

Birds Across Borders

International pen pals correspond about ecology lessons

By Rebecca McCaffery

The diversity of life on Earth is a fundamental concept in biology, but it can be difficult to explore in the confines of an elementary school classroom. A great place to start is by getting students outside to observe the diversity in their own backyards. I served as a scientist-in-residence for one year at an elementary school in Missoula, Montana, working on ecological inquiries inside and outside of the classroom. To extend students' learning beyond their local area, I set up an ecological pen pal exchange with students at two schools in northern Scotland. In our exchange, we focused on the broad differences in biodiversity between our two countries. This approach introduced younger students to the concept of biodiversity: They learned about why different species inhabit different places, and compared the species found in Scotland and Montana. They also explored how the envi-

ronment affects living organisms by making observations of birds in their school yards over multiple seasons.

Pen pal relationships have been used to enhance literacy skills (Rankin 1992) and create cross-cultural connections (Shandomo 2009), among other topics. We focused on writing about bird diversity



because students can easily observe and listen to birds in their own backyards and school yards (Frissell and Cayton 2009; Smith 2009). Additionally, we were able to link into each country's existing citizen science bird monitoring programs, which allowed students to contribute their findings to a real database and see how the data were used in a larger biodiversity context. The goals for this project were (1) to make connections among students in two different countries, (2) to learn about local bird ecology and biodiversity, and (3) to contribute to national bird monitoring programs.

In this article, I describe how we developed this project and share some of the tangible results of the exchange, with suggestions along the way for how to implement this kind of project in your classroom.

Making Connections

Before the school year started, I contacted two teachers I knew in Scotland about getting involved in this project, and they were enthusiastic about participating. Their schools were Udney Green Primary School in northeastern Scotland and Poolewe Primary School in northwestern Scotland. Our first letters gave students the opportunity to introduce themselves. They wrote about their favorite things and described their families and where they live. Once the introductions had been made, we were ready to write about biology! All of the letters exchanged by students and teachers included some information on what the students were learning in their science classes. Although our focal project was on birds, students were able to share stories and information on other outdoor and classroom-based science projects throughout the school year. Students in Scotland and Montana completed their investigations on birds in their own countries and then sent letters, artwork, pictures, graphs, and other reports to each other.

I was fortunate to know teachers in another country, but there are other ways you could set up such an exchange. These could include contacting local universities, which generally have connections with schools overseas; connecting with fellow teachers at conferences or online teacher networking sites; or identifying interested teachers and schools through bird education and citizen science websites (Figure 1). Contacting these citizen science programs could help identify participating schools in different countries and provide an opening for reaching out to a new school. For example, the Big Schools' Birdwatch in the United Kingdom has an online teachers' community. This type of eco-pen pal exchange could also be accomplished with students in a different region of the United States. The ecological and cultural diversity of the United States could make a more local exchange fun, success-

Figure 1.

Bird ecology resources.

Citizen science bird counts in various countries (these websites include great resources for educators and may facilitate connections with teachers in other countries):

Australia School Yard bird survey

www.birdsinbackyards.net/surveys/schoolground-birds.cfm

Big School's Birdwatch UK

www.rspb.org.uk/schoolswatch/index.aspx

Great Backyard Bird Count USA

www.birdsource.org/gbbc/

New Zealand Garden Bird survey

www.landcareresearch.co.nz/research/biocons/gardenbird/activities.asp

Resources on North American bird ecology:

Bird calls

www.enature.com/birding/audio.asp

Cornell Bird Laboratory

www.birds.cornell.edu

National Audubon Society

www.audubon.org

ful, and informative. The Great Backyard Bird Count (USA) website has a page of resources for educators and a list of local events occurring in different states that could connect classrooms to local or regional contacts.

Learning About Ecology and Diversity

Each classroom developed its own set of activities to study bird biodiversity, and these intersected with their art and math curricula. Poolewe students studied and drew pictures of local bird species and made clay birds (Figure 2); Udney Green students made bird feeders and recorded detailed observations of bird behavior in the school yard; and Missoula students learned to identify local species and birdcalls every week. The different projects were developed by the individual teachers to complement what was going on in their classrooms, and winter bird counts were the common link between the three schools. The goals for the Missoula students were to (1) learn the natural history and ecology of local bird species, (2) collect data on local birds to contribute to a national citizen science monitoring program, and (3) present data to peers using skills in math and writing.

In science class, students in Missoula were learning

the characteristics of different groups of species, such as birds, mammals, and fish. These winter bird activities provided an in-depth and hands-on experience with birds. Students learned about common bird species, the types of environments in which they were found, and what they ate. We showed pictures of common local species and practiced recognizing the birdcalls and pictures of the bird. We had a field guide for western North American birds and a CD of Rocky Mountain birdsongs in the classroom. The students spent about 15 minutes each week learning about these birds, and the students were soon able to recognize about 10 common winter bird species when I played the birdsong or showed a picture. Every student had a favorite bird species, and they were soon pointing out the common birds seen out of the classroom window, such as magpies, black-capped chickadees, and northern flickers. We also built bird feeders, which we placed around the school yard and at students' houses (see NSTA Connection for instructions). Finally, we kept a log of birds seen at school and at home in the students' backyards (see NSTA Connection). Parents were encouraged to help their children fill out the log at home.

The bird project in Missoula culminated in a bird-watching field trip to a local natural area that coincided with the Audubon Society's Great Backyard Bird Count. We practiced using binoculars safely and met two bird experts who accompanied us on the field trip, along with several parent chaperones. Follow your school guidelines for field trips, and see additional precautions online (see NSTA Connection). The class was divided into two groups, and we counted birds in two different areas of the park. We wrote down the number of birds of each species we saw and recorded the total time we spent looking. Students in Scotland conducted similar counts at their schools, recording numbers of birds seen and total time spent looking. This gave students in both countries an introduction to some of the scientific methods that biologists use to collect data and the opportunity to collect data themselves.

Back in the classroom, we made bar graphs to visualize how many birds we saw, and Scottish students did the same (Figure 3, p. 34). Making bar graphs linked directly with what the students were learning in their math class and allowed for easy comparison between Scotland and Montana.

Figure 2.

A Scottish student's bird drawing.



We showed the students how math and science were linked and how the data they collected could be presented visually. We practiced making bar graphs by hand and also made them on the computer. Students from all three schools sent artwork, graphs, and summary information about the bird ecology projects to each other, in addition to



their letters describing the field trip. Once we had received the projects from Scotland, we were able to discuss why there are different or similar species in the two different countries and compare our bird counts.

Connecting to National Programs

Citizen science programs monitor long-term trends in bird populations using data collected by the public at certain times of the year. These programs have consistent, easy-to-follow protocols. Both Scotland and the United States have established winter bird counts, and all three schools participated in these bird-monitoring programs in their countries. The Scottish schools participated in the Big Schools' Birdwatch, which is a citizen science program for schoolchildren, and Missoula students participated in the Great Backyard Bird Count (GBBC), which is a national program in the United States cosponsored by the Audubon Society and the Cornell Laboratory of Ornithology (see Figure 1, p. 32). The bird counts used the protocols and forms from these programs, which can be found on their websites. For example, the GBBC is completed over the course of four days and has an easy-to-use form for recording species seen. We set up our field trip to coincide with the dates of the GBBC. Although there were some differences in the protocols for the Big Schools' Birdwatch and the GBBC, the data collected were similar and easy to compare.

Students in Missoula were able to look at their results and the United Kingdom results on the internet, and vice versa. Students in both countries were able to see how their results fit into the larger picture of bird diversity, both in Scotland and in the United States. Examining maps of bird diversity throughout the two countries led to discussions of why diversity is higher in some places than in others, when and why birds migrate, and which species were the most common. In Missoula, we discussed how the environment might differ between Montana and Scotland (continental versus coastal and differences in latitude) and how that relates to differences in the birds seen. We also talked about some of the similarities among the bird species

seen, which introduced concepts of evolution and biodiversity. Maps of local and countrywide bird diversity are available from the bird count websites after the bird counts are over. Students can also compare bird counts from their year to previous years and examine the abundance of individual species.

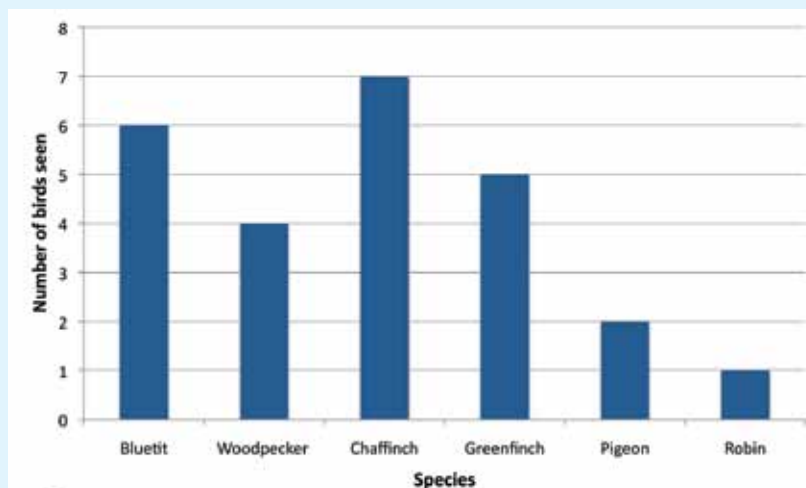
Evaluation of the Project

Each school participated in a qualitative evaluation of the eco-pen pal project in late spring. Students were asked a series of 10 questions designed to determine what they learned in their own investigations and from their pen pals' investigations. Each teacher also completed a questionnaire addressing the greatest successes and challenges of the exchange and how the exchange enhanced

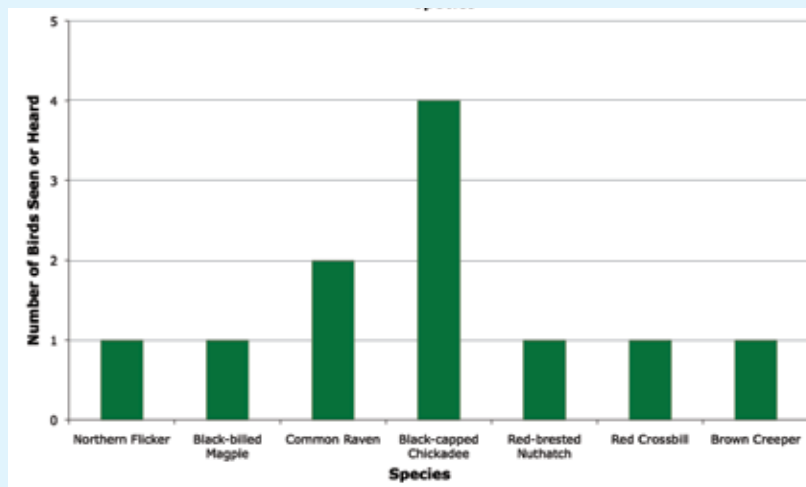
Figure 3.

Graphs of bird count data.

Scottish students' bird count data.



American students' bird count data.



student understanding of ecological concepts. See NSTA Connection for the questionnaires.

Generally, students from Missoula enjoyed participating in the exchange and indicated that they learned something new or interesting about Scotland's wildlife, such as identifying which species we had in common and which were different. Most students demonstrated some understanding of the ecological concepts we covered in the short-answer questions. For example, in response to the question "Why are the birds here different from those in Scotland?" students mention the differing weather and climate of the two countries. In response to the question "Why do seasonal changes occur at different times here than in Scotland?" one student responded, "[Scotland is] farther from the equator." These answers demonstrated that students were connecting differences in geography and climate to differences in ecology between the two countries. Students from Scotland had similar responses.

The teachers benefited from the exchange as well. The Montana teacher felt that the exchange "definitely helped [the students] understand species better because [they] got to exchange data." She felt that receiving the letters and projects from Scotland "allowed for discussions about Scotland and led [them] to extending what [they] were learning [in Montana]." The teachers from Scotland felt that the letters and projects received generated a lot of discussion and helped students "appreciate the bigger picture of the diversity of life on Earth." By participating in the exchange, the teachers in Scotland also reached out to local experts to learn more about their local ecology. The main challenge with the project was the time delay in the exchange of letters. This could be improved by sending correspondence by e-mail.

From my perspective, the exchange was both fun and informative for the students. In their regular science class, students were learning the characteristics of birds in a textbook, and this experience allowed them to see those characteristics out in nature, contribute to a national bird monitoring project, and compare birds from two countries.

Conclusion

Although this project was conducted with third-grade students, eco-pen pal exchanges such as this could be done with all grade levels. Initiating this type of exchange with older students could result in more in-depth ecological inquiries with analyses that formally compare the results from different countries. Exchanges could also incorporate various classroom technologies. For example, students could exchange videos or pictures through e-mail, or classrooms could set up a blog to chronicle the progress of the project. Nothing can compare to the experience of receiving handwritten letters, artwork, and colorful reports, but computers and the internet could certainly enhance and add to the exchange. We used tra-

Connecting to the Standards

This article relates to the following National Science Education Standards (NRC 1996):

Content Standards

Grades K–4

Standard A: Science as Inquiry

- Understanding about scientific inquiry

Standard C: Life Science

- Organisms and environments

National Research Council (NRC). 1996. *National science education standards*. Washington, DC: National Academies Press.

ditional mail to facilitate sending art projects and to work on handwritten letters, but next time we would incorporate some e-mail writing and more internet use.

Connections between students from different regions or countries in the areas of science and ecology have the potential to enhance ecological knowledge and enlarge the world-views of participants. The students from Montana that were involved in this exchange will probably not go to Scotland anytime soon, but this exchange provided a first glimpse into the ecology of a country thousands of miles from their own home through the eyes of their peers. Similarly, students in Scotland were able to directly communicate with American students. Through this type of exchange, these different worlds were brought a little closer together, while allowing each group of students to get outside, observe their local bird diversity, and develop a stronger ecological understanding of their local environment. ■

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References

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NSTA Connection

Download safety tips for field trips, a bird log, instructions for making a bird feeder, and questionnaires at www.nsta.org/SC1203.

