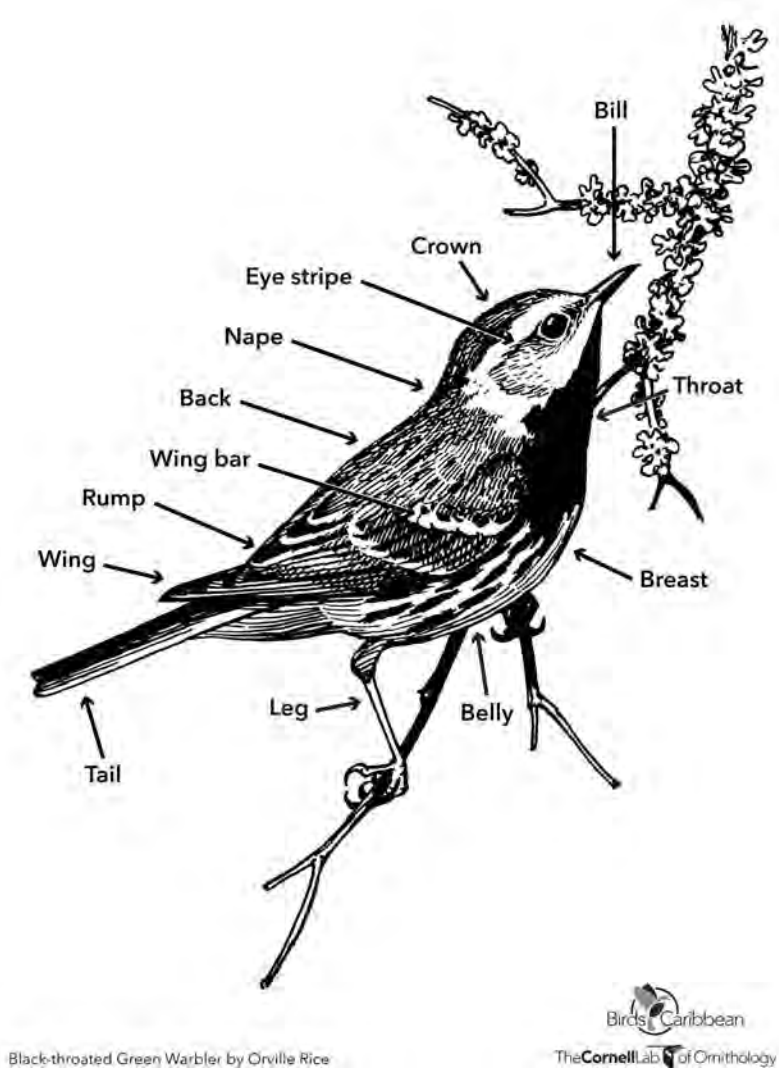
Write the name of the body parts on the board (take the names from the diagram). At the front of the class, put up the Birds Body Parts Poster (no labels) or draw on the board a similar but large bird body that you create. Ask volunteers to come up and fill in the blanks by writing the names of the body parts in the appropriate places using a dry-erase marker. Discuss the names and decide if any need correcting. If you wish to provide names of more body parts (e.g., eyebrow, eye ring, flank, see your bird field guide) add these to your list.

Ask:

- Which bird parts have the same name/location as human body parts?
- Which are unique to birds?

2. Explore silhouettes, and field marks to identify birds

Assign one field guide per 2–4 children. Write the following questions on the board for children to consider while they explore the guide.



Ask:

- How is the field guide organized? (Though the initial reaction might be to think of alphabetical order, most children will quickly recognize that most field guides place birds next to their closest relatives, so that similar-looking birds often appear on the same page; bird groups are together.)
- If you saw a bird you didn't recognize, how would you find it in the field guide? (Answers might include: flip through the book looking at pictures, or try to use the index.)

Have children spend about 5–10 minutes looking through the guides, thinking about these questions, and discussing their thoughts with other children at their table.

Show the silhouette poster. Assign each group one of the ten silhouette groups on which to focus (for example, one group looks at the shorebirds, another, the owls). Ask the children to research the following about their silhouette group:

- Where do you find your bird group in the field guide?
- About how many different species in this group can be found in our area? (Some field guides have range maps that make this data easy to visualize.)
- In what types of habitats are the species in this group found? (For example, some groups are found primarily on the coast or in wetlands, some in the forest, etc.)
- What are some of the key characteristics of the group? (For example: size or shape similarities, what they eat and beak shape, leg or wing similarities.)

Tell each group to work in pairs try to find two similar birds in their section (for example, find the two most similar shorebirds, hummingbirds or woodpeckers), and discuss how these similar species

are distinguishable, using bird body part names to describe the similarities and differences between the two species. For example, "this bird has a black nape, while this bird has a red nape, but both have a white breast." Have the children share the similarities and differences with the whole group.

Explain: "Noticing and describing field marks is an important part of beginning to learn bird identification. Field marks are characteristics you can see that make one bird species different from another bird species. For example, all of you have hair, but the length or color of your hair might be an important clue for helping to identify you. For a bird example: all birds have tails, but these tails look different depending on the species. For others, the beak is a critical field mark in order to distinguish the two species (one may have a thinner, narrower beak, while the other has a thicker, wider beak)."

3. Discuss dimorphism and plumage variation

Sexual dimorphism is the difference in appearance of a male and female bird of the same species. It can be a variation in size, color, body structure or any combination of these traits**.** In many bird species that are sexually dimorphic, typically males are more colorful or have more intricate plumage patterns.

There are other visible forms of variation; for example, some species change plumage patterns seasonally (they look different in the spring and summer (typically the breeding seasons) versus the fall and winter (typically non-breeding season, although some species in the tropics may breed at any time of year, depending on local conditions), and some based on age (e.g., immature or juvenile plumages that differ from adults, gulls who look different at age 1, 2, 3, and as adults). Depending on the bird identification resources you use, the concept of variation and dimorphism might not be included, making it a bit more difficult to identify a bird using the resource.

Ask:

- How do the field guides you are using handle dimorphism and variation in plumage? *Most guides will have multiple photos or illustrations, showing plumage differences in males and females and breeding and nonbreeding seasons.*
- If you are using a 1-page laminated guide like Bird Identification Cards, how does this "quick guide" handle variation? *Sometimes it just shows the male plumage or the breeding or non-breeding plumage.*
- Will the birds you see outside necessarily match the photo or drawing in the field guide exactly? *No, because the guides can't show all possible variations and birds can vary individually from drawings or photographs, especially if they are molting, i.e., growing a new set of feathers.*

You could recommend that if children have trouble finding a bird in their guide, they should consult several resources such as other field guides, books and/or online sources.

American Redstart pair

4. What's that bird I see?

Invite one child to the front of the room. Ask the rest of the children to notice and remember as much as they can about the child. After about 5 seconds of observation, remove the child from the room so she/he cannot be seen. Ask the children to describe the appearance of the child. For example: what was she wearing, did she have jewelry on, how tall she was, what kind of shoes she wore, how did her hair look? Invite the child back in and see what the group got right and missed or about what they were mistaken. Emphasize the importance of observation and remembering/noting details of appearance when you are looking at a new species and trying to determine its identity. Point out that the process we use to identify birds is the same process we use to identify our friends and family at a distance—we use size and shape, hair color, the way we move, etc.

Take children outside to find at least one bird. Invite them to sketch the bird and label several of its field marks in their Bird Journals.

Using field guides, try to identify any unknown birds. Ask:

- Is the bird you sketched a male or a female? Can you know for sure? How?
- What field marks helped you correctly identify your bird? Are you confident in your identification? If not, what would you need to look for next time?

5. Sketch and share a local bird

Using whatever resources are available (field guides, bird identification cards, books, online resources), ask each person to sketch a common local bird and label its distinguishing field marks. Tell children to use the entire page when drawing their bird so their drawings will be large enough to be seen from a distance. Encourage them to select a bird that is found in the area (perhaps their favorite local bird, or one they see often). Give children 10 - 15 minutes to sketch their bird and label at least 3–5 identifying field marks. Emphasize the importance of labeling field marks precisely so that others can use those field marks to identify their bird. A good example is "breast has rusty streaks."

Ask: Do the male and female of your sketched species look the same? If not, what are the differences? Encourage anyone who has selected a dimorphic species to sketch the other gender as well.

Have children present their sketches and field marks to the group, and as birds are presented encourage children to look for differences among the birds. Remind them that these differences—in color, shape, and size—can be used to tell birds apart. You might encourage all the children with the

same bird to present in front of the class at the same time. You may wish to compile the labeled sketches into a class bird guide.

6. Play Bird Detective Game

In an outdoor area, ideally one with trees and shrubs, place your laminated birds in branches or foliage (or on the ground), hanging the birds with string or securing with tape. Put a large number or letter next to each bird. Send the children out in groups of 2 or 3 to be bird detectives. Their task is to find each bird and identify it using field guides or bird identification cards. They should write the appropriate letter or number next to the bird's name on the sheet. If you have binoculars let the children use them to get a closer look at the birds. Call the children back after about 30 minutes and see how they have done. Ask them which species were most challenging to find and identify. Why?

Wrap-up and Reflection

Try to leave some time at the end of this lesson to encourage children to reflect on the things they learned about bird identification. Ask questions such as:

- Are there any species that you couldn't identify before, but now can?
- What are the challenges of identifying birds? How can we overcome these challenges?
- What questions do you have?

Playing Bird Detective game in Jamaica.

Extension

If possible, organize a birding field trip to a local park, wetland or protected area in order to give the students an opportunity to see a greater variety of birds and practice their bird identification skills. Mangrove wetlands are excellent places for birdwatching as waterbirds tend to be more out in the open and therefore easier to observe. Ask bird experts or ornithologists from local government agencies, NGOs or universities to assist with leading the field trip. Bring a spotting scope if available. A field experience in nature can have a huge impact on a child, sparking a life-long interest in birds, nature, and science.

BIRD DETECTIVE GAME

BIRD	LETTER
Western Spindalis	
Cuban Parrot (Bahamas race)	
American Redstart	
Tricolored Heron	
American Kestrel	
Bahama Woodstar	
Mangrove Cuckoo	
Northern Mockingbird	
Black-whiskered Vireo	
White-crowned Pigeon	

Lesson 9: Count Birds for Conservation!

Big Idea: The general public contributes to bird research and conservation by monitoring birds for the eBird citizen science project[3].

Location: Indoor and outdoor

Approximate Time: 1 hour and 30 minutes, plus additional bird count sessions if desired

Learning Objectives

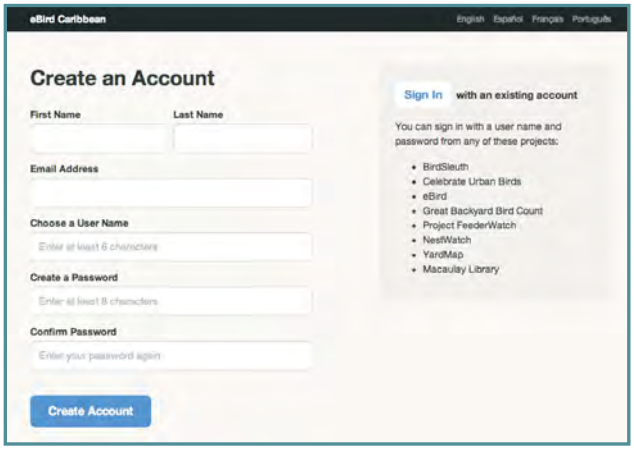
Children will be able to:

1. Describe the purpose of citizen science and the eBird database.
2. Explain two ways that scientists use data from citizen science counts.
3. Describe and implement a count protocol.
4. Enter data into the eBird Caribbean database.

What do I need?

- ❏ Bird Journals
- ❏ Clipboards or heavy cardboard
- ❏ Pencils
- ❏ Bird identification resources (field guide or bird ID cards, one per group or pair)
- ❏ Binoculars (recommended)
- ❏ Computer with Internet access, if possible, connected to a projector

Getting Ready...



- ❏ If possible, recruit extra helpers for the bird count.
- ❏ Visit the eBird Caribbean website and get registered (http://ebird.org/content/caribbean/). If you need to translate the page to Spanish or French, this option is available on the right-hand side of the screen. Select "Register as a New User" on the left-hand side of the screen. Create a class account by entering a username, password and your email address, following the easy directions. You may do this step in advance of the lesson because the username and password are created only once. Run through the entire data entry process on your own by observing a bird and entering it on the website as an "incidental observation."
- ❏ Make a plan for how you and your children will get the data entered (this largely depends on your access to computers with Internet).

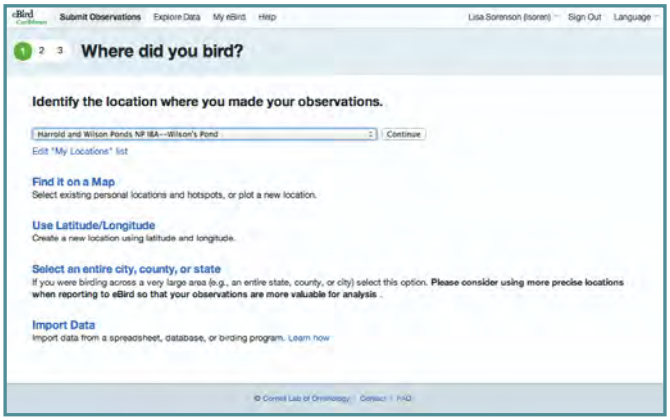
---

[3] *Note that eBird is available throughout the world. In addition to the core eBird site there are several regional portals, such as eBird Caribbean, which provide local information and birding expertise. We suggest that you use eBird Caribbean to enter your data because this portal has several special checklist options unique to the Caribbean, such as the Caribbean Waterbird Census (CWC) and Caribbean Martin survey. These applications are fully integrated so when you enter records into eBird Caribbean, they immediately show up in each portal (and vice versa).*

Background Information

Citizen science programs connect the general public with scientists to collect information and data useful in professional scientific work. One of the Cornell Lab of Ornithology's programs is called eBird; it is an easy-to-use online project that collects data from people about their local birds. The information is compiled and used by scientists who study bird populations and conservation. We will use the eBird Caribbean portal to enter our data.

Monitoring birds through citizen science provides important scientific knowledge about bird distribution, abundance, and population trends that scientists are otherwise unable to collect because of a lack of time and people in the field. It also provides insights into local areas that can contribute to understanding, conserving, and managing the earth's natural systems.



If you can't enter eBird Caribbean data at your site…

eBird data entry requires the use of a computer with an Internet connection. If you do not have that access and can't enter data into eBird at this time, we would still strongly encourage you to keep records of your bird observations and counts. The process of collecting and recording data is a valuable educational experience for children that will make them more aware of their environment. Later, you might also monitor birds in conjunction with the group's chosen conservation project, to help determine whether the project affected local bird populations.

Consider…

- Collaborating with a local center, such as a biological station or an environmental organization that might be willing to enter your group's data into eBird on the class' behalf or let you use their computers to enter data.
- Using Bird Journals to observe, count, and record birds every week. Regardless of whether or not data is submitted, the act of observing, recording, and keeping these bird records is important.
- Partnering with someone to whom you can mail the data for entry.

Activity

1. Introduce citizen science and do a skit

Have the children read the background information on citizen science (provided at the end of this chapter), or verbally explain it to them. To get the children thinking more deeply about the value of citizen science, divide them into 3 groups. Each group will act out a different scenario involving professional scientists and volunteer citizen scientists.

In the first scenario, the professional scientists have no volunteer citizen scientists to help them collect data, and this limits their work.

In the second scenario, the professional scientists have the help of one or two volunteer citizen scientists, and this benefits their work a little, but not a lot.

In the third scenario, thousands of volunteer citizen scientists submit their bird observations for the professional scientists to use.

Ask:

- How do you feel about becoming a citizen scientist?
- Why do you think it is important to correctly identify the birds we see?

Tell children that soon they will become citizen scientists. In this class, they will go outside to count birds and then submit their count data to the Cornell Lab of Ornithology's eBird project.

2. Count birds!

Tell everyone the information that they need to record in their Bird Journals while in the field (count, site name, date, start time, total bird watching time, number of people in the group, bird species, and number of individuals seen for each species). If possible, write this list on the board or on a poster for children to copy in their journals, since this information must be gathered each time children count birds.

Explain that each person should count all the birds that he/she sees and hears in the count area or along the count route. It is very important that birds are identified correctly and counted accurately. Brainstorm a plan to increase accuracy of identifying and counting during a class stationary or traveling count, asking:

> ***LEADER TIP:***
>
> Some educators express concern that their group's data are not good enough to be included in the eBird database. Bird watching skills are critical to entering accurate data, and the preceding lessons were designed to give children skills and practice in identifying birds. Let children know why their data are important and need to be reliable. Encourage your group to enter only data about which they are confident. You might wish to consider how you'll respond if children report seeing birds you know are unlikely. For example, one group leader explained, "I feel uneasy about submitting data that is inaccurate. I also don't want to tell children "No, you couldn't have seen that." We'd like to offer these possible responses if you are concerned about a child's identification of a species:
>
> What makes you think it was that species? Do the field marks match?
>
> Is that species found here at this time of year?
>
> Is that species found in this habitat?
>
> What other species could it have been?
>
> What makes you confidant that it was that species?
>
> Let's not enter that bird this time, since we aren't sure about it. But next time you see that kind of bird, point it out to the class so we can figure it out together!
>
> Note that improbable data might be "flagged," in which case eBird staff might contact you to ask if your report could be a mistake. We encourage you and your children to enter data! So relax, enjoy bird watching, and continue to be the eyes and ears of Lab scientists!

- Where will we count birds? Where will we stand? What path will we take?
- How do you think we'll have to behave to make sure we see as many birds as possible? (Quiet, still, and carefully watching)
- How can we be sure we don't misidentify a bird?
- How can we avoid counting the same bird more than once? (For example, for early counts, you might suggest that for a bird to be officially counted, at least two people have to see the bird and agree on its identification. We will work closely together in the field so that if a bird is spotted, we are all alerted and in most cases a number of us will have seen the bird.)

Take children outside to count birds for at least 15–20 minutes for the count.

FIELD RECORD OF BIRDS

Date: _____ **Start time:** _____

Location: _____ **End time:** _____

	Common name	Notes on habitat & behaviour	# seen
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			

LEADER TIP:

Even if the children are using different kinds of guides, you'll notice that most guides arrange the species in the same general order. For example, the various swimming birds (ducks, geese) are nearly always first, followed by the soaring birds of prey (hawks), with the owls and woodpeckers near the middle of the book. Some books color-code or otherwise mark the pages for each bird group. If your field guides aren't marked, you can create tabs for the groups on sticky notes. Attach them to the appropriate page in the guide so they stick out of the book and help you easily locate the name of the bird group for which you are looking.

3. Summarize the count and enter data

After children complete a count, list on paper or on the board the names of birds and the number of each species the children observed (see "It Happened in Class" box). Transfer this list into the teacher's Bird Journal. This will serve as the official tally for the class, and is the data you will submit to the eBird Caribbean database. Enter and submit bird count data. If possible, project the data entry process onto a screen in front of the group.

It happened in class…

This conversation was overheard when a class summarized their bird data for the first time:

Teacher: What birds did you see when we were outside?

Jaime: I saw three Gray Kingbirds.

Teacher: Yes, I actually counted two Gray Kingbirds. Are you sure you saw three different birds?

Jaime: Yes. Two were flying together and later I saw another one perched in a tree in another area. I don't think they were the same birds.

Teacher: Did anyone see more than three?

Laura: Alejandro and I wrote down five on our list. I think we saw the two flying ones that Jaime saw, and we saw three that were perched in trees. I think they were all different birds too.

Teacher: We'll write down five then. What other birds did you see?

Alejandro: We also saw two doves.

Teacher: What kind of doves? Aren't there several species of doves around here?

Alejandro: I don't know what kind they were, I just wrote down "dove"

Teacher: Did anyone who saw the doves look them up in a field guide or sketch them?

Students: No.

Teacher: Well, we can't count those doves since we need to know what species they are. Let's look in our field guides. Next time we see doves, what should we look for?

Students: The size… the markings on its head… the color of its wings.

Teacher: In this area, what are the common doves we might see?

Stephen: The Common Ground Dove and the Mourning Dove. It says both are common. But the Common Ground Dove has a pinkish red bill with a dark tip while the Mourning Dove has white tail feather tips with black borders.

Teacher: Next time we see doves, we should look for those field marks. Maybe we can figure it out during another count!

Ricardo: Could we write down "dove" in the notes section, to remind us that we saw them?

Teacher: That's a great idea! I'll add "two unknown doves" to the notes section.

4. Make a plan to continue citizen science

Tell the children that they will continue to regularly observe and count birds, and then enter their data into eBird. Create a class plan for data collection with your children, deciding:

- What kind of count to do (i.e., stationary – this is staying at a fixed location while counting, also called a point count; traveling – moving a specific distance while counting, for example walking a trail, driving a route)

- Where counts will take place
- How long each count will last (recommended duration for stationary counts: 5-15 minutes)
- How often to conduct counts (i.e., twice a week, weekly, every other week, monthly)
- Who will enter data (you may want to develop a class schedule, with pairs or triads entering data)

Keep the completed master lists in one place so that children can see the accumulation of data. (If the data are entered online, they will also be available through the eBird Caribbean web site.) Periodically assign questions that encourage children to review the data. For example, you might ask:

- What is the most commonly seen species in our count area(s)?
- What is the least common?
- Which species do we see in the largest groups?
- Have there been any changes in the types or numbers of birds we've seen over the past two months?

Children birding in Antigua

Optionally, you can ask children to visit eBird Caribbean and ask/answer their own questions about birds using the "View and Explore" tab. eBird allows anyone to view the data that has been submitted by eBirders all over the world. There are maps, line graphs, and charts that can easily be created.

Wrap-up and Reflection

Try to leave some time at the end of this lesson to encourage children to reflect on the things they learned. Ask children to answer the following question in their Bird Journals: "How do you feel about becoming a citizen scientist?" Encourage them to ask any questions they might have.

Lesson 10: Bird Conservation Projects

Big Idea: Through bird conservation projects and your daily actions, you can have a positive influence on birds.

Location: Indoor and outdoor

Approximate Time: 90 minutes

Learning Objectives

Children will be able to:

1. Name three conservation challenges that birds face.
2. Name three actions they could complete to help reduce negative human impacts on birds.

What do I need?

- ❏ Pencils
- ❏ Bird Journals
- ❏ Project materials needed for the conservation project your group chooses

Getting Ready…

- ❏ After your group brainstorms its conservation action plan, gather any supplies needed for the project.

Background Information

Humans can have large positive and negative effects on the habitats and resources birds need to survive. The biggest threats to birds globally are habitat loss and degradation due to human actions (cutting down trees and filling in wetlands for development; contaminating the environment through oil spills, water pollution, and littering; climate change; introduction of non-native species, also called "invasive" species). Without enough quality habitat, a bird species cannot survive in an area. In this lesson, we emphasize some of the actions that people can take in response to these issues.

Activity

1. Brainstorm a list of local bird conservation issues and actions

Ask: What do you think makes it hard for birds to survive here?

Brainstorm a list of problems on the board, then indicate which problems are caused or made worse by humans.

In groups of 3-4 children, brainstorm a list of ways people can help solve each of these problems—when brainstorming, large, costly, or far-fetched ideas are acceptable. Then, as a large group, share the lists. Be respectful of all ideas, and write them on the board. If there aren't any realistic actions listed yet, brainstorm more ideas as a group. Circle any actions that your group could take.

Possible ideas[4]:

- Clean up beaches and wetlands to help protect shorebirds and seabirds from eating garbage or choking on plastic

[4] More ideas are available at www.BirdsCaribbean.org/GetInvolved

- Clean up land habitat and plant trees to create bird habitat
- Build bird boxes or put up bird feeders or provide a source of water for birds
- Continue citizen science counts
- Educate family and friends about ways they can help such as not killing or injuring birds with slingshots, not buying birds as pets, and not removing baby birds from their nests
- Create educational murals or posters for your school and community
- Hold a 'Birding Expo" event at the end of your school year for your school to display and share the work you have been doing with birds, with prizes for the best display.
- Create a campaign to encourage people to "reduce, reuse, and recycle" in your community

2. Choose a project and create a plan

Decide one project that your class would like to undertake. Research your issue and decide on an action to address it. Create an action plan using the following questions as a guide:

- What is our goal?
- How will we achieve it?
- What might be some of the obstacles to achieving our goal, and how can we address them?
- Who are the people involved? What are their roles?
- What materials do we need?
- What will the project cost?
- Where and when will the project take place?
- How will we know if we have met our goal?

3. Evaluate your actions

At the conclusion of the project, think about your actions by asking the following questions:

- Did we accomplish what we hoped to?
- What lessons did we learn?
- What additional ideas do we have to go further with our project?
- What might be the long-term impacts of the project?

Be sure to share your actions with others!

Important note: Whatever project you choose, we encourage you to monitor your local birds before, during, and after, either through citizen science projects such as eBird, or by recording data in your Bird Journals. This will help you evaluate whether your actions had an impact on local bird populations.

Sample Project: Educational Mural

Issue: Many birds are harmed when people use slingshots to hit them or their nests.

Youth working on a bird mural in Puerto Rico.

What is our goal?

Our goal is educate our community—specifically family and friends—about the importance of not harming birds with slingshots.

How will we achieve it?

On an empty wall at our school, we want to design and paint a mural containing messages that will convey the importance of birds and why we should not harm them with slingshots.

What might be some of the obstacles to achieving our goal, and how can we address them?

We might not have enough funds to cover the costs of the project. To address this obstacle, we could organize a fundraiser as a group.

Who are the people involved? What are their roles?

Our whole class, including our educator, will be involved. We will each propose an idea for the mural, and as a class, vote on our favorite one. Everyone will be involved in painting the mural.

What materials do we need?

- Paper and coloring pencils or crayons to design the mural
- Non-toxic paint and paintbrushes to paint the mural

Note: Use this list to help answer the question **"what will the project cost?"**

Where and when will the project take place?

We will spend two class sessions researching and designing murals individually, before voting on our favorite design. Then we will spend two weeks painting the mural as a group at the school.

How will we know if we have met our goal?

We will have painted a beautiful mural that conveys the importance of birds and why we should not harm them with slingshots.

Did we accomplish what we hoped to?

Yes, we completed a mural that the community appreciates. We have talked to many members of the community about the purpose of the mural, to emphasize the messages of bird conservation. We also shared our project in the local newspaper (and/or radio/ television).

What lessons did we learn?

We can encourage some people to change their behaviors, but others might be more difficult to convince.

What additional ideas do we have to go further with our project?

We'd like to design another mural for another site in our community. We'd also like to host an open house at our school to showcase the mural and share what we know about birds.

What might be the long-term impacts of the project?

We hope that over time fewer people will harm and kill birds with slingshots.

Sample Project: Beach Clean Up

Issue: Litter is collecting on our beaches. This is important habitat for many birds, and we worry that the litter is harmful to the birds that live there.

What is our goal?

Our goal is to clean up the beach to help protect shorebirds and seabirds from eating garbage or choking on plastic.

How will we achieve it?

We will hold a beach clean-up day for members of our group and their families.

What might be some of the obstacles to achieving our goal, and how can we address them?

We might not be able to designate a day that is convenient for everyone involved. To address this obstacle, we could conduct the beach clean-up on two different days.

Who are the people involved? What are their roles?

Children from the school and their families will clean up an assigned section of beach.

What materials do we need?

- A map of the beach
- Trash bags
- Gloves
- A vehicle to take away trash bags

Where and when will the project take place?

The project will take place on the beach chosen by the group, at a time that is convenient for the people involved.

How will we know if we have met our goal?

We will have a clean beach that is free of plastics and other garbage.

Youth clean up the Ashton Lagoon wetland in Union Island, St. Vincent and the Grenadines..

Did we accomplish what we hoped to?

Yes, we had people slowly walk the entire beach and pick up all the trash they saw.

What lessons did we learn?

Garbage that isn't put in trashcans or is pitched out at sea ends up in large quantities on the beach. Besides looking bad, it has a negative impact on birds and other species.

What additional ideas do we have to go further with our project?

We hope to maintain this beach and organize other cleanups in the future. By making our cleanup publicly known, we hope our actions will encourage the community to be more aware of its impact on the environment. We are now working with the town to provide more garbage cans.

What might be the long-term impacts of the project?

The beach will continue to be clean of trash and safer for birds and other animals.

Sample Action Plan: Doing Citizen Science

What is our goal?

To contribute to a citizen science project called eBird that is run by the Cornell Lab of Ornithology. We will do so by monitoring our class feeder or going on a bird walk for half an hour twice a week and recording our sightings.

Who are the people involved? What are their roles?

We found a local bird watching group that is willing to enter our observations for us at least every other week. Our whole class will be involved in the counts. Everyone has the job of quietly observing and coming to an agreement as to the identification and number of each bird species observed. Additionally, we will all use our Bird Journals to make notes of interesting behavior we observe.

What materials do we need?

Bird Journals, pens or pencils, and a place to observe birds. Field guides and binoculars would also be useful to have, but they could make the project more costly if they need to be purchased.

Where and when will the project take place?

We will make 15-minute observations at school after lunch on Mondays and Fridays for the next month, and hopefully longer.

Share Your Actions!

The Cornell Lab of Ornithology will share success stories about projects children have undertaken to help birds. Please document your actions through photos and journals! We'd like children from across the globe to be able to communicate with each other about the birds that they see and the bird conservation efforts in which they are involved. We encourage you to share your ideas with us.

Visit www.birdsleuth.org/action-map/ to learn how you can share your actions! For more resources and links, please visit www.birdsleuth.org/birdsleuth-international-resources.

Glossary

adaptation—a characteristic that improves an organism's ability to survive and reproduce particular habitat. For example, ducks have webbed feet that help them to swim and feed in water.

altricial—a baby bird that is helpless, naked, and blind when it hatches

arthropods—invertebrate animals, such as insects and spiders, with segmented bodies and external skeletons.

bird—a vertebrate that has wings, feathers, and a beak. They lay eggs and can usually fly.

breeding—mating and producing offspring.

breeding range—the geographic area where a bird species breeds and raises young. This is sometimes called the bird's "summer range." Birds that do not migrate have the same range year round.

carnivore—an animal that primarily eats meat.

Caribbean Waterbird Census (CWC)—a region-wide citizen science project to learn more about the numbers and habitats used by resident and migratory waterbirds in the Caribbean through counts at wetlands. There is one region-wide CWC count in January, but everyone is encouraged to count waterbirds at their local wetlands as often as possible, especially during migration periods. www.BirdsCaribbean.org

Celebrate Urban Birds—a citizen-science project that connects people to nature through science and the arts, and raises awareness of city birds and urban greening. www.birds.cornell.edu/celebration

citizen scientist—a person who collects data for use in scientific studies.

classification—how animals are grouped together according to their shared characteristics and evolutionary relationships.

climate change—a change in the Earth's climate caused by increasing concentrations of greenhouse gases in the atmosphere from human activities (burning of fossil fuels and deforestation. The effects of climate change include warming temperatures, altered weather patterns (e.g., changes in the frequency and intensity of precipitation events and droughts) and rising sea levels.

common name—a bird's non-scientific name. For example, *Ceryle alcyon* is also known by its common name, Belted Kingfisher.

consumer—an organism that cannot produce its own food and therefore gets its energy by eating other organisms. Animals are consumers.

cover—shelter and protection from the elements and predators.

decomposer—living creatures, such as bacteria and fungi, that break down dead plant or animal matter to obtain energy.

desert—an especially dry habitat with very little rainfall and relatively few plants and animals.

distribution—the geographic locations where a species is found. Distributions are shown on maps as shaded areas.

eBird—an online citizen-science project that collects bird observations. The information is shared among scientists, educators, students, and bird watchers who want to know more about the distribution and movement of birds around the world. www.ebird.org

eBird Caribbean – one of eBird's regional portals. The systems if full integrated so that all data entered into eBird Caribbean are included in core eBird and other regional portals. (http://ebird.org/content/caribbean/)

ecosystem—an area in which animals, plants, and other living things interact with each other and the non-living things around them. An ecosystem can contain many habitats.

egg—a round or oval cell laid by an animal, in which the embryo develops until it is mature enough to hatch. Bird eggs have hard shells and a large yolk that nourishes the developing embryo inside.

endemic—a species found only in a particular country or region

endotherm—an animal that creates its own body heat ("warm-blooded").

evolution—an ongoing process in which species change over time. The diversity of life we see today is the result of the evolutionary process.

feeder—an outdoor container for food that is used to attract wild birds.

feather—light, flat growths on birds. Feathers are used for flight, insulation, and waterproofing and make up the bird's plumage.

field guide—a book with illustrations and descriptions of various bird species. Most field guides group birds according to their taxonomic order, instead of alphabetically.

field marks—distinctive colors and patterns used to identify birds. Breast spots, wing bars (thin lines across the wings), and eye rings (circles around the eyes) are common field marks.

fledge—to leave the nest.

fledgling—a young bird that has left the nest or is capable of flight.

food chain—the sequential flow of energy through species.

food web—all of the food-chain interactions in an ecosystem.

fungus—an organism that feeds on and decomposes organic material. Fungi include molds, mushrooms, and yeasts.

genus—a category of animals or plants. Members of a genus have a common origin and often share similar physical characteristics and/or behaviors. Western Bluebird *(Sialia mexicana)* and Eastern Bluebird *(Sialia sialis)* are in the genus *Sialia*. Both have deep blue plumage with red breast feathers, similar bills, and musical calls in flight.

grassland—a large open area covered primarily by grass, with only a few trees or bushes.

habitat—the place where a bird (or other organism) lives. It provides the food, water, cover, and space that the animal needs to survive. Examples include wetlands, beaches, rainforests, pine forests, grassland, and scrub.

herbivore—an animal that primarily eats plants.

incubation—keeping eggs warm while an embryo develops inside.

introduced species—a species that was not originally part of an ecosystem. Species can be "introduced" to an ecosystem deliberately or by accident.

interdependence—a relationship in which two species must coexist in order to survive.

Invasive species—those plants, animals and microbes not native to a region which, when introduced either accidentally or intentionally, out-compete native species for available resources, reproduce prolifically, and dominate regions and ecosystems. Invasive species cause enormous ecological and economic damage around the world and are the second leading cause of species endangerment (habitat destruction is first).

invertebrates—animals without backbones, such as spiders, insects, snails, and worms.

mammal—a vertebrate that has hair or fur, gives birth to live young, and feeds them milk. Mammals include humans, cows, squirrels, and raccoons.

Mangrove—extraordinary trees or shrubs that are adapted to grow in coastal and wetland habitats throughout the Caribbean. They have special adaptations that allow them to live in salty, wet and muddy places such as a spreading root system and the ability to excrete salt through their leaves. The four species of mangroves in the Caribbean include Red Mangrove (*Rhizophora mangle*), White Mangrove (*Laguncularia racemosa*), Black Mangrove (*Avicennia germinans*) and Buttonwood (*Conocarpus erectus*).

mate—(noun) a breeding partner of the opposite gender. Together, two mates produce offspring; (verb) to breed and produce offspring.

migrant—a bird or other animal that makes seasonal journeys. Most migrants move to their breeding grounds each spring, then back to their non-breeding grounds in the fall.

migration—the seasonal journey that some species of birds and animals make each year, traveling between their breeding and non-breeding grounds.

molt—the replacement of feathers. Birds molt some or all of their feathers every year. New feathers replace the feathers that are shed.

native—original to a particular location. A species that arose in its current location, rather than arriving later.

nature journal—a notebook to make sketches and record observations (like the date of your observations, the sort of weather that day, the types and numbers of birds you saw, and what they are doing) while outdoors.

nest—a place for an animal to lay eggs, and raise offspring. Animals that build nests include birds, mammals, snakes, fish, and insects. Birds often build nests out of twigs, grass, and leaves.

nest box—a manmade box that provides a place for an animal to build a nest. Nest boxes for birds are often called "bird houses," but mammals may use the nest boxes, too. Only birds that nest in cavities use nest boxes.

nestling—a young bird that has not yet left the nest.

NestWatch—a nest-monitoring project in which citizen scientists share their nest observations through an online database to help scientists better understand the effects of environmental change on breeding birds. http://nestwatch.org

nonbreeding range—the geographic area where a bird can be found during the winter months (also called the "wintering range"). Birds that do not migrate have the same range year round.

non-native—the opposite of native. A species that is not original to its location because it was introduced or spread into an area later.

omnivore—an animal that eats both plants and animals.

plumage—a bird's feather colors and patterns.

polar area—the area of ice-covered ocean and land at either the North or South Pole, with frigid temperatures and minimal vegetation.

precocial—a baby bird that is covered in down and can move around and feed itself immediately after hatching.

Project FeederWatch—a citizen-science project in which participants survey birds that visit their feeders during the winter months. The data they collect helps scientists track bird movements, distribution, and abundance. www.birds.cornell.edu/pfw

predator—an animal that hunts and kills other animals for food.

producer—an organism that makes its own food through photosynthesis. Plants and algae are producers.

range map—a map showing the geographic area where a species is found.

scavenger—an animal that either eats dead animals or searches through garbage for food.

scientific name—a bird's internationally standardized name, which has two parts—genus and species. It is written in Latin. The Belted Kingfisher's scientific name is *Ceryle alcyon*.

seed—an undeveloped plant with food stored inside a protective covering. Seeds come from flowering plants. Examples include corn kernels, beans, and sunflower seeds.

sexual dimorphism—the difference in appearance of a male and female bird of the same species.

species—in taxonomy, this category is the most specific classification. Birds grouped in the same species can breed with each other and generally share common habitats, appearance, and behavior.

species account—the information about each bird that is provided in a field guide. Most species accounts include the common name, scientific name, size, visual description, distribution map, habitats, sound description, and a picture.

taxonomic order—the scientific hierarchy used to group living organisms: kingdom, phylum, class, order, family, genus, and species. "Kingdom" is the most general and "species" the most specific.

taxonomy—the system of assigning names and categories to living organisms based on their evolutionary relationships. "Order," "family," and "genus" are examples of taxonomic categories.

temperate forest—the common forest habitat found in parts of North America, Asia, and Europe. Mild in temperature and rainfall, these forests have tall trees, such as oaks, hickories, and maples with wide leaves that are shed in winter. Temperate forests are less diverse than tropical rainforests.

territory—an area that an animal or group defends from other animals of the same species.

tropical rainforest—an especially diverse habitat found near the Earth's equator. Tropical rainforests have high rainfall and warm temperatures throughout the year. They are wet, overgrown with plants, and have a great variety of animals, including birds.

vertebrate—an animal with a backbone, such as humans, lions, lizards, birds, and fish.

wetland—any place that is regularly flooded with fresh, brackish or salty water. There are many types of wetlands in the Caribbean including salt ponds, salinas, tidal creeks, mangroves, mud flats or tidal flats, swamps (usually with trees) and marshes (grassy-looking). Visit www.ramsar.org and www.BirdsCaribbean.org/OurWork/WIWD-and-Wetlands-Conservation for more information on wetlands.

year-round range—the geographic area where a bird can be found year round. This is the total range for a non-migratory bird, or the overlap.