

PREPARATION: Cut strips of construction paper for bands. Make banding permits.

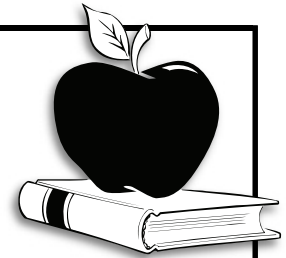
CLASS TIME: 20 minutes class time on each of two days

VOCABULARY: bird banding, scientific inquiry, data

MATERIALS: construction paper bands (enough for four-fifths of the class); masking tape; banding permits

COMMON CORE STANDARDS: mathematics 6.SP, 5.MD

TEACHER'S GUIDE



ACTIVITY

Buddy Banding

OVERVIEW

By conducting a simulation activity that involves banding fellow classmates, students use scientific inquiry and learn about how some bird research is done.

CONCEPTS

Scientific inquiry, including posing problems, solving problems and persuasion, can be used for the study, management and conservation of bird populations and forest ecosystems.

OBJECTIVES

Students will be able to: 1) describe the process of bird banding; 2) recognize bird banding as a research tool; and 3) use the process of scientific inquiry.

KEY POINTS

- Researchers use the process of scientific inquiry to learn about birds.
- Bird banding is one way researchers learn about birds.
- There are many obstacles to finding out exact information about bird populations through banding.

TEACHER BACKGROUND

Scientists can attach radio transmitters to large animals, including large birds, to track the animals and see where they go. Because of their size, it is difficult to put a radio on the body of a small bird, like a warbler, especially if the bird is trying to fly long distances. The main technique used by scientists to follow the movements of birds is banding.

Bird banding is the art and science of capturing, marking and releasing wild birds for research. Biologists have been marking birds for study for more than 100 years. The first record of anyone marking a bird for study was that of John James Audubon, who captured an eastern phoebe in the 1850s and wrapped a small piece of silver wire around its

leg and noted that the same individual bird returned to the same place the following year. Today, bird banding involves attaching a tiny aluminum bracelet to a bird's leg, just above the toes. This loose-fitting band that does not harm the bird or restrict its movements. Many of the details of birds' lives are known only through the observation and banding efforts of scientists around the world.

In Illinois, about 300 different species of birds are found each year. Not all of these are seen at one time or in one place. Some are here only during summer because they winter far south of here. Others only come "south" to Illinois during the cold Canadian winter. Some only pass through Illinois during migration because they neither nest nor winter here. There are only a few species of birds that remain in our state throughout the year, both nesting and wintering here. These species generally include some woodpeckers, several hawks and owls, crows, jays and chickadees. We refer to these birds as permanent residents.

Why do we band birds, and what do we learn from banding? To discover which kinds of birds live in a particular area or habitat, we could walk the area throughout the year and watch for different species. With the aid of a good field guide and plenty of practice, we should be able to identify all of the birds that come to an area. However, some birds are hard to see, especially in summer when the leaves are thick. Some people can identify the birds by their calls and songs, since each bird sings differently. Identifying songs and calls is, of course, even more difficult. Since each species looks different from others, we should be able to separate American robins from blue jays or northern cardinals. However, all individuals of any species look the same. Every American crow, great horned owl, Canada goose and bald eagle looks just like the others of its species. How do we know which is which and how many there are in the local population? Color marking, with the use of bands, helps provide the answers.

It is important to estimate the number of birds to monitor population increases and declines. If populations decline at a threatening rate, we can activate management strategies to help them. Population counts are a measure of the success of the management programs we use. Banding birds with a numbered, aluminum band may help in the monitoring efforts of some bird populations. However, hundreds, if not thousands of birds must be banded to get sufficient information on survival and population size.

Some birds that nest in Illinois travel as far south as the tropical rain forest, while others fly only to Mexico or the southern United States for the winter. Do these birds winter in a very specific area? Are they threatened with loss of habitat on their wintering grounds? By marking individuals and seeing where other biologists catch them again, we can learn about their travels. But this knowledge is dependent upon catching the same bird twice. Many birds that are banded are never recaptured. Researchers here and in Latin America both band birds and share information.

One typical method used by researchers to catch birds for banding is mist-netting. A fine net is stretched across an area where birds are likely to fly. Birds are caught when they fly into the net. A researcher then collects data on the species of bird, its age and sex and takes measurements. The bird is banded, and then released. Each band is coded with a unique identification number.

How long do birds live? If we mark young birds in the year they hatch and record their annual return, we can observe a turnover in the population as they die and are replaced by their young. Our songbirds live an average of three to five years. Chickadees have been known to live 10 to 12 years, but this feat is as likely as one of us living to be 100! In fact, 75 percent of all songbirds born this summer won't live to see next spring. That is why it is so important to protect habitat here in Illinois, where these birds raise their young, as well as in the tropics.

Many birds that have been banded die without the researchers knowing where or when they died. If you find a dead bird with a band on its leg, you should notify the U.S. Geological Survey Bird Banding Lab. Record the entire number on the band, the date you found the bird, the species (if known) and the exact location. Report the information at <http://www.pwrc.usgs.gov/bbl/bblretrv/> or by calling 1-800-327-2263.

With such a high percentage of natural losses, further decline in bird populations may threaten their continued existence. We can help birds best if we understand where they live, what they need, and where they travel. Banding is one technique that provides us with the

essential information we need to manage habitat for bird conservation.

PROCEDURE

1. Begin a class discussion on bird banding. How do biologists know where birds fly for the winter? How do scientists know which birds go where, when most individuals of the same species have a similar appearance? How would banding birds facilitate gathering information? Explain that the students will have the opportunity to see what it's like to be a bander and to be a bandee. However, because it requires special equipment, special permits from the federal government and lots of training, they will not actually be banding birds; they will be banding people!
2. Review the method of scientific inquiry. As a class, select a research question, such as: Where do students go at lunch?; Where are the students from the participating class during the last period of the day?; How many students from the participating class use the front door to leave the school building at the end of the day? More than one question may be pursued during the data collection, as is often done in real research. Tell the students that they will need to collect data to answer their question.
3. Divide the class into "researchers" and "migratory birds" with a ratio of approximately one researcher to five birds. Band student "birds" with numbered construction paper anklets and instruct them to go through the school day in their normal fashion. (If you are doing this activity with several classes at once, use different colored bands for each class. If a large percentage of the students in the school are participating in the activity at once, it would be more realistic if the number of banded "birds" were reduced to two out of every five.)
4. Give each researcher a "banding permit" that gives permission to do this activity. Researchers then set up imaginary mist nets. For example, researchers can stand in a selected hallway to catch migrating students, recording the number and color of the band, the time, location and whether or not they had been caught before and any information necessary to the research question. Emphasize to the student "birds" that they shouldn't change their daily activities on account of the research project, or they will risk invalidating data. Because birds are not usually confined to hallways when they travel, and they may fly over or around the mist net without necessarily knowing it's there, student researchers should agree to accept a handicap, such as only stopping every fifth person who passes them.
5. The next day, have students organize the data and present their findings to the class. It would be a

good opportunity to incorporate math skills, such as fractions, probability and graphing. Students could calculate what percent of all "birds" migrated outside during lunch and what percent were caught by the library, then graph the results. Some questions may require more "field work" to collect data. If any new banding is required, students need to request a new banding permit.

6. Discuss the process of scientific inquiry. Relate this process to how students answer their research question.
7. Ask "researchers" to share some of the problems they encountered in banding "birds." Compare these results to the problems bird banders might face. Discuss the benefits and limitations of obtaining data on birds from banding.

DISCUSSION

1. Did the research answer the original question? What similarities exist between this activity and what bird banders do? What differences exist? Why is cooperation and sharing of data important in any study such as this? How could the study have been improved to increase the accuracy of the findings? Who else might be interested in your findings?
2. How have scientists been able to learn so much about migratory bird travel and needs? Do they know all that needs to be known about bird migration? Why is it that we don't know many exact details about where individual birds spend various parts of their lives? For how many years do scientists have to band and catch birds before they obtain sufficient information on bird ages and survival? Before participating in this activity, what would you have done if you found a dead bird with a band on its leg? What would you do now?

EXTENSIONS

1. To really simulate what happens in bird banding, several different parties should be monitoring the same banded students at different times. Some ideas for incorporating this suggestion include: a) have two groups of students (or two classes) collect data on the same banded students at different times of the day or week; or b) on the back of the bands, have students write a request to the parents of the banded student to please return the band to school with information about where the family lives or what types of things the student does at home.
2. Visit a bird bander in the field, or invite one to come to your school to demonstrate equipment. Banders are most active during the spring and fall migrations. Contact the IDNR at 217-785-8547 for information about bird banders in your area.
3. Sometime during the school day, introduce a catastrophic event that would affect part of the "bird" population. For example, have a hazardous storm sweep by the lockers, "killing" any "birds" there at the time. Then recover the bands and discuss what you would do with them in real life.

ASSESSMENT

1. Students should be able to explain some benefits and shortcomings to relying on bird banding for learning about birds.

