



005 - Birdwatching in the Schoolyard

Supports PA STEELS Standards

- 3.1.3.B Construct an argument that some animals form groups that help members survive
- 3.1.3.H Make a claim supported by evidence about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.
- 3.1.3.G Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.
- 3.4.3-5.B Make a claim about the environmental and social impacts of design solutions and civic actions, including their own actions
- 3.4.3-5.E Construct an argument to support whether action is needed on a selected environmental issue and propose possible solutions.
- 3.1.6-8.I Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.
- 3.2.6-8.Q Use mathematical representations to describe a simple model for waves that includes how the amplitude of a wave is related to the energy in a wave.
- 3.3.6-8.M Apply scientific principles to design a method for monitoring and minimizing human impact on the environment.
- 3.4.6-8.E Collect, analyze, and interpret environmental data to describe a local environment

Summary and Timing

Students use binoculars and a variety of bird guides to observe the birds in their schoolyard. Use this flexible activity to learn about a variety of topics, including social interactions, ecosystem interactions, adaptations, biodiversity, migration, human impacts, and even the properties of sound waves. Engage your students in a MWEE by extending this activity to include solutions to a local schoolyard or community habitat issue your students identify. We recommend installing [Cornell's Merlin Bird](#) app on student tablets or other devices that can be used outside. The kit includes a class set of binoculars (30 pairs) and field guides. Suggested timing: 1+ class periods, repeat seasonally to observe migration patterns.

Materials *Teacher Provided ([view materials](#))

- Binoculars
- Binocular “backpack straps”
- Bird guides
- Bird Bingo cards
- Dry erase markers
- *Student device with [Merlin app](#) installed
- *Science notebooks/datasheets

Safety

- Instruct students to only use the binoculars when they are standing still!
- Use alcohol wipes to sanitize the rubber flange between uses.



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Suggested Background Resources

- Cornell Lab - [Educational Resources](#)

Guiding Questions/Phenomena

- What birds live in our schoolyard? Does the bird population stay the same throughout the year?
- What is the habitat and climate like where my favorite schoolyard bird migrates to?
- How does the diversity of birds in our schoolyard compare with other places in our community?
- Do the birds engage in social interactions or group behavior?
- How are the birds adapted to their role in the ecosystem?
- How do the birds interact with the ecosystem?

Local Context

Measure biodiversity in your schoolyard and compare it to a field trip site (park, nature center, etc).
Improve bird habitat in your schoolyard.

Credits and Document Version

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Procedure (Learn to use the Binoculars)

1. Remove the 4 lens caps. Leave the caps in the lab tub.
2. Use an alcohol wipe to sterilize the rubber around the eyepieces.
3. Provide each student with a set of binoculars and backpack straps.
4. Wear the straps like a backpack, and have a partner help you use the clips to attach the binoculars. Adjust the straps to fit, as you would with a backpack.
5. Glasses wearers should wear their glasses and fold down the rubber rings around the eyepieces. Non-glasses wearers should keep the rubber rings folded out.
6. Adjust the distance between the eyepieces by pushing the barrels closer together or pulling them further apart. If you see two images when looking through the binoculars, the eyepieces are too far apart. Most young students will need the eyepieces pushed together to the smallest setting. If this is still too big, the student can turn the binoculars up/down and look through only one eyepiece. For advanced binocular technique, [refer to this guide](#).
7. To focus the binoculars, move the center lever back and forth until the object is in focus.
8. To practice with the binoculars, post the bird signs at varying distances. Starting with the nearest sign, have the students practice focusing the binoculars until they can read each sign. After students have focused on near signs, increase the distance.
9. Look for birds in your schoolyard. Start by locating the bird with your bare eyes. Keep your eyes locked on the bird and raise the binoculars to your eyes while keeping your eyes on the bird! Adjust the focus lever as needed to bring the bird into focus.
10. Replace the lens caps when you are finished.



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Procedure (Bird Watching Activities)

1. Bird behavior, bird adaptations, evidence of bird activity
 - a. Play Bird Bingo to practice binocular skills and observe bird behavior/evidence. Use the dry-erase bingo cards included in the Advancing Science kit.
 - b. Use nature journaling to make behavioral observations and connect structure with function. How does the bird use its call to interact with other living things? How does the structure of a bird's body parts (beak, legs, wings, etc.) support their functions?
2. Biodiversity, Migration, and Sound Waves - Install Cornell's [Merlin app](#) on student devices to identify birds in your schoolyard (or use the field guides included in the AdvSci kit). When you download the Merlin App, be sure to download the bird pack for your region (US Northeast); you can add bird packs through the settings option. Merlin works offline, but be sure to complete a test identification while you are still connected to Wi-Fi to ensure your location is set properly. Use Merlin to:
 - a. Identify birds by answering a set of simple questions (size, color, bird activity).
 - b. Identify birds by recording their song. Merlin will identify what is singing in your schoolyard and display a spectrogram (pictures of *sound wave patterns*) on your device.
 - c. Investigate seasonal migration patterns in your schoolyard. In the Merlin app, click "explore" and then modify the settings - change the date to different times during the year to see which birds are most likely in your location at a particular time during the year.
 - d. Learn more about particular birds.
 - e. Create bird lists - choose "this is my bird" and it will add to your "life list"
3. Participate in a citizen science project, like eBird or Celebrate Urban Birds, to share your bird observations.
4. Engage in a MWEE by generating solutions to a lack of birds in your schoolyard. Are habitat components missing?



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Name _____ Date _____ Location _____

Today's weather

Sunny or cloudy?	Precipitation?	Wind speed?	Temperature?
☐ Sunny ☐ Partly sunny ☐ Cloudly	☐ None ☐ Rain ☐ Snow	☐ Calm ☐ Gentle wind ☐ Strong wind	☐ Cold ☐ Cool ☐ Warm ☐ Hot

Birds I noticed today

Do you notice any evidence of birds?

- ☐ Bird Song
- ☐ Nests
- ☐ Droppings
- ☐ Feathers
- ☐ Food leftovers (like seed shells)
- ☐ Holes in trees
- ☐ Other _____

Was the bird...?

- ☐ Eating at a feeder
- ☐ Swimming or wading
- ☐ On the ground
- ☐ In trees or bushes
- ☐ On a fence or a wire
- ☐ Soaring or flying
- ☐ Other _____

What size was the bird?

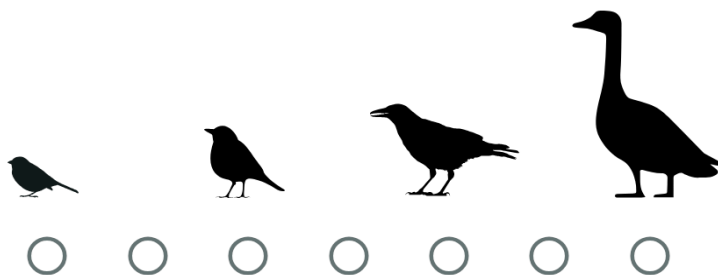


Image Credit: Merlin Bird App by Cornell

What color was the bird?

- ☐ Black
- ☐ Gray
- ☐ White
- ☐ Brown
- ☐ Red
- ☐ Yellow
- ☐ Green (olive)
- ☐ Blue
- ☐ Orange