Grade Level: 7-8

Follow that Bird!

A Science and Technology Unit on Tracking Birds

experiencemigration

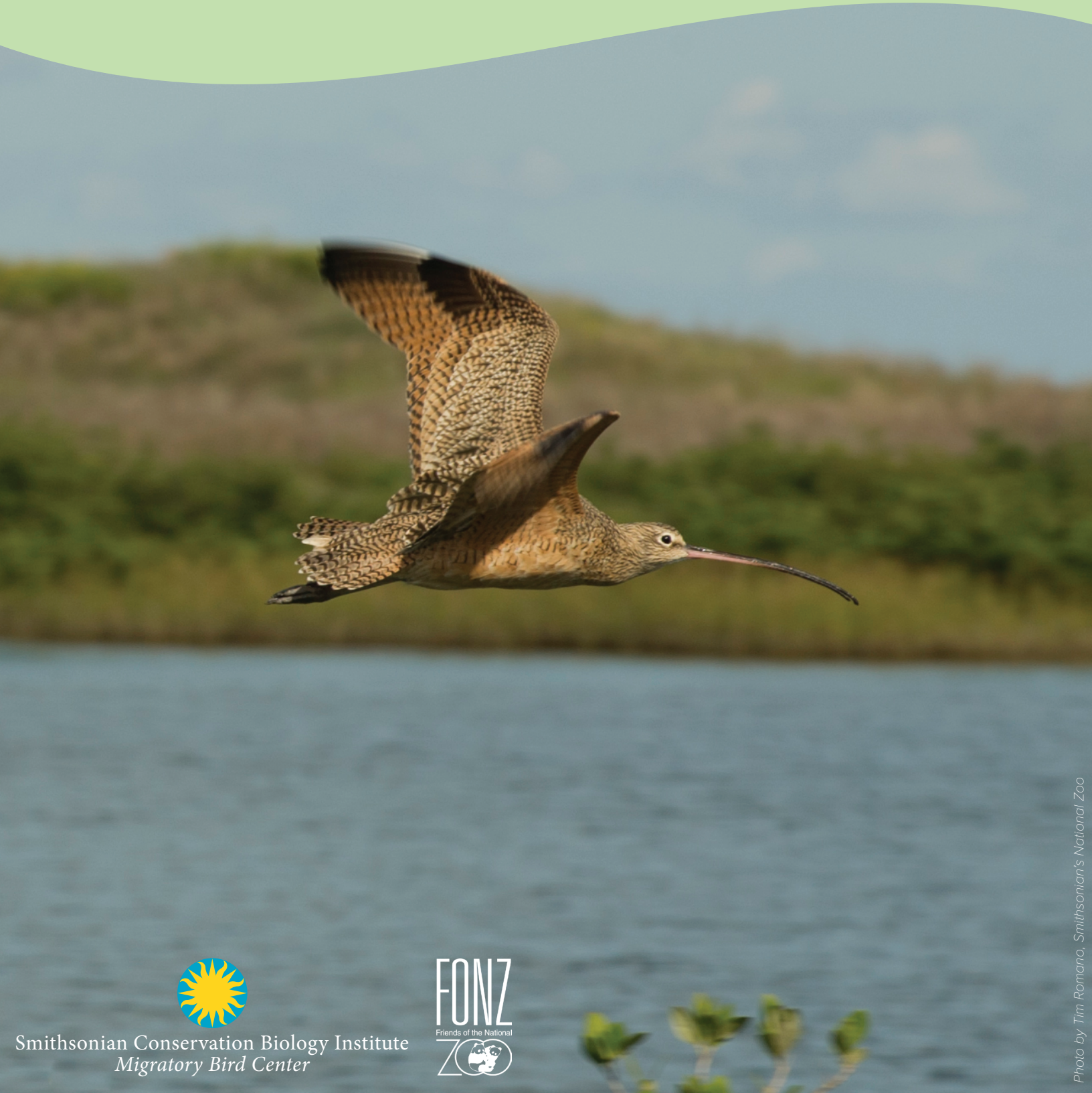


Photo by Tim Romano, Smithsonian's National Zoo

Smithsonian Conservation Biology Institute
Migratory Bird Center

FONZ
Friends of the National Zoo

Welcome!

WELCOME TO *FOLLOW THAT BIRD! A SCIENCE AND TECHNOLOGY UNIT ON TRACKING BIRDS.*

The goal of this inquiry-based unit is to teach core middle-school science concepts through student exploration of the tools used by Smithsonian scientists to track birds, the data they are collecting, and how new information is used for conservation. This project is one component of the larger Experience Migration exhibit coming to the Smithsonian's National Zoo in 2021 and represents a collaborative effort between the Smithsonian Migratory Bird Center of the Smithsonian's National Zoo and Conservation Biology Institute and Friends of the National Zoo.

TABLE OF CONTENTS

ACKNOWLEDGMENTS

It took an amazing “flock” to bring the *Follow that Bird!* unit to life. We want to especially thank Edgar and Ellie Cullman for making this unit possible through their generous contributions.

Follow that Bird! was co-directed by Erika Novak, Senior Education Specialist with Friends of the National Zoo (FONZ), and Dr. Brian Evans, Migratory Birds Ecologist with the Smithsonian Migratory Bird Center (SMBC). The creative lessons were developed by the collaborative duo of Dr. Sarah Haines and Elena Takaki-Moschell. Additional editing, brainstorming, content expertise and prototyping was carried out by Dr. Peter Marra, SMBC Director, Mary Deinlein, SMBC Education Specialist, Stefanie Angles, FONZ Education Programs Specialist, and Rebecca Zurlo, SMBC Research Technician.

All print materials were designed by Erika Novak; web components were built by Dr. Brian Evans and Anthony Braun, Web Technical Manager with the Smithsonian’s National Zoo and Conservation Biology Institute (NZP-SCBI); webpages were edited by Ashley Goetz, NZP-SCBI Web Content Writer; videos were filmed by Amy Enchelmeyer, NZP-SCBI Media and Web Content Specialist, and produced by Roshan Patel, NZP-SCBI Media Producer; video stars include Calandra Stanley, Autumn Lynn-Harrison, Kali Holder, Dr. Emily Cohen, and Eric Slovak.

Finally, a sincere thank you to the classrooms that piloted the lessons and provided valuable feedback; and to you, the teachers, for participating in this unit. We sincerely hope you and your students have a wild time with it!

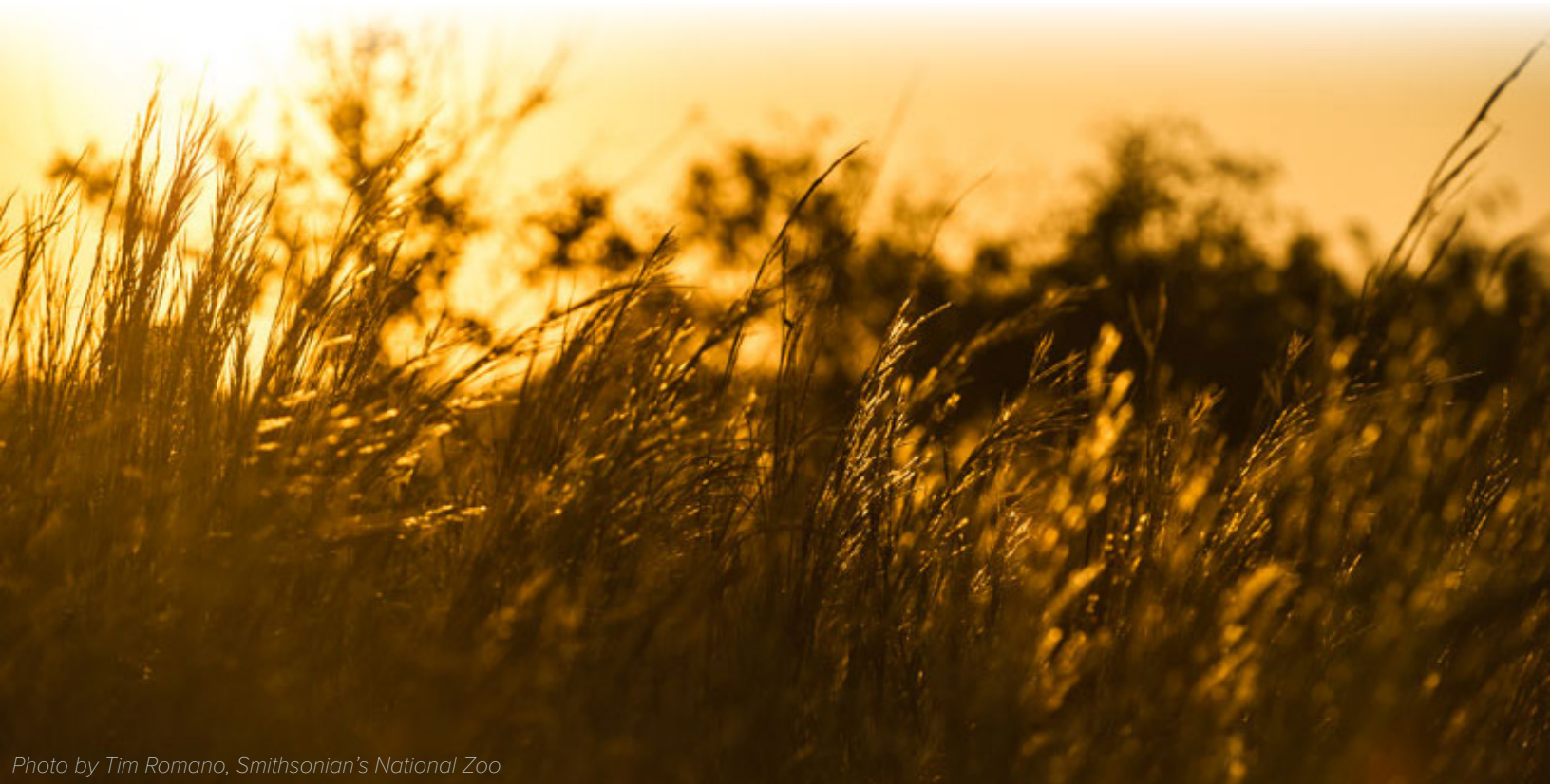


Photo by Tim Romano, Smithsonian’s National Zoo

INTRODUCTION

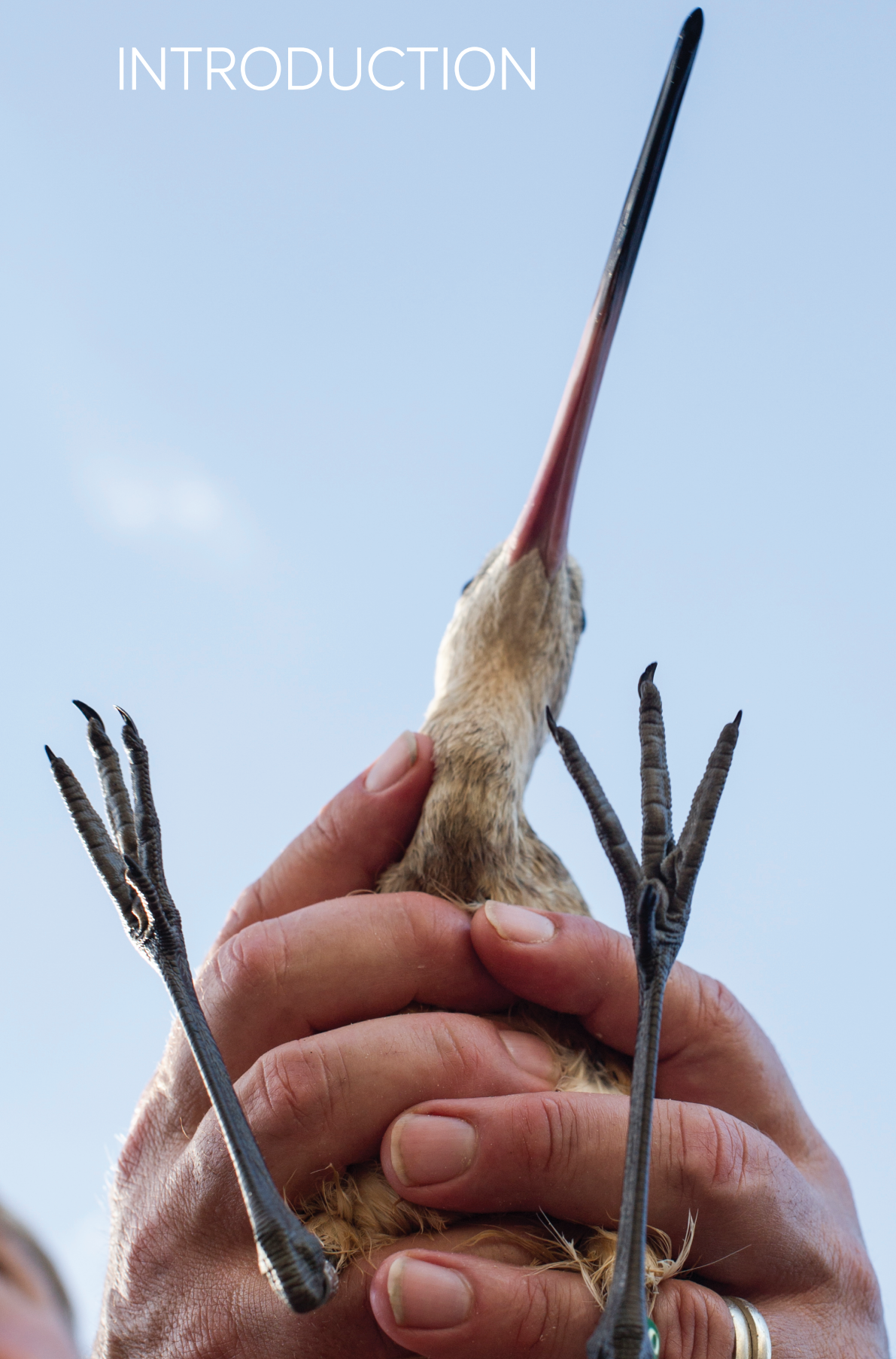
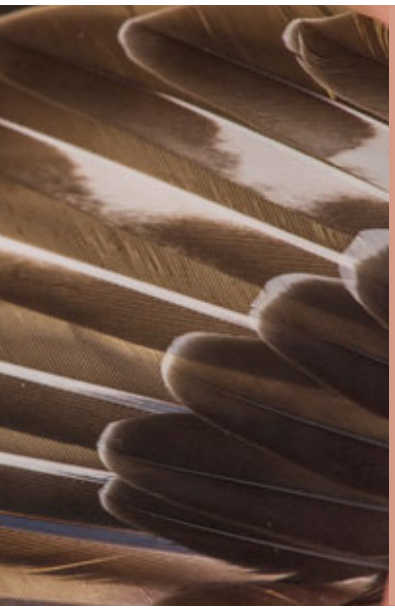


Photo by Tim Romano, Smithsonian's National Zoo

INTRODUCTION:
NGSS DISCIPLINARY CORE IDEAS

Follow that Bird! is comprised of five lessons that focus on Middle School Life Sciences: MS-LS2-1, MS-LS2-4, and MS-LS-5. The chart below designates which lessons cover each of these core ideas.



DISCIPLINARY CORE IDEA	LESSON 1	LESSON 2	LESSON 3	LESSON 4	LESSON 5
MS-LS2-1	✓			✓	
MS-LS2-4			✓		
MS-LS2-5		✓			✓

Photo by Tim Romano, Smithsonian's National Zoo

MS-LS2 Ecosystems: Interactions, Energy, and Dynamics

MS-LS2-1 Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.

MS-LS2-4 Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.

MS-LS2-5 Evaluate competing design solutions for maintaining biodiversity and ecosystem services.

ENCOURAGING BIRD OBSERVATIONS

OPTIONAL SUPPLEMENTAL OBSERVATION ACTIVITY

OVERVIEW

This activity will encourage students to begin connecting with nature, specifically birds, and observing animal behavior, a key component to any scientific study. Begin this activity before or at any point during the lessons and get students in the habit of making observations at the beginning of each class.

Continue observations throughout the *Follow that Bird!* unit, the school year or a pre-determined amount of time.

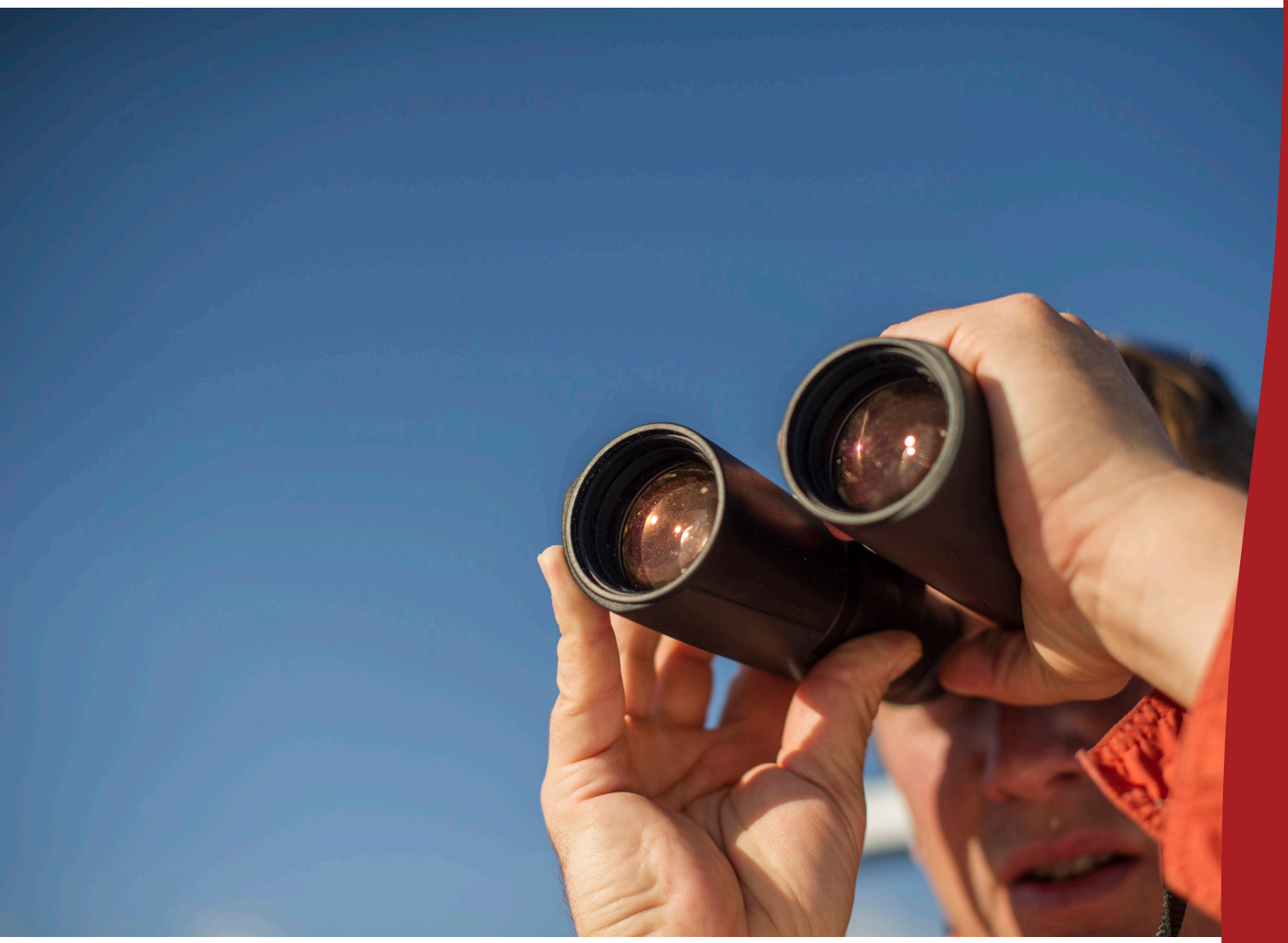


Photo by Tim Romano, Smithsonian's National Zoo

SCIENCE AND ENGINEERING PRACTICES:

- Asking questions
- Planning and carrying out investigations
- Using mathematics and computational thinking
- Analyzing and interpreting data
- Obtaining, evaluating and communicating information

CROSSCUTTING CONCEPTS:

- Patterns

Step 1:

ESTABLISH AN OBSERVATION AREA

Create a bird observation area utilizing a variety of feeders. You can purchase pre-made bird feeders, or create your own using recycled materials such as plastic bottles or juice cartons.

Step 2:

DEVELOP A RESEARCH QUESTION(S)

Have students design a scientific experiment using the feeder type and/or food types as variables. Sample research questions students might ask:

- *Is there a relationship between the type of seed put out in a feeder and the species of birds observed at that feeder?*
- *Do the kinds of birds visiting a particular feeder change with the seasons?*
- *Do feeders attract birds more or less at different times of the year?*
- *Have the birds visiting feeders in our schoolyard changed over time (long-term study)?*
- *Does the land/habitat surrounding a feeder affect the birds that visit?*
- *Does changing land use affect the species of birds that visit a feeder (long-term study)?*

Photo by Pamela Jenkins, Smithsonian's National Zoo

Step 3:

SET UP BIRD FEEDERS

1. Refer to the bird feeder tips on pages 9 and 10 for more information on types of feeders, types of foods, maintaining feeders and general feeder facts.
2. Set up your bird feeders and schedule time for students to observe them.
    - Place feeders so that they are visible from a window so indoor viewing is possible when there is inclement weather.
    - To avoid having birds crash into the window, feeders should be placed either within 3 feet of the window or more than 30 feet away (in which case it would be handy to have binoculars for viewing the birds). If birds still collide with windows, it's likely because the birds are being fooled by the reflection of the outdoors in the glass. You can break up the reflection and make the windows more visible to the birds by putting stickers or tape on them. Hanging old CDs, pie plates or other objects outside the window may also deter birds from flying towards the windows.

Step 4:

RECORD OBSERVATIONS

1. Have students keep track of birds they see at the feeders. Vary observation times so that students can investigate whether visitors change throughout the day - or perhaps even throughout the seasons (another opportunity to hypothesize). If you have multiple feeders containing different types of food, make sure students record which birds visit which feeders, as certain types of birds prefer particular food preferences (yet another variable to investigate!).
2. After several weeks, analyze your data looking for patterns in birds observed at your feeders.

TIPS FOR FEEDING BIRDS IN YOUR SCHOOLYARD

TYPES OF FEEDERS

The following types of feeders are likely to be the best options for a schoolyard setting:

- **Tube feeder.** A hollow cylinder with multiple feeding ports and perches, used by a variety of seed-eating birds.
- **Window feeder.** A seed feeder that attaches to a window with suction cups. Should have an overhang above the seed trough to protect seeds from rain.
- **Nectar feeder.** Used for serving a sugar water solution for hummingbirds and less commonly for orioles (see below for recipe).
- **Suet feeder.** A specially made cage for holding suet (hardened beef fat) which attracts woodpeckers and other insect-eating birds. Instead of a suet cage, you can offer suet in a net bag, such as the kind onions are often sold in.
- Have students make seed feeders using recycled materials such as plastic bottles or juice cartons--an online search will turn up lots of simple designs.

TYPES OF FOODS

Seeds

- Black oil sunflower seeds are the preferred feeder food for a wide variety of seed-eating birds, including chickadees, titmice, nuthatches, and cardinals. You can purchase these seeds with the shells removed, which cuts down on the amount of debris collecting on the ground below the feeder. The larger black striped sunflower seeds are slightly less popular.
- Be careful when buying bird seed mixes because the cheaper brands tend to contain a high proportion of "filler" seeds that are rejected by most birds and end up being tossed to the ground. This can cause a mess and attract rodents. Filler seeds that are unpopular with most birds include milo, red millet, and wheat.

Suet

- Suet cakes made from beef fat are a good choice for attracting woodpeckers and other insect-eating birds. This high-calorie food is best offered in winter because it can quickly spoil in warmer temperatures, unless you purchase specially processed "heat-resistant" suet cakes.

Sugar Water

- Hummingbirds, and less commonly orioles, are attracted to sugar water feeders, also known as "nectar" feeders. Mix ¼ cup sugar to 1 cup boiling water, and allow to cool. Do not use honey or other sweeteners other than sugar, and do not use red dye.

Hummingbird at a nectar feeder
Photo by Jessie Cohen, Smithsonian's National Zoo

MAINTAINING FEEDERS TO KEEP BIRDS HEALTHY

To avoid mold contamination and the spread of disease amongst the birds that come to your feeders:

- Clean seed feeders and suet cages once every 2 weeks. Soak empty feeder in warm, soapy water or a dilute bleach or vinegar solution (1 part bleach or vinegar to 9 parts water). Use a bottlebrush to get out any caked debris. Rinse well and dry thoroughly before refilling.
- Clean sugar water feeders every 3 to 5 days with warm water and a brush to prevent fermentation or mold.
- Store seeds in a cool, dry location.
- Clean up area beneath seed feeders by raking and disposing of shells and wasted seeds.
- If possible, relocate your feeders periodically to keep wastes from accumulating.

OTHER HELPFUL FEEDER FACTS

- With few exceptions, birds that come to seed feeders are not migratory. Although insects make up most of their diet during the breeding season (insects provide added protein necessary when raising young), seeds are a staple of their diet at other times of the year. Because seeds are available in the wild throughout the year, there is no reason for these birds to migrate.
- Most migratory birds require insects throughout the year and do not eat seeds. They therefore must migrate to warmer places during the winter where they will be able to find the food they need.
- Seed and suet feeders will attract more birds during the winter months because naturally occurring foods are in shorter supply at that time of year, and because birds are not eating as many insects as they do during the summer months.
- Feeders usually account for a relatively small portion of any bird's diet. The only time feeders may play a critical role is during severe winter weather when birds' naturally occurring foods are covered by ice or snow. In this instance, having access to a seed or suet feeder may be a lifesaver.
- In most parts of the United States and Canada, nectar feeders are used from early spring to late summer because that is when hummingbirds are present. Exceptions are the West Coast and southwestern corner of the United States where Anna's hummingbirds are year-round residents. However, reports of hummingbirds lingering through the winter in the Gulf Coast states are becoming relatively common. An online search should tell you when hummingbirds typically arrive and depart in your area, and whether there have been any local reports of hummingbirds in the winter. It is a myth that keeping up a feeder in the fall will prevent hummingbirds from migrating.

For more information on feeding birds and having your students collect data on birds at feeders, visit: https://feederwatch.org/learn/feeding-birds/.