

Banded Birds

*Adapted with permission from
“One Bird, Two Habitats.”
Wisconsin Department of Natural
Resources.*

Grade Level: upper elementary school/middle school

Duration: one 30-minute class period to one full day, depending on the option selected

Skills: vocabulary, discussion, collection and interpretation of data, formation of hypotheses, observation, communication/presentation, evaluation, and team building

Subjects: science and math

Concepts

- Research is vital for shorebird conservation.
- Through research we learn what shorebirds need and what we can do to conserve them.
- Some shorebirds concentrate in great numbers at their stopover sites, which provide large populations of birds for study.
- There are still many unanswered questions about shorebirds and how we can conserve them best.
- There are many tools researchers use to collect information about individual birds, as well as an entire population of shorebirds.
- Bird banding is one tool researchers use to collect information about individual birds, as well as entire populations of shorebirds.

Vocabulary

- banding
- population
- sample size
- individual
- mist net
- cannon net
- random sample
- color bands
- breeding ground
- migration flyway
- nonbreeding area

Overview

Students conduct a banding simulation in which they attach colored construction paper armbands to a group of classmates and then observe and record the students behavior over the course of a school day.

Objectives

After this activity, students will be able to:

- Give a general description of bird banding.
- Describe the two types of bird bands and the way they are used to provide research data.
- Explain why bird banding is an effective research tool.

Materials

- Ruler
- Colored construction paper
- Masking tape
- One copy of the *Banding Birds* reading for each student

Optional

- Clipboards or shorebird notebooks assembled as described in the *Activity Preparation* section

Introduction

Banding is an important method of capturing and marking animals for study. It allows close examination of live birds, which is often the only way of determining sex, age, race, and breeding condition. Because many members of a single shorebird species can look alike to people, banding allows biologists to tell shorebirds apart.

When banding and observations are carried out in many places around the world, important information can be gathered about migration routes, destinations, and behaviors. Banding individuals is one of the most important tools in studying many aspects of behavior and biology of birds in their natural habitat.

It is often impossible to capture and mark an entire *population*, be it a group of shorebirds that breeds locally, a group using the same migratory flyway, or other designated population. If a large enough *sample size* can be studied, it is not always necessary to study the entire population. Since scientists can seldom study every *individual* of a population, a *random sample* provides information that accurately represents the entire population.

Biologists use three methods of marking shorebirds: individual numbered metal bands, individual colored plastic bracelets, or a *color band* for an entire group.

For more information about what these bands mean, how biologists safely capture shorebirds, and how to report a dead banded bird, read the *Shorebird Primer* section *Shorebird Technology and Research*.

Activity Preparation

1. Make a photocopy of the *Bird Banding Reading* for each student.
2. Assemble shorebird notebooks by stapling several sheets of 8½ x 11 (or smaller) paper in the middle and then folding them in half.

Procedure

1. Give each student a copy of the *Bird Banding* student reading to review before conducting this activity.
2. Begin with a class discussion on bird banding.
 - Why is it important to be able to track where shorebirds or other animals migrate? (To learn what habitats they depend on; to learn how and where different sexes, age classes, or populations interact; etc.)

- How do biologists know the destinations of migrating birds?
 - Is it possible that a different population (in this case, groups made up of a single species of shorebird) of the same species can act separately, behave differently, or rely on different places during their lives? (Yes.)
 - How do biologists know which individuals go where, since most members of the same species look alike to us, at least at a distance?
 - How would marking birds facilitate the gathering of information?
 - What are some ways in which birds can be marked without interfering with or altering their behavior? (Banding, dyeing a patch of feathers, radio tagging)
 - Can you think of other important information to be gained from marking individual birds or being able to tell populations apart? (To learn how long birds live, how large their territories are, or how they interact; to find out whether they return to the same area to feed day after day or to the same area to breed year after year; to discover if juveniles return to the area where they were hatched; and to learn how quickly the population migrates from one habitat to another, etc.)
3. Explain that students will have the opportunity to see what it is like to be a bird-bander, as well as a banded bird. However, since it requires special equipment, special permits from the federal government, and a lot of training, they will not actually be banding birds—they will be banding each other!

Option 1 — Observing Banded Birds for a Class Period

4. Have the students make bands out of construction paper that are long enough to fit around their wrists or their ankles. Using as many colors as possible, pass out two pieces (mixing colors randomly) to each student. If you have a big class or not many colors, pass out three colors to each student. (This will allow for more combinations if students wear them in different orders.) Have the students measure and cut out one 1" x 7" strip of each of their colors. These are their "bird bands."
5. Have the students attach the strips around their "bird's" wrists, one strip above the other. Both bands must be visible, placed over any long-sleeved clothing. Secure them with tape. Each student should have a different color combination.
6. Now tell them that they are banded birds and will be known today by their color combinations—"blue over red," "red over blue," or (if three colors are used) "red-green-yellow." Explain that this is how a biologist tells birds apart when they might otherwise look alike.
7. After all the birds are banded, tell the "bird biologists" to observe their "birds" in their natural habitat—in this case, the classroom. Clear the desks away or lead the class to a large open area. Designate one end of the study area as the northern shorebird "*breeding ground*" and the opposite end as the southern "*nonbreeding area*," where shorebirds rest and eat. The middle of the study area is the "*migration flyway*," the flight path shorebirds take to travel between nesting and wintering sites.

8. Divide the "banded birds" into three groups and move each group to a different location in the study area. Instruct the "banded birds" in the nesting area to sit down on the floor as though they are on their nests. "Banded birds" located along the migration route must flap their arms or make eating motions. Those in the south must also make eating motions or pretend that they are resting by standing on one foot.
9. Give the "banded birds" a few minutes to act out their parts and for "bird biologists" to observe them. Ask the "bird biologists" questions like the following:
 - Is "yellow over white" migrating or nesting? Is "red over green" a male or female?
 - Which nesting birds (answer with band combination) have blonde feathers (hair)?
 - Which migrating shorebird is flying (flapping) fastest?
 - How many wintering birds are there with green bands?

After a few minutes, instruct the "banded birds" to "migrate" to the opposite habitat and continue with more questions. Repeat this a few times.

10. Now repeat the activity, reversing the students' roles: "bird biologists" become "banded birds" and previously "banded birds" are now "bird biologists."
11. When everyone has had a chance to play both roles, discuss their observations.
 - Did any birds lose their bands?
 - Do you think you could keep your bands on all day?
 - Were any colors hard to see?
 - Did any birds have exactly the same color combination or confusing combinations?

- Was it hard for everyone to see all of the birds all of the time?
- What would this be like if you were real birds and biologists? What problems might you have?

Option 2— Observing Banded Birds for a Day (or Two)

- Assign each student a partner. Designate one student the role of “banded bird” and the other of “bird biologist.” Explain that the job of the “bird biologist” is to locate and observe the “banded bird.” The role of the “banded bird” is to go about doing what it always does.
- Explain that each “bird biologist” has five times (which occur during the remainder of the day or the next school day) to locate and observe his or her “banded bird.” In a real shorebird study, these times might be high or low tide or early versus afternoon hours.
- Have the “bird biologists” take out a piece of paper, or a shorebird field notebook if they have one, and instruct them to draw up a data sheet similar to the example provided. Substitute the observation times to fit your class schedule. Divide the time you have available for this activity into two rounds so that

each student has a chance to play both roles. “Banded birds” should not know the times they will be observed! Ask students to give the table an appropriate, descriptive name. This will encourage them to keep focused on the data question and practice the skill of clear labeling.

- At the times indicated on their data tables, “bird biologists” should record in words what their “banded birds” are doing. Explain to them that you will not announce when it is time to make an observation. This would alert the “banded birds” to the fact they are being studied and may cause them to change their behaviors. If their banded birds are not present at the observation times, students should also record that on their data tables.
- After the five observation times, have the students reverse roles. The new “bird biologists” should secretly draw up their data tables and prepare to make their observations. Make sure you give the new “bird biologists” different *observation* times.
- When all the students have had a chance to role-play as a “bird biologist,” have them report on their findings by:

- Pooling the data on a “flock” data sheet drawn on the board. Ask the “bird biologists” to work together to determine the most common activity, any pattern of activity according to the time of day, the most unusual activity, etc.
 - Using a graph that shows their results in order to identify the most common activity. Make a bar graph comparing how often an activity was observed in each time period.
 - Comparing percentages of the birds not observed at each time. Determine the percentage of “bird biologists” who did not observe birds at a designated time.
 - Presenting the results in a paragraph describing what they learned about their “banded birds” or about their own observation techniques.
10. Discuss the results and the following questions with the class:
- Was it easy to find your bird at the appropriate time?
 - How did your bird’s activities compare to that of other birds?
 - Do you know what was going on (for example, lunch, math

Data Table Example

What My Banded Bird Is Doing at Certain Times of the School Day

<i>Time</i>	<i>Description of Activity</i>
10:15	
12:35	
1:00	
2:10	
2:30	

period, physical education, class break) in the school or class during each observation time. Do you think that might have a relationship to the data results (for example, was there more running during lunch or more talking during art)?

- Did you notice any differences in the activity patterns of males and females?
- Do you think you got an accurate picture of what your bird does during the day?
- Was the sample size sufficient to give an accurate picture of bird activity?
- Did you have a banded bird that was not present? What challenges would that create for researchers?
- How could the plan we followed be modified to learn something about the specific activities of all the birds in the school? (First, come up with a study question or hypothesis. Then decide when and where would be the best time and place to collect data.)

Additional Activities

Take a Field Trip to a Banding Station

Visit a bird bander in the field or invite one to come to your school to demonstrate the proper use of bird-banding equipment. Keep in mind that banders are busiest during spring and fall migration seasons. Your local state or federal wildlife agency's migratory bird department, a local Audubon chapter, or a nearby wildlife refuge should be able to direct you to someone who bands bird in your area.

Human Labels

Brainstorm or discuss with students ways in which humans are labeled or marked, whether for study or as an aid in daily life (for example, name, Social Security Number, library card, residency status, medical identification tags, "dog tags" for soldiers).

How Do You Report a Banded Bird

If you or your students see a banded bird, it is important to report it. Color bands are reported to a different organization than silver/metal bands. To learn more, go to the Shorebird Sister Schools Web site <http://sssp.fws.gov> and click on "Tracking."



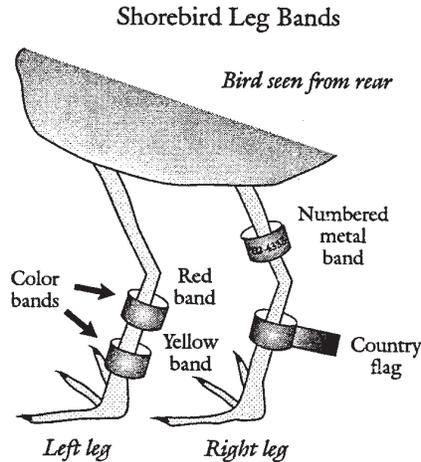
Banding Shorebirds

Scientists are still searching for answers to many questions about shorebird *survivorship*, *mortality*, and *behavior*. This information is critical to making decisions about shorebird management. We can help birds best if we understand where they live, what they need, and where they travel. *Bird Banding* is a technique to help answer many of these questions.

Whether scientists want answers about a group of local breeding shorebirds or a group using the same migratory stopover site, it is often impossible to capture and band every *individual* within the *population*. However, if a large enough *random sample* is banded, then scientists can assume that the data they collect accurately represents the entire population.

Bird banding involves attaching around the bird's leg a loose-fitting aluminum band that is coded ahead of time with a unique identification number. Biologists record the bird's age, sex, species, location of capture, and weight. If this same individual is captured somewhere else, the original data can be looked up using the bird's personal identification number. By comparing old data with current sightings, scientists can slowly piece together answers to a sort of question puzzle to create a picture of this bird's life. How far has it traveled? Where does it spend its winters? Where does it breed? How long does it live? What caused its death?

Sometimes a series of *colored bracelets* and *flags* are also attached to shorebirds. These may represent the country where the bird was banded, the banding year, and perhaps the age of the bird. The advantage of color-coded bands and flags is that it reduces the times a bird must be captured to gather information. With colored bands, researchers can observe shorebirds from a distance to gather the information they need. No matter how careful biologists are in capturing



birds, it creates stress on them and takes time away from feeding, a critical activity at their migration stopover sites.

Sometimes biologists will clip the feathers between a shorebird's shoulder blades and attach a small radio or satellite transmitter with glue. This technique allows scientists to study shorebirds in remote habitats that are difficult for researchers to get to, and it allows the birds to continue their natural behaviors that might be interrupted if people were nearby.

Bird researchers capture shorebirds with a delicate, almost invisible net called a *mist net* that is stretched across an area where birds are likely to fly at night. Another method for banding shorebirds is banding chicks that are not ready to fly. By banding birds in the year they hatch and recording their annual returns, biologists can see how long they live and if they are being replaced by a sufficient number of young. Another method, *cannon netting*, is used mostly in coastal areas. Here, a net is shot out over feeding shorebirds.

Not just anybody is allowed to capture and band birds. A special permit from the U.S. Fish and Wildlife Service is required for all bird banding in the

United States. This is to ensure that the birds are handled carefully and that the data is collected properly.

Many birds that have been banded disappear and die without the researchers knowing where, when, or why. If you find a dead bird with a band, please report it to the appropriate agency.

To Report a Metal-banded Bird

Notify your local state wildlife agency or the U.S. Fish and Wildlife Service Bird Banding Lab. Record the entire number on the band, the date you found the bird, the species (if you know it), and the exact location.

Send this information along with the band if possible, to:

Chief, Bird Banding Laboratory

Office of Migratory Bird Management
U.S. Fish and Wildlife Service
Laurel, MD 20810

Or call: 800/327 2263
or 800/327 2263

To Report a Color-banded or Flagged Bird

Describe each band: type (metal, color band, flag), colors (as exactly as possible — light green, dark blue), and location on bird (bird's left or right leg, upper or lower leg, above or below other bands). Note if you are unsure of any bands or if you did not see all parts of both legs clearly. Note species, location of sighting, date, and any other information such as behavior, other birds, etc.

Submit shorebird color band sightings by mail or the Web site:

PASP, Canadian Wildlife Service
115 Perimeter Road
Saskatoon, SK S7N 0X4
CANADA

Or
<http://www.mb.ec.gc.ca/nature/migratorybirds/pasp/dc29s01.en.html>