

It's for the Birds

AFTER 1: Mapping Migration

To use **After** your visit to expand on the migration game conducted at Blandy. Brings in map reading skills, mathematics, and social studies to deepen understanding of migrations.

Investigative Question: What species of bird migrate? How far do they migrate?

Objectives: Using maps and measuring tools, students will track the migration of a particular bird species to determine the approximate distance of its migration in terms of months, weeks, days. Students understand that many species of birds migrate, and migration routes differ among species.

- ~ **Knowledge:** Students learn that many types of birds migrate to a variety of places depending on adaptations and needs. Students will learn migratory routes of a specific species in relation to a map of North and South America.
- ~ **Skills:** Students use non-standard and standard forms of measurement to calculate a migration route on the map to the nearest foot, yard, and meter. Students will use math skills to find equivalent periods of time for migration. (Hours into days; days into months).
- ~ **Values:** Students gain an appreciation for the distance of migratory paths as well as the difficulty of migrating, in North and South America.

VA SOL addressed:

Mathematics (2016): 2.11, 3.9, 3.12, 4.7, 5.2, 5.8, 5.10
Science (2018): 2.1, 2.5, 2.7; 3.1, 3.4, 3.5, 3.8; 4.1, 4.3, 4.8
Social Studies (2015): 2.6, 3.6, VS.2

Note to Educator: Because of the wide range of grade levels and learners, there are various extensions and further options for each particular grade level. Adjust this lesson to fit your needs!

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Materials:

- Migration Info Cards
- Wet erase markers and wet wipes
- Colored string/yarn (5 different colors, one for each bird route)
- Measuring devices (meter tape, meter stick, or rulers)
- Large, laminated map (Sample Map for Mapping Migration)- as large as you can make them for groups of 4-5 students
- Conversion Sheet for Mapping Migration

Instructional Strategy

1. Students refer to the Migration Info Cards from the migration game for this activity.
2. Recap the bird migration game and discuss migration. Look at the large, laminated map of North and South America. Ask students: What is this a map of? What do you see on the map? Check: does the map have all the features it should?
3. In groups, students reread the information for their bird and its migration route.
4. Instruct each group to draw their bird's migratory path on the laminated map. Each bird has a corresponding color.



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5. Next, estimate the distance of their bird's migratory route by using context clues (using a map scale or distance from east coast to west coast and the conversion sheet).
6. Ask: What are some ways we can determine the distance of the migration route?
7. Distribute colored string to groups. Place the string over their bird's migratory path on the large, laminated map. Students should look at the scale (1 in: 205 miles) provided on the map to determine the approximate distance of their migratory route. 1 inch on the map = 205 miles (1:205). If the measurement of the route is 4 inches, then the distance of that bird's route is 820 miles.
8. Distribute the rulers to groups and then ask each group to calculate the distance traveled using the scale provided on the map. Round up or down as needed.
 - a. If time allows, students can convert the final measurement from English standard to the metric system (kilometers). The large, laminated map has a meter scale for help. It may help to round down the conversion from 1 inch= 205 miles to 1 inch = 200 miles.
9. Ask students which form of measurement is easier (the string estimate or ruler measurement)? Which is more accurate?
10. With the information given on each of the bird information sheets, students can convert their bird's total length of migration into equivalent time periods: days, months, hours (ex. 15 days= ½ month, 2 months = 60 days). This may be total migration or a portion of their bird's migratory route.
11. Questions to extend the investigation
 - **Where did your bird frequently visit?**
 - **Did your bird migrate to the same locations every year? If so why?**
 - **What do the birds need to survive?**
 - **What characteristics in the landscape was your bird searching for?**

Extensions

- Create a legend on the laminated map.
- Analyze and compare the migratory patterns and distances of each species of bird.
- Research migration flyways (flight used in bird migration) <https://www.birdlife.org/migratory-birds/>
- Students explore different locations of their bird's migration and make a prediction as to why birds stopped at specific locations. Research different areas of the migration route.
- Create a large number line/migration line down a hallway at school. Online resources are available to track a current bird's migration by The Center for Conservation of Biology and Wildlife tracking. <http://www.cbbirds.org/what-we-do/research/bird-migration/>
- **Engineering and Technology-** Students can use technology to research satellite transmitters and their specific use of tracking. Use engineering design principles to build/design a transmitter model. In what ways can the original transmitters be improved?
- **Higher Level Thinking Extension/ Abstract thinking –** Students find their bird migratory path on a globe. How is the path different once you take into account the sphere that is Earth? Does a bird fly in a straight line? How does bird flight speeds and distances compare to airplane speeds and distances?



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Teacher Background Information

Northern Pintail

“Pintails were caught with both rocket nets and swim-in traps and then fitted with transmitters. The satellite transmitters weigh 20g. The weight of the transmitter is critical as the overall weight of the transmitter/harness package should not exceed approximately 3-4% of the weight of the bird. Because we are primarily interested in large-scale movements over the course of 1 year, our transmitters are programmed to send a signal every 65 seconds for eight hours every six days. This routine conserves battery power and should allow researchers to track the pintails through spring migration, breeding, and the following fall migration (North Carolina Wildlife Resource Commission).”



North Carolina Wildlife Resource Commission

<https://www.ncwildlife.org/Hunting/waterfowl/Satellite-Tracking-of-Northern-Pintails#2375788-tracking-maps>

Whimbrel

“Beginning in 2008, the Center for Conservation Biology collaborated with The Nature Conservancy to investigate the stopover ecology of whimbrels along the Delmarva Peninsula. The study includes aerial surveys to estimate seasonal numbers, traditional transmitters to examine stopover periods, and satellite transmitters to document migration pathways and breeding destinations for birds leaving the site (wildlifetracking.org).”

http://www.seaturtle.org/tracking/?project_id=369

Eagles

“Wildlife tracking.org banded and satellite tagged Bald and Golden Eagles in the upper Chesapeake Bay, USA as part of a program funded in part by the US Army. The Chesapeake Bay is a unique convergence zone for eagles along the Atlantic Coast of North America. It hosts over 1,000 breeding pairs of Bald Eagles year-round, plus thousands of migrant eagles from the southeastern US and northeastern US and Canada. Using the satellite tracking data, we can study the eagles' migration path, roosting patterns, foraging sites, and nesting sites. In addition, we can determine common causes of mortality and provide management recommendations to reduce future eagle mortalities. Eagles were tagged as nestlings or captured as free flying birds. We fitted eagles with backpack harness to hold the solar-powered transmitter in the middle of the eagle's back. Eagles were named after rivers and creeks in the Chesapeake Bay watershed, Canada, and Florida (wildlifetracking.org).”

http://www.seaturtle.org/tracking/?project_id=349



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Peregrine Falcon

“Center for Conservation Biology began a research program called FalconTrak as a cooperative project designed to answer questions about the movements and survival of Peregrine Falcons (*Falco peregrinus*) within the mid-Atlantic region of North America. Sixty-one falcons were tracked between 2001 and 2012 with solar-powered, satellite transmitters to investigate the spatial dynamics of their annual cycle and to identify causes of mortality (The Center for Conservation Biology).”

http://www.seaturtle.org/tracking/index.shtml?tag_id=8175a

Northern Harrier

Avian Research and Conservation Institute

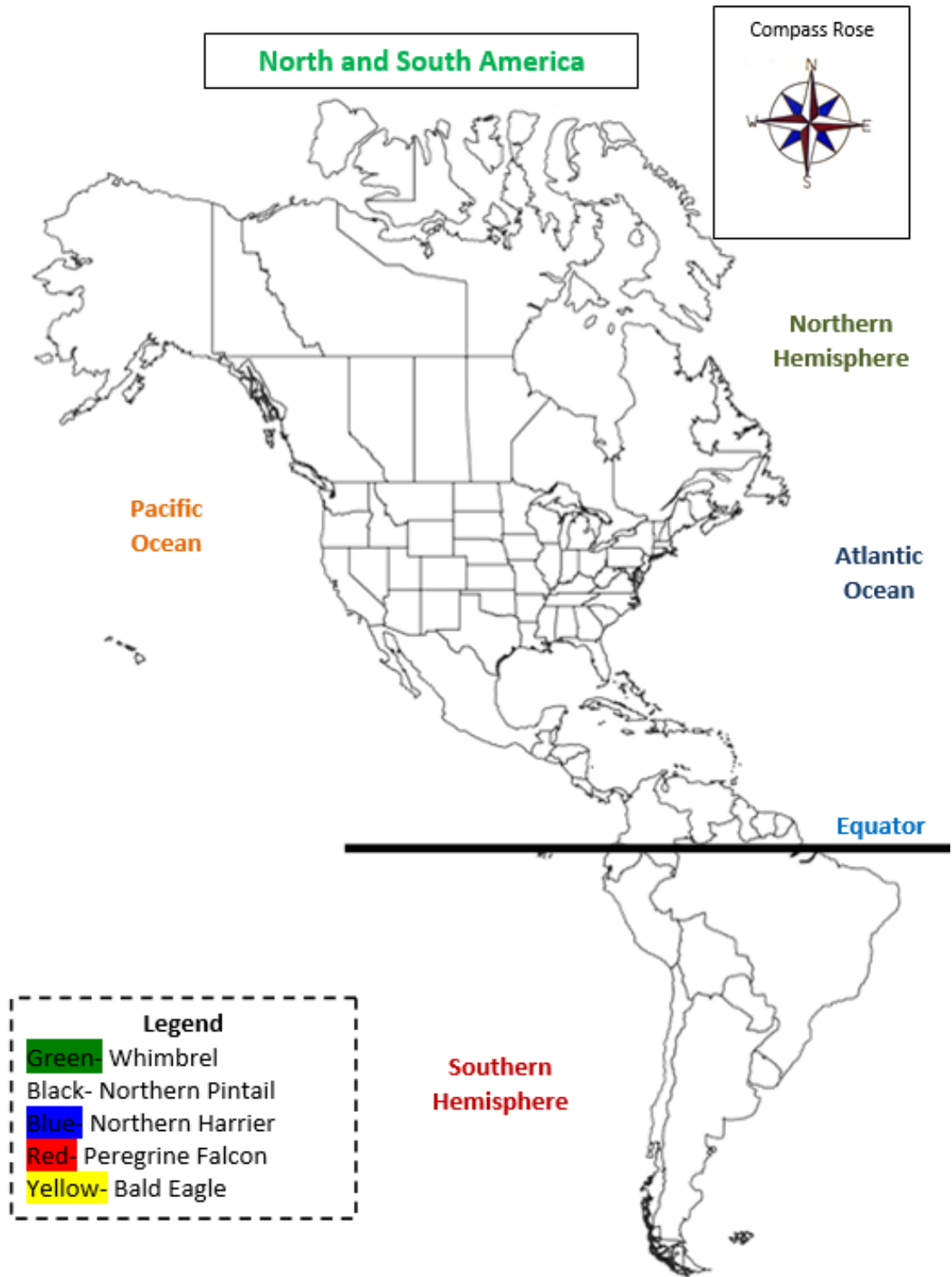
“During the fall of 2010 and again in 2012, we deployed satellite transmitters on a total of five Northern Harriers (*Circus cyaneus*) migrating through the westernmost reaches of the Florida Keys. This study was a first attempt at identifying pathways, stopover sites, and wintering destinations for this long-distance migrant (Avian Research and Conservation Institute).”

http://www.seaturtle.org/tracking/?project_id=556



It's for the Birds

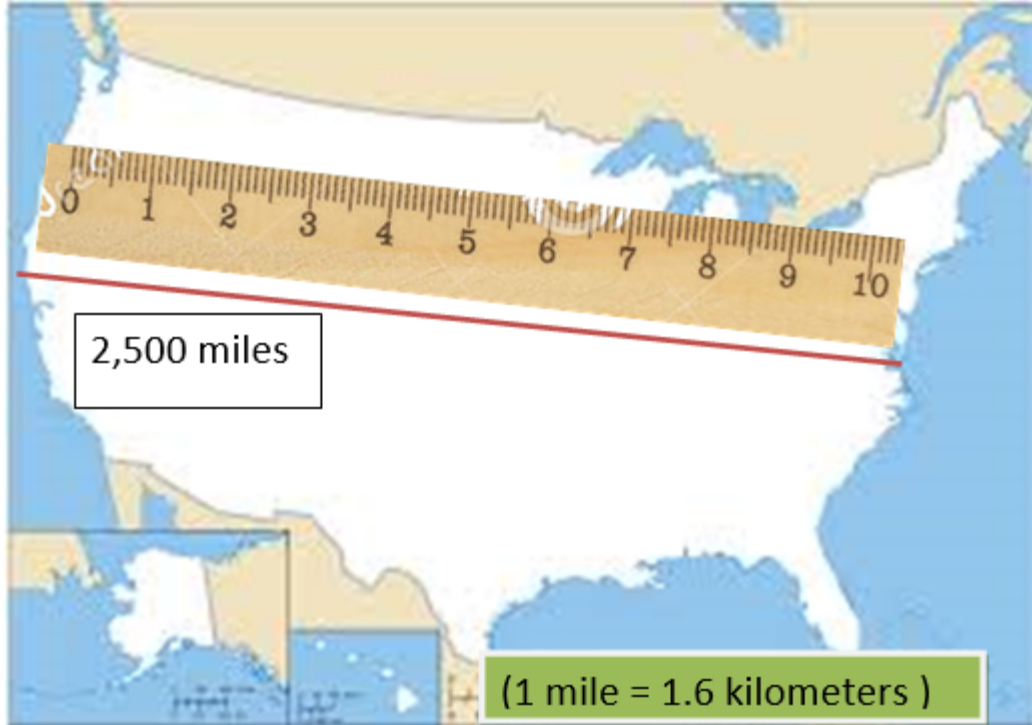
Sample Map for Mapping Migration



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Conversion Sheet for Mapping Migration

Conversion Sheet
The United States



*This map is not to scale & numbers are rounded up or down.

Inches	Miles	Kilometers
1 in	250	1 mile = 1.6 km
East Coast to West Coast inches		E. Coast to W. Coast Kilometers
10"	2,500	2500 m = 4000 km




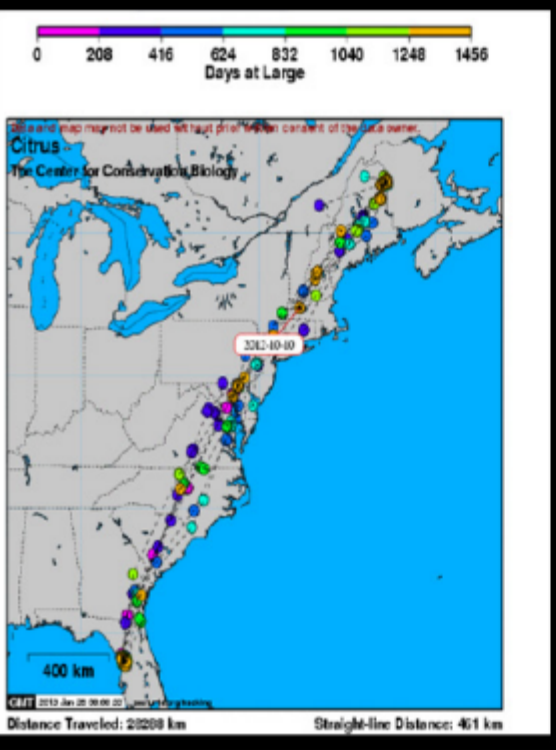
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Migration Info Cards

Species: Bald Eagle
Life Stage: Sub- Adult
Gender: Male
Release Date: 10/17/2008
Release Location: Harford County, Maryland
Last Location: 10/10/2010

Bald Eagle Migration





Distance Traveled: 20208 km Straight-line Distance: 461 km

This bald eagle is a summer visitor to the Chesapeake Bay.

In fall, this eagle flies to Florida for the winter months, a distance of 800 miles.

In spring, this eagle will return to the Bay to hunt spawning fish along the many tributaries of the Bay.

Bald eagles build their nests in large trees near rivers or coasts. A typical nest is around 5 feet in **diameter**.

Eagles often use the same nest year after year. The largest nest recorded weighed two tons. (National Geographic)

HABITAT- in FORESTS next to large bodies of water.

DIET- Fish, amphibians, invertebrates (like crabs), and some birds

Spring Migration
March 31, 2009 to June 8, 2009

Sticks placed in trees result in cylinder or cone shaped nests. Disk shaped nests are built on the ground or a tree branch which is nearly level. Bowl shaped nests occur where the tree trunk branches off into smaller upright branches.

http://www.wildlifetracking.org/index.shtml?project_id=349

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PreK-12 Programs at Blandy Experimental Farm
The State Arboretum of Virginia
<https://blandy.virginia.edu/>

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Whimbrel Migration



Species: Whimbrel
Life Stage: Adult
Gender: Female
Release Date: 05/22/2013
Release Location: Bloody Marsh,
St. Simons Island, Georgia
Last Location: 09/14/2014

One of the most wide-ranging shorebirds in the world, the Whimbrel breeds in the Arctic in the eastern and western hemispheres, and migrates to South America, Africa, south Asia, and Australia.

Essential stopover sites (in and on waterways) allow whimbrels to refuel before the next leg of their journey.

They use their long, down-curved bill to probe deep in the sand for food.

Whimbrels nest on the ground in a shallow bowl shape lined with leaves and grasses.

HABITAT- Tundra in wet, low areas, and dry shrubs. Winters on shores of coastal plains.
DIET- Invertebrates (insects and crabs), berries
Fall Migration
October 26, 2013 to November 27, 2013



Some migrating Whimbrels make a nonstop flight of 4,000 km (2,500 miles) from southern Canada or New England to South America.
http://www.wildlifetracking.org/index.shtml?project_id=369



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Peregrine Falcon Migration



The word "peregrine" means wanderer or pilgrim. Peregrine falcons live all over the world.

On average, southbound migration is 2,000 miles.

Peregrine falcons do no nest building beyond a ritualized scraping of the nest ledge to create a depression in the sand or gravel of the nest site.

Scrapes area about 9 inches in diameter and 2 inches deep.

Other nesting sites include electricity lines and towers, quarries, silos, skyscrapers, churches, and bridges.

HABITAT- Open habitat but prefer coastlines, lake edges, and barrier islands.

DIET- Mostly birds: from shorebirds to songbirds, and occasionally fish.

Spring Migration
April 26, 2003 to May 18, 2003

DANGER!

Of the 11 tracked Peregrine Falcons:
7 flew into man-made structures
3 were killed in storms
1 was lost at sea.

http://www.allaboutbirds.org/guide/peregrine_falcon/id

http://www.wildlifetracking.org/index.shtml?tag_id=8175a

Species: Peregrine Falcon

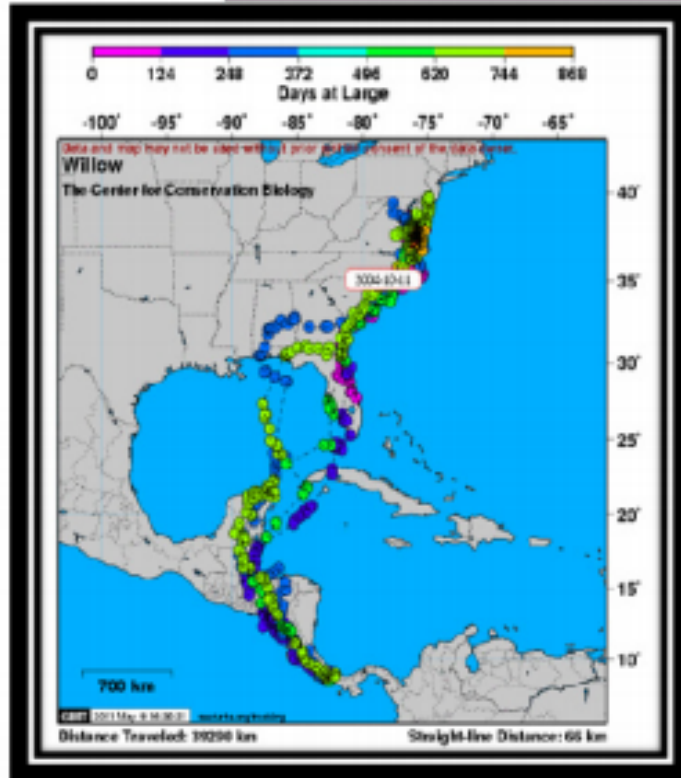
Life Stage: Juvenile

Gender: Female

Release Date: 5/31/2002

Release Location: Watts Island, Virginia

Last Location: 10/12/2004



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Northern Pintail Migration

Species: Northern Pintail

Life Stage: Adult

Release Date: 02/04/2004

Release Location: Pine Island Hunt Club,
Currituck County, NC

Last Location: 10/07/2011, Refuge, Florida



The Northern Pintail stays in low, thick vegetation, such as freshwater marshes and lightly grazed meadows.

They can be found in old fields across Canada and the northern United States.

Northern Pintails are a highly prized species by hunters.

Their population has been in decline due to avian (bird) diseases, loss in habitat, and changes in farming practices.

Northern Pintails nest by scraping in the ground, in brush, or in grass. They line their nests with grass.



HABITAT- Large wetlands and grassland habitats.

DIET-Plants and small invertebrates



The transmitter batteries used to track these birds usually last an average of 169 days. This Pintail was tracked for almost 7 years!


<http://www.ncwildlife.org/Hunting/waterfowl/SatelliteTrackingofNorthernPintails.aspx>



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Northern Harrier Migration


Species: Northern Harrier
Life Stage: Juvenile
Gender: Female
Release Date: 10/16/2010
Release Location: Key West, National Wildlife Refuge, Florida
Last Location: 10/07/2011



Subarctic Arctic Ridge and Coast (not km)

000 km

Distance Traveled: 6506 km Straight-Line Distance: 4213 km



Northern harriers fly low over the ground when hunting.

They weave back and forth over fields and marshes as they watch and listen for small animals.


They eat on the ground, or perch on low posts and trees.

Their nests are concealed on the ground in grasses or wetland vegetation.

HABITAT: Northern Harriers breed in grasslands or wetlands and prefer wide-open areas like fields, the Arctic tundra, prairies, deserts, and open marshes for hunting.

DIET: small mammals (mice, moles, voles), reptiles, amphibians, birds

Spring Migration: April 4, 2011 to June 6, 2011



http://www.seaturtle.org/tracking/index.shtml?tag_id=98355b
http://www.allaboutbirds.org/guide/northern_harrier/id

