

Taking Flight with Conservation Education

Engaging students in bird conservation using technology



Sandhill Cranes

Photo by Ian Shanahan

By **Lauren Baldacci**

INCLUDING CONSERVATION education into high school science curricula is important, and I ultimately chose to add bird conservation to my teaching after seeing students' strong reactions to the calls of migrating Sandhill Cranes. Illinois has adopted the Next Generation Science Standards, which has a performance expectation (HS-LS2-7) addressing human activity and biodiversity, and I have added this lesson to approach the performance expectation by engaging students to think about how humans impact bird population diversity. The cranes were heard while doing invasive species removal with my school's Environmental Science Club. Students were not sure what type of creature was making the sound and their eyes were glued to the sky trying to find the source. Knowing my students have first-hand experience with birds provided a great foundation for building further understanding of basic conservation principles.

Engaging my ninth-grade Biology students was the next challenge since one of the only birds students care about these days involves 140 characters (i.e., Twitter). I found myself struggling to find lessons and activities that were both appropriate for high school students and involved their using chromebooks to gather relevant and current information about bird conservation. Developing a Padlet allowed me to create a lesson that was flexible, interactive, and engaging for

ninth-grade students to complete using chromebooks. Padlet is a platform that allows the user to connect related images, websites, maps, photos, and videos.² Students can access Padlet via the internet or by downloading the Padlet App specifically made for Apple products, Android, and Kindle.² Each item appears as a post that can have accompanying text and allow viewers to comment. Posts in the Padlet include what bird sounds mean, methods for collecting bird sounds, and bird conservation. My students were focused during the activity and shared their experiences with birds as they worked through the lesson. Students' making connections to the subject content and their personal experiences made the activity more meaningful and interesting for them. Ending the lesson with a game kept the students engaged made applying what they had just learned fun.

Lesson details

The objective of this activity is to teach students about how using audio recorders to collect data helps protect bird species and their habitats. I cannot think of anywhere I have been that does not have birds — birds are everywhere! Students all over the world can relate to hearing and seeing birds. Engaging students in making connections between their observations of birds and the importance of their conservation can influence students to make decisions that have a positive impact on a bird species that is also personally meaningful to them.

Students worked individually on the activity during a 47-minute class period in a ninth-grade Biology classroom in Manteno, IL. Manteno High School is 50 miles south of Chicago and has a student population of 700. The majority of students are Caucasian and speak English as their first language. Many are familiar with online discussion boards, so I chose to incorporate these into the Padlet to better engage my students in conservation education. The Padlet is highly interactive by allowing students to access websites that provide information about bird monitoring and data collection, while allowing them to answer questions on an accompanying worksheet. (See the link in the Resources List.) Using chrome-books, students accessed the Padlet and worksheet through Google Classroom. If teachers allow more time or have students work with a partner, this activity could also be appropriate for a middle school classroom. While developing this activity, I made sure to include a variety of math and reading skills to allow students to apply these skills within a science context.

Using Padlet helped ensure this activity was approachable for students because they were easily able to visit different websites instead of struggling to find information on their own about audio recorders and bird conservation. Additionally, Padlet is a great resource for teachers because it is easy and convenient to create webquests or discussion boards for students to use and it allows easy access of materials vetted by the teacher. There are also features that allow inappropriate language to be replaced with emojis. As the teacher, I was able to have my students use information from peer-reviewed journal articles through my paraphrasing of key ideas into easy-to-read posts. Footnotes allowed me to avoid placing distracting citations in the posts. By connecting posts together, I was able to have students follow a path that helped to expand their knowledge about audio recorders and bird conservation.

Students accessed information from peer-reviewed articles as well as questions to answer using websites that were appropriate for a ninth-grade class. Using the worksheet as a guide, students began the Padlet with the purple box and

followed the arrows that lead from post to post, some having questions for students to answer. I also included a vocabulary section; therefore, students would understand important terminology as well as comparison terms used later in the Padlet. The beginning post asked students, *what do bird sounds mean?* and

students then identified and defined the five main types of vocal sounds: alarm calls, begging calls, contact calls, flight calls, and songs.⁴ I included a picture of peafowl from the Brookfield Zoo to encourage students to start thinking about their experiences with birds. Building on their own experiences, students learned

about people who study birds. I also took the opportunity to introduce the concept of Environmental Stewardship, namely volunteering to help restore and protect native habitats. Next, I included peer-reviewed literature and paraphrased the research to an appropriate reading level for my students to answer any questions they may have about the collection and study of bird sounds.

Students read about the types of technologies used to record bird sounds and identified the benefit of using more expensive equipment. Students then drew spectrograms and learned about how bird sounds are collected and studied. The drawings were a challenge and intentionally so! Viewing the spectrograms are difficult, and asking students to draw them allowed the students to understand the benefits of computer software for sound analysis. Also, students got an introduction to the types of patterns they will see while playing the Bird Song Hero game at the end of the Padlet developed by The Cornell Lab of Ornithology. In addition, I introduced students to different phone applications (e.g., eBird, Audubon Bird Guide App, iNaturalist, and Merlin Bird ID) so that they could learn how citizens get involved in the data collection process. Students also compared and contrasted two of the phone apps using a Venn Diagram.

Bird conservation in Illinois was the next topic, but that post could easily be edited to allow for representation of other regions. The chosen website has lists of at-risk birds in different habitats in Illinois. Students had to select a bird species, identify its habitat requirements and conservation status, and describe its population graph. Next, students read how bird counts are conducted, before completing a guided analysis evaluating the advantages and limitations of audio recorders. Having students read about bird counts allowed

them to understand how data is collected to monitor the conservation status of different bird populations as well as identify migration stops and nesting sites. I included a recording of migrating Sandhill Cranes that I had personally taken to give the activity authenticity. The recording elicited questions

Next Generation Science Standards – HS-LS2-7

Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity. [Clarification Statement: Examples of human activities can include urbanization, building dams, and dissemination of invasive species.]¹

A canary in a coalmine

Some students will be familiar with the use of canaries as sentinels to detect environmental pollutants, such as carbon monoxide in coalmines. Ecologists have taken this concept one step further and now use birds as bioindicators of ecosystem health. Birds are sensitive to changes in their environment, so their presence, abundance, and behavior provide invaluable information about habitat quality, pollution, diseases, and declines in biodiversity. Additionally, birds provide ecosystem services, including eating pests and spreading seeds.³ Birds have immense ecological value, but U.S.-based students have little knowledge about birds and conservation since these are topics not traditionally included in high school science curricula.

Conservation games

Conservation games have many advantages, such as promoting conservation-minded behavior, including building a bird-friendly garden or purchasing products (e.g., responsibly-sourced coffee) that protect bird habitats.⁶ The Bird Song Hero game has students match sonograms to bird sounds; while it does not directly promote conservation, teachers can use it as a tool to engage students.



from my students about my experiences with birds. Students were engaged while asking me questions and it gave my students the opportunity to share their own experiences with birds.

The guided analysis of audio recorders allowed me to get students thinking about different environmental conditions to consider when collecting bird sound data, such as distance to birds, background noise, and the ability to collect data from nocturnal birds. Helping students evaluate the benefits and limitations of audio recorders allows students to think critically and develop higher-level thinking skills. Finally, students ended with the Bird Song Hero Game.⁵

At the end of the Padlet, students had fun playing the Bird Song Hero game and matching spectrograms to the correct bird.⁵ Students had to use their listening and visual-spatial skills to decipher the patterns viewed in the spectrograms to match the songs to different bird species. The game helped to reinforce the information presented in the Padlet, as students were able to use recordings of birds to identify different bird songs.

Adaptation suggestions

The Padlet activity can be used as part of a larger unit on conservation or as an opportunity for teachers to begin adding conservation education into their curricula. The activity also allows for discussions about biotechnology. Teachers can use this Padlet and make changes to posted images and bird calls to reflect birds in their local region. Teachers can also enable features to allow students to comment on posts and make connections to material taught in class. For teachers who want to spend more time on conservation, specifically bird conservation, students are able to collect data with the

different phone applications such as iNaturalist and eBird, allowing the Padlet activity to be differentiated for older students who can collect data independently or even outside of the classroom. Students can also broaden their conservation knowledge by making a Padlet about conservation of an animal of their choice.

Bird conservation may not be currently part of your curriculum, but conservation likely is part of any science curriculum. As the environment continues to change due to human impacts, students need to learn how they can help protect Earth's valuable resources. This Padlet activity allows teachers to easily connect their students with information regarding many facets of bird conservation. Students must navigate through carefully-curated resources to answer questions about topics ranging from Environmental Stewardship to bird sound collection technology. Reading skills are incorporated through a science context as students analyze the benefits and limitations of audio recorders. Furthermore, identifying patterns in spectrograms integrates math skills. Teachers can easily edit the Padlet to fit the needs of their students and represent the region where they teach. This Padlet allows for students to be interested in more than just "tweets." Try adding some squawks, screeches, and chirps to let your students take flight learning basic conservation principles.

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Endnotes:

1. NGSS Lead States. 2013. *Next Generation Science Standards: For States, By States*. Washington, DC: The National Academies Press.
2. Padlet. (n.d.). Padlet features. Retrieved July 3, 2019, from <https://padlet.com/features>.
3. Sekercioglu, C. (2017). How much is a bird worth? *Living Bird* 36(3): 18-20.
4. Mayntz, M. (2017, July 15). What Types of Sounds Do Birds Make? Retrieved March 04, 2018, from <https://www.thespruce.com/what-types-of-sounds-do-birds-make-387332>.
5. The Cornell Lab of Ornithology. (n.d.). Bird Song Hero - The Cornell Lab of Ornithology. Retrieved March 04, 2018, from <https://academy.allabout-birds.org/features/bird-song-hero/bird-song-hero-tutorial>.
6. Sandbrook, C., Adams, W. M., & Monteferrri, B. (2014). Digital Games and Biodiversity Conservation. *Conservation Letters*, 8(2), 118-124. doi:10.1111/conl.12113.

Resources:

Link to Padlet: <https://padlet.com/baldacl2/lr7szs1xthd>.

Link to Student Worksheet: <https://docs.google.com/document/d/1vwKezGpwV-UJIAZwuEpMF1lvxIIZMrh7pvhCqMSeVD-o/edit?usp=sharing>. (You will need to request for permission through your email address)