TheCornellLab
K-12 Education

eBird ESSENTIALS for Educators

INTRODUCTION

Citizen-science projects like eBird can help make concrete connections between classroom learning and life skills, preparing your students with the tools they need to thrive in the world. Being an eBird citizen scientist involves bird identification and confident data entry. This guide gives educator-tested tips, tools, and activities for scaffolding students in identifying birds and submitting data as a class. One of the keys to enjoying bird identification and citizen science with your class is to embrace the unknown. Don't worry if you don't have all the answers. Learning with your students provides a great opportunity to model and encourage a curious mindset.

WHY CITIZEN SCIENCE?

Kids and adults all over the world are following basic scientific protocols and submitting their observations to databases that scientists use to answer real-world questions. From stars to flowers, and bugs to birds, citizen science is people-powered science that helps us connect to and understand our world.

Through these diverse projects, students become scientists—making careful observations, following protocols, and collecting data, while supporting researchers across the world. You'll find participating in real science is deeply engaging and exciting for your students. In addition, amid growing concern about the health of children and their access to nature, citizen science gets children outside, learning to appreciate their local environment.

Finally, citizen science helps educators seamlessly meet the Next Generation Science Standards' (NGSS) goal of having students experience the science process first hand. Both NGSS and citizen science encourage the development of science literacy through discovery, exploration, and real-world connections. To learn more about how citizen science meets NGSS performance standards, visit the resource website for this guide (birds.cornell.edu/k12/ebird-essential-resources).

WHAT IS EBIRD?

eBird

eBird is the world's largest biodiversity-related citizen-science project, with more than 100 million bird sightings contributed each year by eBirders around the world. The Cornell Lab of Ornithology manages eBird in collaboration with partner organizations, regional experts, and users. eBird harnesses the power of bird watchers all over the world to document where birds are and when they are using different habitats. With eBird's simple online tools and easy-to-use app, educators and students can become part of a larger community of people helping scientists and birds.

Before using eBird with your students, we highly recommend that educators take the free *eBird Essentials* online course which provides an overview of how and why eBird works. After taking this course, you'll understand what data eBird collects, and how that information is used to help conserve birds. This guide will assume that you have taken the course and understand how to enter data into the eBird database through the website or app.

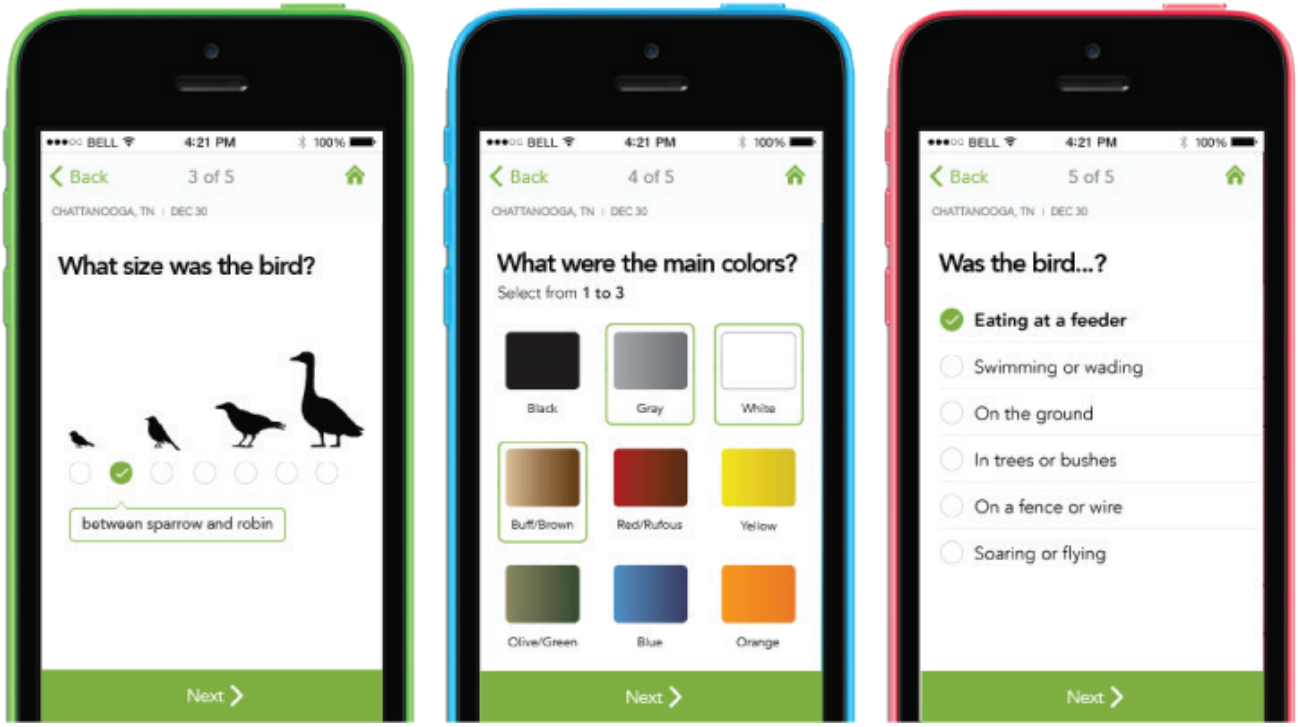
If you haven't already done so, take *eBird Essentials* at academy.allaboutbirds.org/courses/ebird-essentials.

MERLIN AND BIRD IDENTIFICATION

Merlin®

To participate in eBird you and your students need to be able to identify birds. This can seem like a challenge when you first pick up a field guide and realize just how many birds are out there. But don't worry, today's tools can make bird ID fun, easy, and intuitive for educators and students. The Merlin Bird ID app is a free app for iOS and Android that helps you narrow down a mystery bird to a few local possibilities. Merlin asks five simple questions: the date and location, the bird's size and color, and what the bird was doing. Based on your answers, the app provides a short list of possible birds. Even the most novice birders will be successful from the start!

If you don't have access to the Merlin app, there are other ways to identify birds, such as field guides, that will be covered later in the guide.



If you have access to smartphones or tablets, download the Merlin app and have it available for students to use. Practice going through the five identification questions in the classroom before heading outside. You can do this by showing them still images or videos of bird. Be sure to show the range maps and sounds available in the details section for each bird.

***TEACHER TIP:** Taking Kids Outside*

One of the benefits of participating in eBird and citizen science is the opportunity to engage students in outdoor learning. If you are new to taking students outside, it can be helpful to start with short, 10 minute, outdoor walks during which students practice good bird-watching behavior. Before taking students outside, ask them "How can we see more birds?" Create a list on the board and highlight behaviors you want students to practice such as, being quiet, being observant, looking all around, staying together. Encourage students to practice those skills when outside collecting data.

Break students into sub groups: a bird spotter with binoculars if available, a data recorder with paper checklist or eBird mobile, and a bird ID expert with a field guide or Merlin. This will allow students to practice their skills and have a job to focus on. For more detailed tips on taking students outside, visit the resource website at birds.cornell.edu/k12/ebird-essential-resources.

Using eBird with Students

GETTING STARTED

Create a Group Account

You'll want to create an eBird group account for your class to submit and archive all sightings. Please note, eBird does not allow users under 13 years old to create personal accounts, so we strongly recommend that educators use group accounts. These group accounts should have an email address and password that you feel comfortable sharing with students. When creating your account, be sure to follow the instructions in this eBird blog: support.ebird.org/en/support/solutions/articles/48001059718-ebird-policies-for-special-birding-circumstances#anchorGroupAccounts.

IN THE CLASSROOM: CREATING A GROUP ACCOUNT

Ms. Smith uses the Cornell Lab website to take courses and uses eBird to log her own bird sightings. Because the Lab has a single sign in for all of its websites, she wants to create a new account for her class to keep their data separate. To do this, she creates a new email, SmithClassData@emailservice.com and uses a password that she can share with students. This way her students can log into the account and share in the data-submitting responsibilities. Ms. Smith regularly monitors the SmithClassData email account so she can check for emails from eBird reviewers. She uses these interactions with expert birders to discuss her class's sightings, help her students grow as birders, and encourage them to submit the best and most accurate data to eBird.

INTRODUCE CITIZEN SCIENCE AND EBIRD

Explain to students that the data they collect are important to scientists. In order to provide complete and correct data, students need to accurately identify and count birds. The data they collect will be used by professional scientists who need precise and accurate information in order to understand bird abundance and distribution. One seventh grader put it best when she said, "Scientists can't be everywhere, so students from all over can record data and send it in."

Review the *eBird Essentials* online course Lesson 1, Topic 2 to discover five real-life examples of how eBird data help inform conservation decisions.

PRACTICE BIRD ID BASICS

Know the Keys to Bird ID

Teach your students the basics of bird identification, both in the classroom and in the field. When you first spot a bird, it can be tempting to go right to your field guide or app to try to identify it, but by doing this we often miss key information that can help with identification. Instead, encourage your students to spend time observing a bird and looking for the four keys to identification: size and shape, color pattern, behavior, and habitat.

Size and shape: It's tempting to start with color, but bird ID experts begin by observing the general size and shape of a bird. This helps put the bird into the right group or family of birds. This may sound hard to do, but you already know more than you think. Was the bird you saw a duck? A songbird? Compare your mystery bird to the birds you know. Is it smaller than a goose? Larger than a crow? Pay particular attention to the length of the tail and the length and shape of the beak.

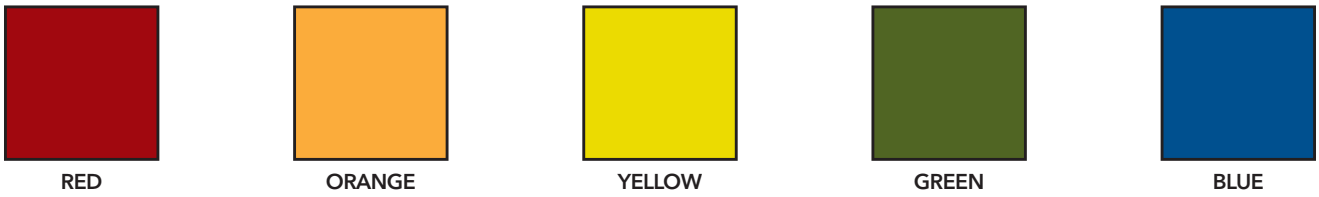
Putting birds into groups based on shape is easier than you think. Project or print the the seven bird silhouettes (page 16) which show representative birds from these familiar bird groups: 1. woodpecker 2. owl 3. hawk 4. duck 5. goose 6. gull 7. sparrow. Share that these silhouettes are not to scale, and ask: Can you identify any of these birds? Students will probably be unable to 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 "goose," but not know whether it is a Canada Goose or Snow Goose; they may recognize the songbird but not know if it is a warbler, sparrow, or finch; they may not know whether the "bird of prey" is a hawk or a vulture.

Color Pattern: Pay attention to the overall color pattern by taking a color inventory of the bird. What color is on the head? Body? Tail? Where is there spotting or streaking? Look for those patterns and features that really stand out. Among birds that are similarly colored, the color patterns on the head and wings are often important for identification.

Behavior: How a bird acts can be a great clue for identification. Being a careful observer of bird behavior can help you take your bird identification to the next level. How is the bird sitting, eating, or flying? For example, when looking at the bird's posture, note if the bird is upright or horizontal. These traits can help you decide between similar species. Another behavior to look for is repeated movements, like a bird bobbing its head or tail.

Habitat: Birds have evolved to survive in their specific habitats, so much of their appearance and behavior reflects where they live. Habitat can be broken down into several types for the purpose of bird identification: forested habitats, water habitats, scrub/shrub habitats, and open habitats, such as grasslands and fields. When you're observing a bird, see how it interacts with its habitat and use those clues to help you arrive at an identification. Habitat is also a great way to confirm an ID. If you've made it through the first three identification keys and think you know your bird, ask yourself, what are the chances that this bird is in this habitat at this time of year? If the habitat makes sense, you can be pretty sure you've gotten your ID right.

The *Inside Birding* video series covers these identification keys in-depth. We recommend that educators watch them all and show at least the size and shape video to their students. You can access the videos from this guide's resource website. Paying attention to these clues will also help you use the Merlin Bird ID app.



Have the Right Tools

Merlin Bird ID app: If you have access to smartphones and tablets, we highly recommend this app. Find a bird that the whole class can observe, whether outside, through a classroom window, or an image or video clip online. Then practice using the Merlin Bird ID app. Tip: If you don't see your bird right away, try adjusting the size on Merlin's bird scale. Size can be difficult to judge from a distance and is often the factor that prevents Merlin from finding your bird. You may want to share the Merlin video from the *eBird Essentials* online course in Lesson 1, Topic 3.

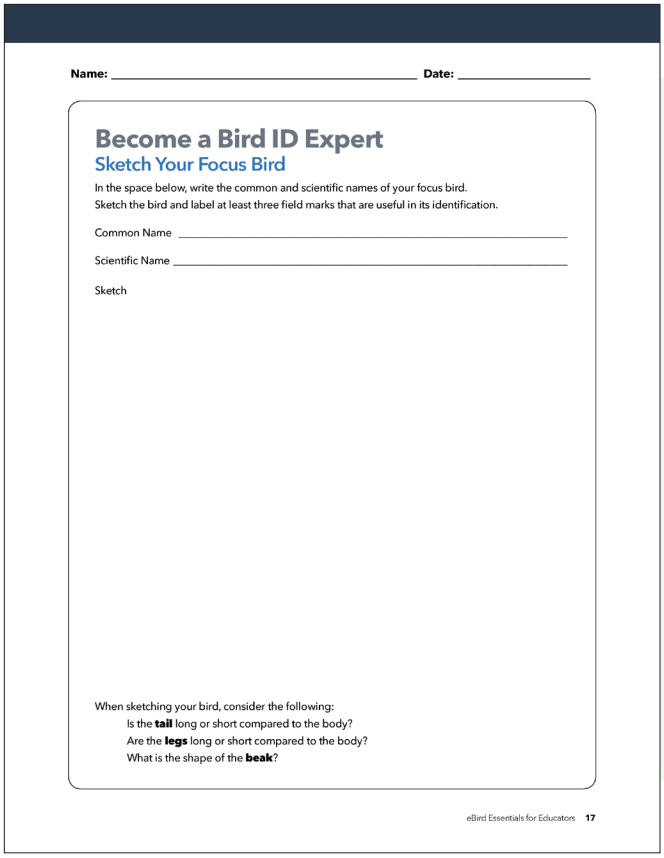
Field Guides: Field guides are a classic birder's tool. These book guides have species drawings or photos, short descriptions, and range maps. They can cover specific regions or an entire country. They can be big and intimidating to use, but if you keep in mind the four keys to bird ID, you'll be surprised at how quickly you can identify birds.

All About Birds: All About Birds (allaboutbirds.org) is an online field guide that has a wealth of life history information and fun facts. You can look at multiple photos and videos of a bird, compare similar species, and listen to songs and calls. This is a great resource for students researching their local birds.

Get to Know Your Local Birds

Once you know basic bird ID skills and have the right tools, the best way to start identifying birds is to understand what birds are around you. You can figure out your most common local birds using one of two methods.

1. Use the eBird website to find your county's most recent bird sightings. Review how in Lesson 2, Topic 2 of the *eBird Essentials* online course for detailed instructions.
2. Press Explore Birds on Merlin's home screen. Use the top filter bar to filter by likely birds on this date. This will show you the birds you have the best chance to see in your area at this specific time of year. Planning ahead? You can change the date under the "likely birds" filter to the time when you'll be doing your unit and get a list customized for that time of year.



Name: _____ Date: _____

Become a Bird ID Expert

Sketch Your Focus Bird

In the space below, write the common and scientific names of your focus bird.
Sketch the bird and label at least three field marks that are useful in its identification.

Common Name _____

Scientific Name _____

Sketch

When sketching your bird, consider the following:
- Is the **tail** long or short compared to the body?
- Are the **legs** long or short compared to the body?
- What is the shape of the **beak**?

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Assign each student a focus bird from the list of common birds you've developed using Merlin or eBird. Their challenge is to become an ID expert on this one species. Give each student a copy of the bird sketch sheet (page 17). Give students 10 to 15 minutes to sketch their focus bird and label and describe its specific field marks. Field marks are important clues that help us identify birds. For example, a student might highlight the red wing patches of a Red-winged Blackbird. You may wish to choose your own focus bird to demonstrate sketching and labelling field marks.

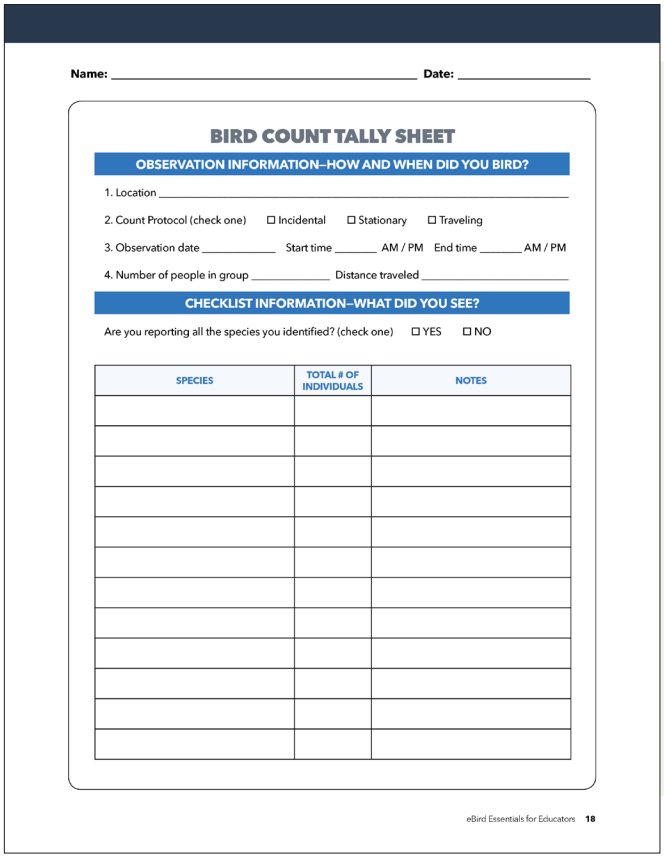
Have students share their sketches and field marks with other students at their table and encourage them to look for differences among the birds. Remind them that these differences in color, shape, and size can be used to tell birds apart. Consider choosing one or a few of the focus birds to be "birds of the day/week" for the students to learn. Visit this guide's website for more resources on teaching bird ID.

Encourage older students to use Merlin and All About Birds to learn more about their bird and add some life history facts to their sketch. Challenge them to use the Explore Data tab on the eBird website to find a nearby location where their bird has been reported in the last 30 days.

Birding really is a skill that gets better with practice. Take a practice walk! Assign students to groups, allow them to use the Merlin app, and practice counting birds. You can give this walk a specific focus, such as how many of our focus birds can we find, but the main idea is to give students the experience of a bird walk before collecting data. You may wish to do several practice counts before collecting data.

COLLECT EBIRD DATA

Begin collecting eBird data when you feel confident in your students' ability to accurately identify and count birds. Remind them why their data are important and need to be reliable, encouraging students to record only data about which they are confident. You may want to create your own guidelines, such as, "at least two students must see and identify a bird in order to count it."



Name: _____ Date: _____

BIRD COUNT TALLY SHEET

OBSERVATION INFORMATION–HOW AND WHEN DID YOU BIRD?

1. Location _____

2. Count Protocol (check one) ☐ Incidental ☐ Stationary ☐ Traveling

3. Observation date _____ Start time _____ AM / PM End time _____ AM / PM

4. Number of people in group _____ Distance traveled _____

CHECKLIST INFORMATION–WHAT DID YOU SEE?

Are you reporting all the species you identified? (check one) ☐ YES ☐ NO

SPECIES	TOTAL # OF INDIVIDUALS	NOTES

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You can collect data on paper sheets, or using the eBird app if your classroom has access to smartphones or tablets. You can use the *Bird Count Tally Sheet* (page 18) to collect data or have students collect data in a bird journal or notebook. You can then enter the data as a class through the eBird website.

Note: If using the eBird app to collect data, only submit one complete checklist for your class or group. This may mean that you only want to have one active list and have students rotate through checklist-keeping responsibilities.

Decide the best method for your students to use to collect data, whether through the app or on data sheets. For younger students, fill in the names of birds you are likely to see on the *Bird Count Tally Sheet* before heading outside. Take some time to review tally marks to make data recording quick and easy.

***TEACHER TIP:** How to Encourage Quality Data Collection*

Some educators express concern that their students' data may not be good enough to include in the eBird database. Let students know why their data are important and need to be reliable. Encourage your students to enter only data they are confident about. You might wish to consider how you'll respond if students report seeing birds you know are unlikely. For example, one field-test educator stated:

> *"As a serious birder, I feel uneasy about submitting data that is inaccurate. I also don't want to tell students, 'No, you couldn't have seen that.' As an example, Lesser Goldfinches are an uncommon bird here in December, and the park we visited is not a likely place to find them. Yet I had one group who insisted they saw five of them. I questioned them about how they knew they were Lesser Goldfinches, and they gave an appropriate answer. I still doubt it, but we entered it. How do I handle situations such as this?"*

We'd like to offer these possible responses if you are concerned about a student's identification of a species. Ask:

- 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 confident 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" and our regional reviewers might contact you to ask if your report could be a mistake. For example, if Lesser Goldfinches are never found in a certain state, the eBird editor might email you to ask, "Are you sure it wasn't an American Goldfinch that you saw?" We encourage you and your students to enter data! So relax, enjoy birding, and continue to be the eyes and ears of Lab scientists! For more information on how regional reviewers work, visit Lesson 3, Topic 4 of the *eBird Essentials* online course.

SUMMARIZE AND SUBMIT YOUR DATA

If students have counted birds individually, in pairs, or in groups, summarize your class data before entering it into eBird. This is useful because it will allow you to double-check the accuracy of the data and also compile the data into one master class list. (Note: you should not enter multiple lists containing essentially the same data into eBird.) Save your master lists so you can demonstrate to students their growing body of data both in print and online.

If entering data in the app or online, note that the eBird system is "smart." Based on your location and the time of year when you list your sightings, the website or app will present the possible birds in order of family and by how likely it is you saw that bird. This feature is intended to make data submission much easier and faster for you. If you are certain you saw a species that is not listed at the top, you can scroll down to find that species or you can use the search menu to find the species.

Improbable data are "flagged" by the system and you may be asked to submit a photo or description of a bird that is unusual. In some cases, a regional reviewer might contact you to ask if your report could contain a mistake. The regional reviewer will work with you to determine the validity of the identification.

Share data submission tasks with students. You might let groups of two to three students take turns entering the data into the group eBird account you created. Eventually some or all of your students may become interested in collecting data at home or out of class. If they are more than 13 years old, they can create their own eBird accounts. You can share the class "master counts" with these individuals by selecting Share with Others in Your Party on the final eBird Checklist page on the website. If they are younger than 13, you can email checklists to students or their parents, or download the data from the class account to print and share.

IN THE CLASSROOM: SUMMARIZING BIRD COUNTS

This conversation was overheard as Mrs. Toth's class summarized their bird data for the first time:

Mrs. Toth: What birds did you see when we were outside?

James: I saw three American Crows.

Mrs. Toth: Yes, I actually counted two crows. Are you pretty sure you saw three different birds?

James: 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.

Mrs. Toth: Did anyone see more than three?

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

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

Xiomara: We also saw two seagulls.

Mrs. Toth: What kind of gulls? Aren't there several species of gulls around here?

Xiomara: I don't know what kind they were. I just wrote down "seagull."

Mrs. Toth: Did anyone who saw the gulls look them up in a field guide or sketch them?

Students: No.

Mrs. Toth: Well, we can list a general group of birds if we aren't able to identify them, but listing specific species is better. Let's look in our field guides. Next time we see gulls, what should we look for?

Students: The size of the gull…whether it has a ring around its beak… whether it has a red spot on its beak… what color its wings are.

Mrs. Toth: In this area, what are common gulls we might see?

Terry: The Herring Gull and the Ring-billed Gull. It says both are common. But the Herring Gull looks a lot bigger and has a different beak.

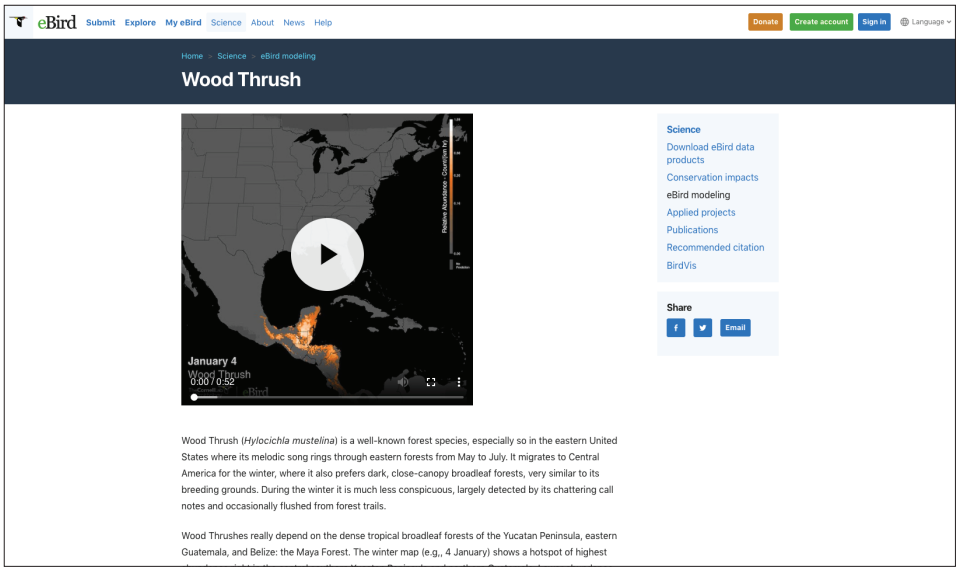
Mrs. Toth: Next time we see gulls, we should look for those field marks. Maybe we can figure it out during another count!

Bella: Could we list them just as "gull" so the scientists know we saw them?

Mrs. Toth: That's a great idea! I'll add two to the gull species category.

EXPLORING EBIRD DATA

eBird Abundance Models provide an unmatched species-by-species window into the full annual cycle of bird populations in the Western Hemisphere. eBird Abundance Models take eBird data, combine them with data on environmental variables, and generate predictions of where birds are on the landscape. These incredible models actually predict the number of birds you'd encounter in an area on a specific date. You will examine a model showing a typical migration pattern for the Western Hemisphere, where birds come north for the summer to breed and take advantage of abundant food, then migrate south for the winter. Links to all models in this section can be found on the resource website (birds.cornell.edu/k12/ebird-essential-resources).



Show the Wood Thrush model. Tell students that this model shows the abundance of Wood Thrush throughout the year. Ask students what patterns they notice, drawing attention to the movement and distribution of the species. Discuss with students that they are seeing the migration of Wood Thrush between their wintering grounds in Central America and their breeding grounds in North America. You may want to write breeding, wintering, and migration on the board and point out the different stages of the life cycle, taking note of what time of year they occur. By knowing where birds are and when, scientists can make better decisions about how to conserve threatened species. That's why citizen science data are so important.

After this discussion, put older students into groups, assigning them each an eBird Abundance Model from the eBird page. Instruct them to view their model several times and write down their observations. Ask: What patterns do you notice in the birds' movements? Where are they more spread out—on their

breeding or wintering grounds? Where do you see the greatest concentration of birds? Do you see any gaps in their range? What geographic features might account for that? Have students look up their bird on All About Birds and compare their model to the range map. Which map do they think is more accurate and why? *The eBird model is more accurate because it reflects seasonal and geographic variations that the static range maps cannot.*

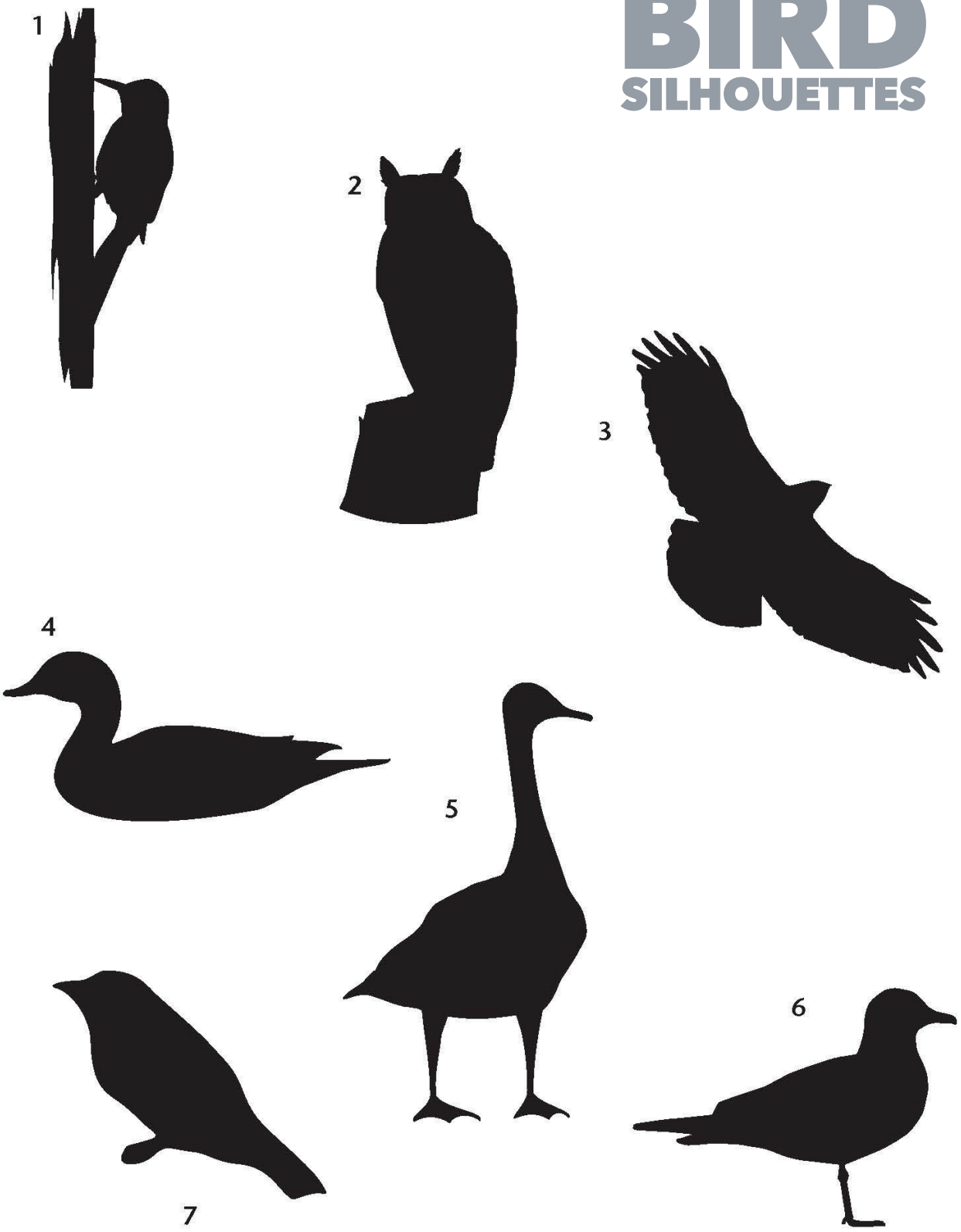
For younger students, share the Barn Swallow model and compare and contrast the models. Ask: How is this model similar to the Wood Thrush model? How is it different? Which bird goes farther south in the winter? Which bird goes farther west?

YOUR DATA MATTER!

When your students submit data to eBird, they are scientists! Their data power the science that helps policy makers and conservation organizations protect birds around the world. As you submit your first counts, pull up eBird's live submission map (**ebird.org/livesubs**) and watch for your checklist to appear on the map. You're now part of a global community!

While out collecting data, you may have noticed your students asking curious questions. Take their learning to the next level by embracing those questions and turning them into scientific investigations. Our free downloadable curriculum, *Investigating Evidence* (birds.cornell.edu/k12/investigating_evidence), will guide the way.

BIRD SILHOUETTES



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