State Historical Records

Objectives:
Students will be able to:

- Analyze and interpret data from the historical record to identify patterns and differences in passenger pigeon populations and movements throughout the state.
- Use evidence from the historical record to support a claim about passenger pigeon migrations.

Prerequisite Knowledge:
Students should be familiar with the general story of the passenger pigeon. See the lesson, "What is the Passenger Pigeon?" on the Project Passenger Pigeon website for a possible introductory lesson.

Materials List:

- Picture of a passenger pigeon
- State historical record cards (Illinois cards attached); one set per group of students
    - Cards were created using data from A.W. Schorger's research. If you would like to implement this lesson with cards specific to a different state, data are available for many states on the Project Passenger Pigeon website. Visit passengerpigeon.org, and click on your state on the map at the bottom of the homepage. You will be taken to a page with information about passenger pigeons in your state, and a link to a PDF document containing state-specific passenger pigeon sightings will be posted near the bottom of the page (if available for your state).
    - A template for creating the cards is available on the P3 website. Select data points from the state historical record that have month and year of the observation, the location (county) of the observation, and a written observation of passenger pigeon movements.
    - If data are not available for your state, or if you do not want to make new cards, the lesson can be conducted using the Illinois card set without impacting students' achievement of the lesson objectives.
- Map of state counties (Illinois map attached); one per group of students
    - Visit http://quickfacts.census.gov/qfd/printmaps.html for maps
    - Divide map into regions that students can use when grouping the cards by location.
- Video: "Passenger Pigeon Timeline and Academy Visit" (available at: http://bit.ly/QctbQc)

Background Information:
Passenger pigeons were native to North America and were abundant in the eastern United States. These birds were known to fly in flocks of hundreds of millions of birds (even *billions*), with the flocks sometimes taking *days* to pass a given location. In the late 1800s, passenger pigeon populations began to drop rapidly as humans hunted the birds and destroyed their habitats. On September 1, 1914, the last passenger pigeon, a female named Martha, died at the Cincinnati Zoo. Though there were very few scientific studies done of passenger pigeons when they were alive, modern-day scientists have been able to use historical records, first-person accounts, comparisons with modern species, and museum

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specimens to study the bird's distributions and behaviors.

The passenger pigeon's scientific name, *Ectopistes migratorius*, reflects the bird's migratory behavior. (*Ectopistes* is based on the Greek word for "wanderer," and *migratorius* is Latin for "one that migrates.")[1] Passenger pigeons moved around in giant flocks, searching for available food. As the seasons changed, the birds would move to find places where food was abundant, but they did not follow a strict "south in the winter, north in the summer" migration pattern. If food was available in the north during the winter, a flock of pigeons might stay during the cold season.[2] In other years, that same location wouldn't have any passenger pigeon flocks in the winter. Since the passenger pigeons' movements were guided largely by food, and food typically becomes less abundant in the north during the cold months, the pigeons' did sometimes seem to follow the standard migratory bird pattern by flying south during the cold months. However, the passenger pigeons' migration patterns often changed from year to year as food availability changed.

Passenger pigeons had a diverse diet, but most of their food came from seeds and fruits.[3] Passenger pigeons had a strong preference for hard fruits like acorns and beechnuts that are found on forest trees.[4] Trees like oaks (acorns) and beech (beechnuts) are known to *mast*, which means that every two to six years,[5] most of the trees of one species in an area will produce a much larger quantity of fruit than normal. Mast events were significant sources of food for passenger pigeons, and passenger pigeons moved around in search of this abundant food source.

Like the populations of other animals, passenger pigeon populations fluctuated in conjunction with many factors. The flocks were impacted by severe weather, when fog made it difficult to fly or snow covered their food. The passenger pigeons were also susceptible to predation, especially from humans. The passenger pigeons gathered in large, dense flocks that made them especially easy to hunt and trap. In the span of a few decades, humans hunted passenger pigeons and destroyed their habitats at such a rate that the pigeons – with numbers in the billions – were extinct by 1914. Now, in 2014, scientists and scholars are using the centenary (100-year commemoration) of the passenger pigeon's extinction as an opportunity to highlight the key roles humans play in supporting healthy ecosystems.

Note: For additional background information, please see *A Feathered River Across the Sky*, cited at the end of the lesson.

Procedure:

1. Show students a picture of a passenger pigeon. Have students share what they know about the passenger pigeon's history. Does anyone know anything about the passenger pigeon's story from *before* the early 1900s?
2. Explain that very few scientists studied passenger pigeons when they were alive, especially in the wild. As a result, the behavior, migration patterns, and population changes of passenger pigeons have been largely judged using historical records and museum specimens. Show the video, "Passenger Pigeon Timeline and Academy Visit," having students pay special attention to what kind of information is known about passenger pigeons from prior to 1914.
3. Discuss that, as seen in the video, museum specimens have played a large role in modern scientists studies of passenger pigeons, and historical records have also played a key role. Though there are not many scientific studies of passenger pigeons that were completed while the pigeons were alive,

many people made note of passenger pigeon flocks as they moved through towns across the eastern U.S., and these records are readily available. Scientist A.W. Schorger published a book about passenger pigeons in 1955 that brought together his extensive research about the bird. The historical records that A.W. Schorger compiled while writing this book have recently become available (see www.passengerpigeon.org). It is possible to use these records to take a closer look at how the passenger pigeon behaved in individual states.

4. Explain that today, students will use the historical records from their state to try to figure out how passenger pigeons moved around the state and how their populations changed over time. Like scientists have done, students will try to identify patterns and discrepancies in passenger pigeon history in the state using the historical records that are available.
5. Pass out the state historical record cards. Give students time to read through the cards to become familiar with the types of observations that are recorded on them (in quotations in the center of the card).
6. Conduct a series of card sorts, each followed by a group discussion about what students noticed. As necessary during these discussions, remind students to support their claims with evidence from the cards. A list of possible card sorts has been provided:

Card Sort: Year of Observation (year marked at the top of the card in blue)

7. Have students arrange the cards in chronological order. Students should then use the descriptions on the cards to identify important trends or changes they notice over time. For example, in Illinois in the 1840s and 1850s, most of the observations describe gigantic flocks of pigeons. By the 1880s, however, fewer observations note large flock sizes, and some even describe small flocks.
8. Discussion prompts:
    a. Describe any clear patterns or trends you are able to find in the observations over time.
    b. Were there exceptions to the trend(s) you identified (i.e., cards with observations that didn't fit the overall trend(s))? If so, what do you make of these exceptions? (i.e., Can you provide some sort of justification for why these exceptions may have occurred? Do the exceptions make you question whether the trend(s) you identified are accurate?)
    c. Do you think that these cards provide enough data to make a strong claim about how passenger pigeon populations changed over time in the state? Explain.
    d. What additional data could be used to strengthen a claim about changes in passenger pigeon populations in the state?

Card Sort: Month of Observation (month marked at the top of the card in green)

9. Have students arrange the cards into groups according to the month of observation. Students should then use the information on the cards to discuss whether they think there was a pattern to how the passenger pigeons moved during each season.
10. Discussion prompts:
    a. In Illinois, migratory birds typically fly south in the fall and do not return north until the spring. For example, you wouldn't find a green heron in Illinois in January, even if it was an

unseasonably warm winter. Based on the information on the cards, do you think that passenger pigeon flocks moved in this way? What evidence from the cards can you use to support your ideas?

b. What factors might have influenced the movement of passenger pigeon flocks throughout the year? Share your ideas.

Card Sort: Location of Observation (county marked at the bottom of the card in orange)

11. Have students arrange the cards into groups by county. (Many counties have only one observation card.)
12. Discussion prompt:
    a. For counties with more than one recorded observation, do you notice any patterns or discrepancies in the observations from a single county when you consider how the observations vary by year or time of year (month)?
13. Provide students with a map of the counties in the state, divided into regions. Have students find the appropriate county on the map for each card and arrange the cards into groups according to whether the observation was in the north, central, or south part of the state (or other regions that are appropriate for your state). If desired, have students mark the locations of the observations directly on the map.
14. Discussion prompt:
    a. How do the numbers of observations vary by region? What factors do you think influenced the distribution of the observations throughout the state? (i.e., What could be some reasons why there are more observations in some places than in others?)

Card Sort: Optional Extension

15. Have students develop their own criteria or methods for sorting the cards. Discuss what the students learn about passenger pigeons by grouping the cards in these ways.

Reflection

16. Tell students that the passenger pigeon's scientific name is *Ectopistes migratorius*. *Ectopistes* translates roughly to "wanderer," and *migratorius* to "one that migrates."[6] Have students use data from the cards to discuss whether this seems like an appropriate scientific name based on the historical records of passenger pigeons in the state. As necessary during the discussion, prompt students to state the evidence upon which their comments are based.

Ectopistes
Greek for "wanderer"

migratorius
Latin for "one that migrates"

17. Have students discuss in small groups whether it is possible to determine what influenced the passenger pigeons' migrations based solely on the information from the cards. What additional data might be useful?

18. Broaden the discussion to include the entire class. As appropriate, provide information from the Background Information section to help students understand some of the factors that shaped passenger pigeon movements.
19. As students should already know, the passenger pigeon became extinct in 1914. Have students discuss whether it is possible to detect the decline in passenger pigeon populations in your state based on the observations on the cards. (It may or may not be possible, depending on the abundance of data points available for your specific state.) Have students synthesize this information with the previous discussion about migration, and have students share their ideas about how the birds' migratory and/or flocking habits might have contributed to or slowed down their extinction. Provide information from the Background Information section as necessary to guide the discussion.
20. Reiterate that 2014 is the Year of the Passenger Pigeon, a year to learn from the story of the passenger pigeon and to use that story to change our perspectives about how we interact with the world around us. Have students discuss or complete a journal entry about whether they have any new perspectives based on what they learned and discussed during today's lesson.

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[1] Greenberg, J. (2014). *A feathered river across the sky: The passenger pigeon's flight to extinction*. New York, NY: Bloomsbury, p. 3.
[2] Greenberg, p. 3.
[3] Greenberg, p. 7.
[4] Greenberg, p. 8.
[5] Clotfelter, E.D., Pedersen, A.B., Cranford, J.A., Ram, N., Snajdr, E.A., Nolan, Jr. V., Ketterson, E.D. (2007). Acorn mast drives long-term dynamics of rodent and songbird populations. *Oecologia, 154*, p. 493-503.
[6] Greenberg, p. 3.