Teacher-Led Activity

Migratory Mapping

OVERVIEW

Students learn about the migration patterns of two Neotropical migratory birds—the Swainson's Thrush and the Wood Thrush—by compiling and mapping data from hypothetical band records.

CONTENT AREA

Geography, Math, Science, Social Studies, Environmental Education

PEOPLE POWER

Divide the students into two sections, then divide those into groups of four

SPACE REQUIREMENT

Indoors

ACTIVITY TIME

One or two 45-minute class

MATERIALS

- Copies of Datasheets 1 and 2, cut into strips
- Western Hemisphere Maps
- Two hats, bags, or other receptacles
- Colored pencils or pens
- Pen or pencil and writing paper
- Bird songs recording, optional

SPECIAL GUEST

Invite a local conservation officer, Fish and Wildlife Service employee, or local member of the Audubon Society to discuss bird banding and also tell students what they should do if they see a band on a bird (either live or dead).

TERMS TO KNOW

breeding ground, wintering ground, migration route, stopover point

Follow that bird!

Learning Objectives

Students will define the terms ***breeding ground, wintering ground, migration route,*** and ***stopover point***; identify the breeding and wintering areas and migratory routes of the Wood Thrush and the Swainson's Thrush; describe hazards to migratory birds; and understand the uses of banding.

Background

The original purpose of bird banding was to gain information on migration. Through the recovery of bird bands, scientists can obtain data on the direction and length of migration, as well as locations of migratory stopover points and breeding and non-breeding areas.

The Institute for Bird Populations (IBP) in California conducts banding activities across the United States with a network of over 300 bird-banding stations. Birds are captured without injury in large, fine-mesh nets (called "mist nests"), then banded and released after information is collected on each bird's species, age, sex, size, and condition.

Researchers have been able to record the migratory routes and breeding grounds of various bird species. For example, the Swainson's Thrush breeds from Alaska to Newfoundland and south to California, Colorado, Manitoba, and the northern Appalachians. It migrates through North and Central America and to some extent the Caribbean and winters from Mexico to Peru and Brazil. The Wood Thrush breeds from North Dakota to Nova Scotia and south to Texas and Florida. It migrates through North and Central America and winters from eastern Mexico to Panama.

By operating the nets each summer and compiling data from many stations within a region, changes in population size can be determined. Information gained from banding can help identify the stages in a species' life cycle when it is most sensitive to environmental threats. Researchers can monitor both birth rate (productivity) and death rate (survivorship) in migratory bird populations, and explore causes of declines for these species.

Data indicates that loss of habitat is the major cause of population decline. Other hazards to migratory birds include predators, storms, windows, automobiles, cell phone TV towers, and other tall structures.

Research showed a population decline of 1.9% per year

over the 26 years between 1966 and 1993 for Wood Thrushes. At that rate, remaining Wood Thrush populations will continue to decline by nearly half over the next 25 years. The Swainson's Thrush population also showed a decline, but by only 0.2% during the same period.

Banding research may contribute to research on whether population declines in the Wood Thrush are due to low productivity on the breeding grounds or high mortality during migration or in the winter, or both. Based on this information, wildlife managers can design appropriate habitat management programs for the Wood Thrush.

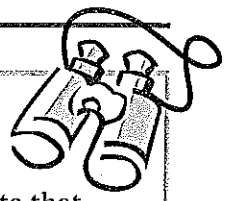
Getting Ready

1. Datasheets 1 and 2 each contain 25 band records for each of the two thrush species. Cut the datasheets into strips, so that each strip contains a single record. Make enough copies of the datasheets to provide each student with six or seven records (or strips).
2. Put strips from the Wood Thrush data in one container. Put strips from the Swainson's Thrush data into the other. *Note: These band records are based on hypothetical data illustrating actual ranges, migration routes, and causes of recoveries.*
3. Plan a discussion of bird banding, population trends, and the Monitoring Avian Productivity and Survivorship Program (MAPS).
4. Show students pictures of the Swainson's Thrush and the Wood Thrush. If possible, play recordings of these birds' songs, as the Wood Thrush is particularly noted for its melodious song. (*You can purchase bird recordings at many bird supply stores, or find further sources such as websites in Appendix C.*)
5. Tell students they have become wildlife biologists for the class period. They are being sent data regarding the banding and recovery locations of the Wood Thrush and the Swainson's Thrush. Their job is to map thrush migration based on the records. Tell students that each of them should receive data from six or seven bands, which they will use to plot records on their maps. They should use different colors for the dates representing each of the four seasons to indicate times when the birds are in their breeding and wintering grounds.
6. Distribute the Western Hemisphere Map, one for each student.

Taking Flight!

1. Divide students into two sections: one for each species. Pass the hat (or receptacle) for each species around its respective group. Each student should take six or seven records for that species and plot the location of each record on the map in the appropriate color. June and July records show the breeding range, August to October records indicate fall (southward) migration, November to March records come from the wintering grounds, and April and May show spring (northward) migration.

ZOOM IN, ZOOM OUT!



Point out to students that they now know one method scientists use to gather data on bird populations. Bring in several bird field guides that contain range maps to illustrate this point to students. Ask students what else scientists can learn through band records, as well as what the limits are for this type of data.

Discuss the many environmental threats, both natural and human-caused, that birds face while migrating. Brainstorm a list of threats and record these on the blackboard. Then ask students which of the threats they can help reduce. What actions can students—individually or as a group—take to reduce threats to birds while migrating? (*Hints: Keep cats indoors. Place warning decals, such as silhouettes of raptors, on large picture windows to break up reflections. Use native plant species in backyard landscaping to improve habitats for birds and refrain from cutting or pruning trees and bushes, especially during the breeding season. Provide equipment and funding for habitat protection in Latin America.*)

Try to arrange a visit to a nearby banding station to give students the opportunity to observe bird banding first hand. Contact The Institute for Bird Populations (*www.birdpop.org*; 415-663-1436) for the location and operator of MAPS stations in your area.

Information gained from banding can identify stages in a bird species' life cycle when it is most sensitive to environmental threats.

2. Have students within each of the two large sections form smaller groups of four to compare data. Based on the information provided by their group's banding records, members of each smaller group should be able to plot spring and fall migration routes and indicate the general breeding and non-breeding grounds of their thrush species.
3. Bring the class together again, and have each student share one or more of the records (from the strips) he or she used to illustrate the various ways banded birds are recovered and the numerous hazards they face.
4. Plot all the band records on the Western Hemisphere Map, using small square symbols for the Wood Thrush and small circle symbols for the Swainson's Thrush. Also use different colors to indicate the seasons and times when birds are in their breeding and non-breeding ranges. When all the locations are plotted, draw lines in the appropriate colors around the breeding and non- breeding grounds of each species and link the two to indicate migration routes. Students can confirm their results by comparing the breeding areas interpreted from their records with those shown in most field guides.

Assessment

Discuss the following with students:

1. Where do the thrush species you studied breed?
   - Where do these thrushes spend the winter?
   - What routes do they use to get from the breeding grounds to the wintering grounds? (Provide students with field guides to help them obtain this information.)
2. List four hazards to migratory birds as illustrated by the band records.
3. What could be some causes of population declines in the Wood Thrush?
4. What can we do to help protect these species?

Festival Connection

See Festival Planning and Implementation for information on how to organize a bird banding booth—set up for each student to wear a self-made bird band on their wrist—at your festival.

Invite a special guest to bring in samples of actual bird bands, as well as a mist net to show how the birds are trapped.

Service-Learning Connection

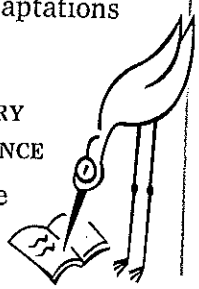
Investigate the many opportunities to participate in Adopt-an-Acre programs such as those provided by Children's Rainforest Network. Look for other ways to support efforts to preserve forests both in your region and in the Tropics.

IN STEP WITH SCIENCE STANDARDS

Standard A: Science as Inquiry
- Abilities necessary to do scientific inquiry
- Understandings about scientific inquiry

Standard C: Life Science
- Regulation and behavior
- Populations and ecosystems
- Diversity and adaptations of organisms

Standard G: History and Nature of Science
- Nature of science



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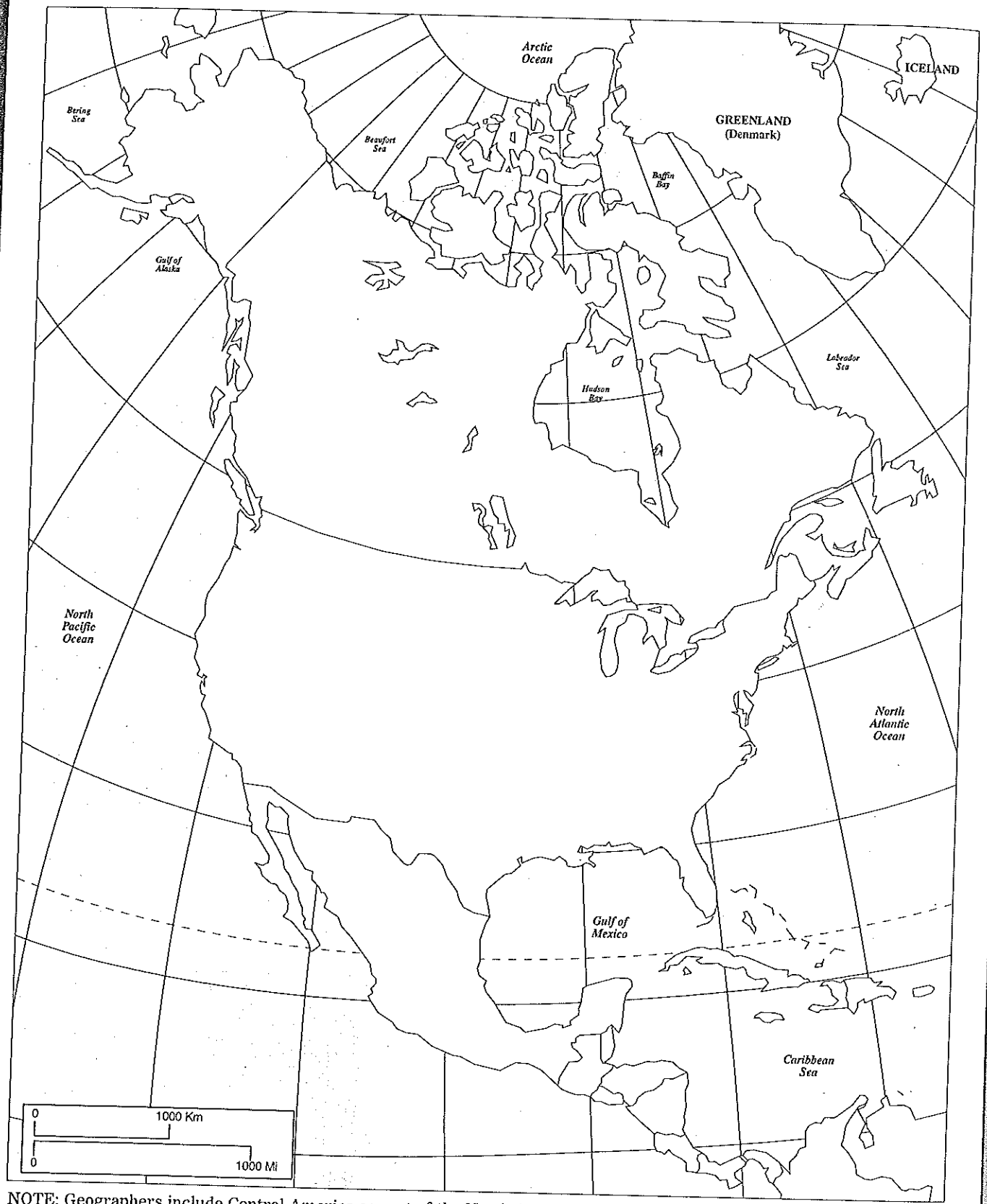
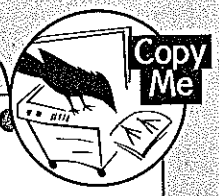
Western Hemisphere Map

North America Map



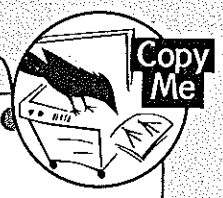
NOTE: Geographers include Central America as part of the North American continent.



South America Map

Datasheet 1: Swainson's Thrush Records

Swainson's Thrush banded in NW California 6/28/89.	Swainson's Thrush banded in Northcentral Pennsylvania on 7/7/92.
Swainson's Thrush banded in NW British Columbia 6/31/91 was recaptured 9/16/91 in SE Arizona, and again (amazingly!) 12/21/92 in El Salvador.	Swainson's Thrush banded found dead on an oil platform off the coast of Louisiana May 25, following the passing of a cold front with heavy rains over the Gulf of Mexico.
Swainson's Thrush banded in SW Alaska early July of 1986 was recovered in SE British Columbia after it flew into the window of a private residence in mid-September 1986.	Swainson's Thrush banded in Central Ontario in June 1980 was recaptured at the same site many times over several years. It was last recorded 7/23/91.
Swainson's Thrush banded in SW Mexico 2/3/92.	Swainson's Thrush banded in North Wisconsin in early August 1993.
Swainson's Thrush banded in NE Quebec 6/11/84.	Swainson's Thrush banded Massachusetts 6/17/91 recaptured in November 1992 in Cuba.
Swainson's Thrush banded in Guatemala 12/19/93.	Swainson's Thrush banded in North Nevada 8/3/92.
Swainson's Thrush that was banded with a unique combination of three colored leg bands by a researcher studying bird behavior in Central Saskatchewan on 6/11/89 was re-sighted by a bird watcher in NE Oklahoma on 4/26/91.	Swainson's Thrush banded in Central Alberta during the summer of 1987 was killed by a cat in SE Colorado. It was discovered and reported by the cat's owner.
Swainson's Thrush banded 5/11/93 in West Virginia.	Swainson's Thrush banded in Columbia, South America in January 1994.
Swainson's Thrush banded in Southcentral Montana on 6/11/88 was subsequently recaptured at the same site on the following dates: 6/27/89, 7/13/90, and 6/20/92.	Swainson's Thrush banded in Central Colorado 7/17/91, found dead in Peru by indigenous person in the tropical forest in January of 1993. The band was eventually returned with a description of the recovery location to the Bird Banding Laboratory (BBL) in Laurel, MD.
Swainson's Thrush banded in Central Yukon Territory in June 1991.	
Swainson's Thrush banded in Northcentral New Mexico 9/29/93.	Swainson's Thrush banded in Western Washington 7/7/94.
Swainson's Thrush banded in the SW Northwest Territories in July of 1986.	Swainson's Thrush banded in Central Idaho during the summer of 1994.
Swainson's Thrush banded in Western Oregon 5/31/81 is killed as it flies into a lighthouse on the Central Californian coast 4/11/94.	Swainson's Thrush banded in Central Manitoba, Canada 6/13/94.



Datasheet 2: Wood Thrush Records

Wood Thrush banded 6/21/94 in Central New Brunswick.	Wood Thrush banded in SE Ontario, Canada, 6/12/93, recaptured in coastal Alabama 4/13/94.
Wood Thrush banded in eastern North Carolina at a MAPS station during the summer of 1990, recaptured at the same site in 1992 Kentucky 6/1/94. It was not captured in 1991 or 1993.	Wood Thrush banded at a MAPS station in West Ohio during the summer of 1991 was re-captured in Costa Rica during December 1993.
Wood Thrush band sent in from Illinois during the summer of 1991 with no information about recovery or cause of death. It had been banded on 8/31/91 in NW Ohio.	Wood Thrush banded 7/27/93 in Delaware recaptured 10/1/93 on the NE Texas coast.
Wood Thrush banded in Honduras 1/17/91 recaptured in SW Pennsylvania 6/18/91.	Wood Thrush banded in SE Quebec 6/17/91.
Wood Thrush banded in Panama 2/17/91, recaptured in Central Tennessee, 6/9/91.	Wood Thrush banded in South Mexico 11/21/94.
Wood Thrush banded 6/29/94 in Central New York recaptured 8/30/94 in SW Virginia.	Wood Thrush banded in East Georgia 8/5/94.
Wood Thrush banded in Southcentral Pennsylvania 8/11/87. The Wood Thrush was found dead the following summer near the original banding location. It had been killed by a cat.	A Wood Thrush that was banded in Central Mississippi on 6/21/85 with a unique combination of colored leg-bands was re-sighted by a bird watcher 8/29/85 in coastal Mississippi.
Wood Thrush banded in NE Texas 5/29/80 as an adult was recaptured at the same site 6/21/89.	Wood Thrush banded at MAPS station in East Kentucky 6/1/94.
Wood Thrush banded in Central Oklahoma 7/19/83. The study site on which it was banded was not used after this year as construction for a residential development began in 1984.	A biologist monitoring the nest of a pair of Wood Thrushes he banded during the summer of 1993 in Central Minnesota found that although no young Wood Thrushes were successfully raised, the pair did successfully raise one Brown-headed Cowbird.
Wood Thrush banded 6/3/04 in Central South Carolina.	
Wood Thrush banded in the summer of 1980 in NW Florida.	Wood Thrush banded 8/9/89 in Central Maine was later recovered after it flew into the window of a residence in Connecticut.
Wood Thrush banded in Central Wisconsin 7/18/92.	The nest of a banded pair of Wood Thrushes in SE South Dakota was monitored in 1989. No eggs were hatched as raccoons ate the eggs.
Wood Thrush banded in Central Georgia 7/7/85 later recovered nearly 50 miles southeast after being struck by an automobile.	Wood Thrush banded in East Nebraska as a juvenile 6/30/93 recaptured as an adult in East Kansas 7/1/94.