The Northern Mockingbird An Introduction to Ethology for High School Students

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Abstract:

Observation is deeply rooted in ethology or the study of animal behavior. By observing bird behavior, we can learn a lot about animal behavior in general. The Northern mockingbird (Mimus polyglottus) is a good choice for a behavioral study for high school students, because, whereas most birds maintain a territory only during the breeding season, the Northern mockingbird holds a territory year round. A territory is an area where an animal spends most of its time. It contains important resources, and the animal defends these from other animals that may compete for them (Gill 1995). In this activity, students map mockingbirds' territories and describe at least 10 common behaviors of these birds. See Figure 1 for a short list of procedural steps. A study of the mockingbird can certainly be conducted with middle school students, although the activities described in this article were done with secondary school biology students. Middle school students would do better with a general observational study, rather than a detailed data analysis.

Article:

BACKGROUND

Before students can map mockingbird territories, they need to identify the bird by appearance and song. The Northern mockingbird is about 25 cm (10") long. It has dark gray upper parts, light under parts, white wing bars and patches, and a black tail with white outer feathers. A field guide makes identification easy. Because male and female mockingbirds look similar, students will not be able to distinguish the mockingbird's sex.

Sight is not the only means for identifying mockingbirds. The mockingbird's song, a series of repeated phrases with each phrase repeated four or more times, allows students to locate birds or determine where they are hiding. The mockingbird belongs to the Family Mimidae because it is a bird that mimics sounds it hears. The majority of its songs are copies of other bird species' songs. However, it is not uncommon for a mockingbird to mimic sirens, animal calls, or even squeaky doors.

PREPARATION

Seasoned bird watchers use several different methods to draw birds out of hiding into an open area so they can make a positive identification. One favored method is a spish call (a type of alarm call that many birds use to indicate that a predator is in the area). When this call is made, many birds come out of hiding to try to locate the predator. Birders also imitate bird predators' calls such as that of the Eastern screech owl, which is a gurgling, trilling noise made in the throat. When it descends in pitch, it sounds like a drawn-out "whool." Either method helps identify birds hidden in trees or shrubs because it brings them over to the edge of the vegetation. Teachers can help students learn these calls. Binoculars, while useful, are not absolutely necessary. Students can also practice their observation skills and their use of field guides by compiling a list of other birds on the school campus.

After you are certain that students can locate and identify mockingbirds, discuss mapping. Most school systems already have a campus map. Blueprints or premade maps are great starters, but they may need to be embellished with landmarks, such as large trees, utility poles, pathways, and fences. We used a slightly embellished form of the school campus map for our study. The map needs to be divided into small areas depending on how many

students are in the class, the total area of the campus, whether or not areas of the campus are restricted for student use, and the density of mockingbirds on the campus. If the density of mockingbirds on a campus is high, an area of approximately 200 sq. ft. would suffice, whereas if a campus has a sparse population of mockingbirds, the area would need to be larger--for example, 800 sq. ft.

MATERIALS

Campus map
Paper
Colored pencils
Meter sticks
Tape measures
Protractors
Compasses

PROCEDURE

1. If a school map is not available, then give students city and road maps as a guide and ask them to make their own map, using the materials provided. Although school buildings are the focus of the map, the students should also include landmarks and legends. Depending on the area, some maps will be more detailed than others. Help students understand that greater detail makes it easier to distinguish mockingbird territories.

2. Divide the campus map into small areas according to how many students are in the class. Assign pairs of students to different areas of the campus. These student pairs will use their maps to complete the observational activities.

3. Send students out in pairs during the first 10-15 minutes of class, on a rotating basis, or set aside a couple of class periods for everyone to look for mockingbirds together. Although it will not take long for the students to become familiar with the different territories, the more time they spend outside, the more detailed their maps will be. To provide both supervision and assistance with this activity, we took the class out as a whole. Your local chapter of the National Audubon Society may be able to provide a volunteer to help with this activity. A long-time birder's experience, especially if he or she enjoys being with adolescents, can be invaluable with this exercise. Be aware that mockingbirds are less active in the midday hours. Optimal times to observe mockingbirds are 8 A.M. to 11 A.M. and 4 P.M. to 6 P.M. The best months for finding them are April and May, which are primary breeding months.

4. This exercise involves completing two different activities--recording the whereabouts of the mockingbirds and completing a journal describing their behavior. To accomplish the first activity, have the students mark the location of any mockingbirds in their area. Students should mark their map every time their bird perches. After a 30-minute observation period, students should see the outlines of each bird's territory or part of a territory. Paired groups can use different colored pencils to mark their bird's territory.

5. In the second activity, have the students record in their journals their mockingbird's behavior. During a 30-minute period, they should record what they observe every two minutes. One partner tracks the bird and describes aloud the observed behaviors, while the other partner times the intervals and records the behaviors (see Figures 2 and 3). Even if the behavior is the same, the students should have at least 15 records. Also, if their mockingbird is engaged in more than one behavior at the 2-minute interval times, the student should record all observed behaviors (see Figure 4).

6. After each pair of students completes their area noting their sightings, have the students piece together the data of the other pairs to construct a master map of all the mockingbirds' territories. This can be difficult because one mockingbird may have a territory that ranges through two or three students' quadrants. Let the students decide whether they were watching the same bird or different birds according to the time of day the mockingbird's behavior was recorded (e.g., one bird cannot preen itself in two different places simultaneously). To decide what the bird's territory is, draw a line around the mockingbird sightings. The territory does not have to be circular, but frequently it does have a near-circular pattern.

One way to sort the data is to formulate the master map, using a series of subgroupings. If you divided the campus into 12 areas, then you should group four areas together and call them area A. The other three area groups can be called B, C, and D. Students in each area can decide their mockingbirds' territories. Once areas A, B, C, and D have been ascertained, group areas A and B together to make map 1. Map 2 will combine data from areas C and D. The master map can be compiled by combining maps 1 and 2. An overhead of this map will provide information and a visual aid for the students' total data compilation.

Because our students used colored pencils, they drew their colored territory onto each other's maps. If the territories overlapped, the students were asked whether they were watching the same bird. Two groups realized that they had one mockingbird's territory contained within the territory of another group's mockingbird. The students made the connection that because the month of May falls within the breeding season, one of the birds was probably a female or juvenile mockingbird. This opened up an opportunity for the teacher to discuss reasons why birds and animals maintain a territory.

Developing a territory represents a significant investment of time and energy; without a return on the investment, animals would not maintain territories. Mockingbirds maintain their territories through the use of vocalizations and aggression. A mockingbird's territory ensures its food, water, and nesting sites. However, the price of holding territories is that conflicts arise and battles must be fought between mockingbirds over control of the territory. Generally, the larger, stronger, and older mockingbirds win. During mating season, females tour male mockingbird territories to see what they have to offer. Abundant food, water, and nesting sites are likely to result in a match, and, if there are few of these resources, then the female is unlikely to mate. In effect, this selection keeps inexperienced males from mating. However, once young males mature and can keep a favorable territory, then they will be able to mate and rear young.

7. After students have acquired a good understanding of mockingbird territories, discuss mockingbird behaviors with them. Students may have previously seen many of the common bird behaviors listed. However, they may not understand why mockingbirds perform some of these behaviors. Although the students can think about why mockingbirds might flash their wings, let them know that even ornithologists do not fully understand wing flashing. Discuss behaviors such as feeding and drinking, too. Preening is another fascinating behavior. Birds must keep their feathers in good condition so they can fly efficiently; feathers that become split in the vane do not allow for efficient flight. Demonstrate this using a chicken feather. Although the vane can be easily separated, it is necessary to pull the feather through your fingernails to re-attach the vane. Point out that your fingernails are acting like the beak of a bird when it preens.

8. End the mockingbird activity with a student handout. We asked the students questions to see whether they understood the activity. We also tried to stimulate them to think about why animals hold territories (see Figure 5). In lieu of, or in addition to, this more traditional assessment, students could prepare a field guide to birds on their campus to include not only the mockingbird but also other bird species as well. The students could also make a photography exhibit or an artistic exposition with photographs, or mockingbird sketches exhibiting the various behaviors discussed in this article.

Do not limit bird behavioral studies to the mockingbird. Other birds display elaborate plumage or sing as a way to attract mates, or they perform interesting behaviors to keep predators away from their nest sites. The Northern mockingbird is a good bird for territorial behavioral studies, but its range (southeastern United States) may not include your school campus. Check with your local chapter of the National Audubon Society to see what birds are available in your area to study.

EXTENSIONS

If you want to bring the Internet into the classroom, have your students participate in Project Classroom Watch

(www.ornith.cornell.edu). Students set up a feeder at school and identify and count the species of birds that visit. They then can publish their findings in a national newsletter, Classroom Birdscope. For more information about mockingbirds, see the bibliography compiled by Dr. Cheryl Logan at the Web site located at http://www.uncg.edu/?calogan/mockerbib.html.

CONCLUSION

The study of bird behavior can be an exciting and worthwhile endeavor. Ethology is becoming increasingly important because of the necessity for species conservation. Conservation efforts may be disappointing, however, because of the lack of behavioral information on many species. The more we understand animal behavior, the more prepared we will be when ecological problems threaten species survival, and scientists must set up conservation parameters and breeding programs. These activities deepen students' appreciation for bird behavior.

ADDED MATERIAL

JENNIFER D. KING, a recent graduate of the University of North Carolina, Greensboro, with a masters of education in biology, now teaches general biology labs at the university. She has always been interested in birding and had her first teaching experience with high school students when she did this project.

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The Northern mockingbird in flight and at rest.

Figure 2. Sample handout for recording mockingbird behaviors.

Figure 3. Sample handout for students.

REFERENCE

Gill, F. B. 1995. Ornithology. New York: W. H. Freeman.

FIGURE 1. LIST OF PROCEDURES.

1. Teacher confirms the presence of Northern mockingbirds on the school campus.
2. Teacher develops and teaches lesson plan to help students identify mockingbirds.
3. Teacher takes whole class on a campus field trip to make sure students can call birds out from hiding, identify mockingbirds, and generate a list of common mockingbird behaviors.
4. Teacher designs lessons to engage students to make or embellish a map of the school campus.
5. Teacher organizes class into study groups.
6. Students gather data, using handout.
7. Students compile data onto a detailed map of the campus.
8. Teacher designs a follow-up handout to gauge the students' comprehension of the activity.
9. Extension--Students learn about behaviors of different species of birds.

FIGURE 4. COMMON BIRD BEHAVIORS AND BEHAVIORS SPECIFIC TO MOCKINGBIRDS.

Mobbing	Mockingbirds and other songbirds will attack and dive bomb predators and anything else that seems threatening to them. To elicit this behavior, set up an inflatable owl decoy or pull a toy snake across a mockingbird's territory. Try this only once so that the parents will not leave their nest and neglect their young.

Wing Flashing	On the ground or a perch, mockingbirds slowly extend and raise their wings, revealing their white wing patches. Reasons for this behavior are not fully known.
Vocalizations	Birds have different songs and calls to reinforce territorial boundaries and to attract mates.
Preening	Birds pull feathers through their beaks to clean and repair them for better flight efficiency.
Bathing	Birds bathe in dirt or water to rid their bodies of parasites and to clean their feathers.
Eating	Mockingbirds eat a variety of berries, insects, and insect larvae.
Perching	Mockingbirds sit on branches or other objects.
Flying	Mockingbirds are identified in flight by their large, white wing patches.
Drinking	Birds drink water from birdbaths, rain puddles, and other places where water collects.
Territorial Aggression	Birds fight with each other (nonspecific aggression).
Nest Building	Mockingbirds make their nests six to eight feet above the ground. Nests are constructed primarily of small twigs from young trees; the birds pick up and drop many twigs before taking one to the tree where they are building the nest.
Boundary Dancing	Birds in neighboring territories come to the edge of their respective territories and dance along an imaginary separation line. It appears as if the birds are daring the others to cross the boundary and create a fight.
Care of the young	Both mockingbird parents feed the young nestlings.

FIGURE 5. THE POSTLAB QUESTIONNAIRE AND A STUDENT'S RESPONSE.

1. Explain the procedure you used to determine your bird's territory. notice where the bird flew, when it fought and with which other birds it did and did not fight
2. Why do animals need territories? to have their own space and for a nest
3. Which behavior did you see the most? perching
4. Look at your list of behaviors and write down each below. Explain why you think each is learned or innate. preening, perching, and vocalization are innate; flying is learned
5. Do you think the time of year influences the types of behaviors you see? How? Yes, because at different times of the year, birds react to different things
6. Using a colored pencil or a crayon, draw a line on your map around your bird's territory. attached
7. Get with another group and using a different colored crayon or colored pencil, draw on your map where they determined their bird's territory. attached
8. Do the territories overlap? Do you think this could cause problems? Yes; no if they are mates, yes if they are not mates.
9. Using what you know about animal territories and why they exist, would it be okay for more mockingbirds to move into this area? Why? Yes or no; it depends on what bird has what area. After seeing the mockingbird fight though I would say no because it seems like mockingbirds do not like seeing any other birds in their territories.