NSDL/NSTA Web Seminar
Beyond Penguins and Polar Bears-
Arctic and Antarctic Birds

Tuesday, April 21, 2009
Today’s NSDL Experts

Jennifer Fee, BirdSleuth Project Leader, Cornell Lab of Ornithology

Colleen McLinn, Education Outreach Associate, Cornell Lab of Ornithology

Jessica Fries-Gaither, *Beyond Penguins and Polar Bears* Project Director and Elementary Resource Specialist, Ohio State University
Overview of Presentation

1. Teaching about birds in the classroom through inquiry
2. Teaching physical science using polar birds
3. Integrating science and literacy strategies
4. Citizen Science

Resource list for tonight’s presentation:
http://www.diigo.com/list/nsdlworkshops/web-sem-birds
How do birds stay warm?

Do they shiver or put coats on, like humans?

Type your responses in the chat
YES (sort of)
Birds’ feathers provide lots of insulation!

- Do they wear a coat?
  - Puff up

- Hat, scarf and gloves?
  - Tuck their bills
  - Stand on one leg
  - A few birds have feathers on their feet

- Do they shiver?
  - Yes!

http://nsdl.org
NSES standards

- Organisms in environments (physical and behavioral adaptations)
- Diversity and characteristics of organisms (form and function)
- Life cycles of organisms (migration)
- Characteristics and changes in populations (conservation)

http://nsdl.org
Learn Through Inquiry!

We encourage kids to ask and answer their own questions!

http://nsdl.org
Arctic and Antarctic Birds - Issue 11, February 2006

In this department, you'll increase your own content knowledge. Learn about the science of the polar regions and literacy skills that you will teach in the featured lessons and activities. Consider the many misconceptions that are held about the polar regions. Learn how to make your teaching practices accessible for all students. Professional Learning includes columns such as: Science Content Knowledge, Literacy Content Knowledge, Misconceptions, Integrating Technology, Teaching and Assessment Strategies, and Equity in the Classroom.

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INTEGRATING TECHNOLOGY
Integrating Technology: Social Networking
by Kimberly Lightle

TEACHING AND ASSESSMENT STRATEGIES
Kids Becoming Scientists through Schoolyard Inquiry
by Jennifer Fee

EQUITY IN THE CLASSROOM
Assessing Effective Boys in Reading (and Reading, Too)
by Jessica Fries-Gaither

PROFESSIONAL BOOKSHELF
Professional Bookshelf: Resources for Teachers
by Jessica Fries-Gaither

PODCAST
Birdwatcher's Delight: Birds and Inquiry Learning: Podcast Episode 3
by Stephanie Chasteen, Jennifer Fee, Robert Payo
Kids can do their own research!

See our student publications: Classroom BirdScope and BirdSleuth Reports
www.BirdSleuth.net/student-research

http://nsdl.org
Students Research Bird Behavior in Cold Weather

by Jennifer Fee

Each year, the Cornell Lab of Ornithology publishes the research of students involved in the BirdSleuth program. By coming up with questions, conducting original investigations, and sharing their findings, students participate in the scientific process. This article was submitted by a fourth-grade class in New Haven, New York.

This investigation was designed and carried out by the 24 students of the 2005-06 4th grade class at New Haven Elementary School in New Haven, NY. This report was written by Nick, Kristen, Austin and Becca.

Introduction

After observing birds at our courtyard feeding station from September through December, several of us noticed that sometimes the birds, especially the Mourning Doves, would puff up their feathers. Nick wondered if cold temperatures caused this behavior and suggested the following investigation.

Hypothesis

Birds at our feeding station will puff up their feathers when the ambient temperature is below 32 degrees F.

Materials

- Outdoor thermometer
- Data sheets
Investigating Evidence

Click on each Investigation to see and download the Teacher Guide, Resource Pages, Investigator's Journal, Online Supports, and Links associated with that topic!

Investigation 1: What is Science?
Students will meet some of our Lab scientists and learn about the science process through their exciting work.

Investigation 2: Testing Hypotheses
Designing your own experiments is fun and demands creative thinking!

Investigation 3: Show Me the Data
Students learn how to share their conclusions visually through graphs.

Investigation 4: Plan and Conduct Investigations
It's an exciting challenge to plan and implement your own investigation!

Investigation 5: Presenting Inquiry Projects
Sharing what you've learned is a critical part of the science process.

Get your FREE copy at www.BirdSleuth.net!
Let’s pause for questions from the audience....
Teaching Physical Science Concepts with Polar Birds
Birds: What are they good for?

http://nsdl.org
## Physical Adaptations

<table>
<thead>
<tr>
<th>FEET</th>
<th>MOVEMENT</th>
<th>BEAK</th>
<th>COLOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long tails for catching and holding food</td>
<td>Hooked for tearing food</td>
<td></td>
<td>Brown like the earth they dig in.</td>
</tr>
<tr>
<td>Legs are long to get above the water and see food</td>
<td>Long strides, wading</td>
<td>Long, pointed beak for pushing</td>
<td></td>
</tr>
<tr>
<td>Big, wide feet so the bird won’t sink in to the ground</td>
<td>Long, walking or running strides.</td>
<td>Large, wide, strong.</td>
<td>Brown and camouflaged to forest floor.</td>
</tr>
<tr>
<td>Wide, webbed for swimming</td>
<td>Waddles, swims, flies</td>
<td>Short, cone-shaped, strong for catching fish</td>
<td></td>
</tr>
<tr>
<td>Two toes point opposite others for grip</td>
<td></td>
<td></td>
<td>Pink for attracting a mate.</td>
</tr>
<tr>
<td>Wide, webbed for swimming</td>
<td>Waddles, swims, flies</td>
<td></td>
<td>Male is colorful, female is brown and camouflaged.</td>
</tr>
<tr>
<td>Feathered feet to deal with snow.</td>
<td></td>
<td></td>
<td>White in winter for camouflage with snow.</td>
</tr>
<tr>
<td>Large tails to hold the food down.</td>
<td>Sharp, curved for tearing food</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grasping branch</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uses its feet to look up leaves to find food</td>
<td>Hopping and kicking up the leaves.</td>
<td>Brown for camouflage</td>
<td></td>
</tr>
<tr>
<td>Talons grab fish</td>
<td>Flying, soaring</td>
<td></td>
<td></td>
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</tbody>
</table>

Discuss: Ask some open-ended questions while watching the videos. “What are the different ways that birds get around?” “What are the different ways that birds get food?” “Which birds have you seen around your house?” “Other than eating, what do birds use their beaks for?” “What colors are the birds?” “Have you seen any of these behaviors in the birds at our feeder?”

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*Images of birds and diagrams are included.*
Beaks as simple machines

Name: __________________________ Activity Sheet & Natural Tools

How does a bird’s beak work like a simple machine?
1. Match the beak to the tool it is similar to.

- Pelican
- Hawk
- Hummingbird
- Sparrow
- Woodpecker
Beaks as simple machines

<table>
<thead>
<tr>
<th>BEAK TYPE</th>
<th>PONY BEADS</th>
<th>RUBBER BUGS</th>
<th>PLASTIC LEAVES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chopsticks</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toothpicks</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Tongs</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Clothespins</td>
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</tbody>
</table>
Wing shapes, flight and migration
For what type of flight is the wing circled in red used? Stamp your answer

<table>
<thead>
<tr>
<th>Rapid takeoff/easy turns</th>
<th>Soaring up high</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hovering</td>
<td>High Speed</td>
</tr>
<tr>
<td>Gliding over water</td>
<td>None of these</td>
</tr>
</tbody>
</table>
How and Why Do Birds Make Sound?

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Angry</td>
<td>Warning</td>
</tr>
<tr>
<td>Sad</td>
<td>Nervous</td>
</tr>
</tbody>
</table>
Let’s pause for questions from the audience....
Integrating Science and Literacy:
Resources from Beyond Penguins and Polar Bears
“Sanderlings are migratory birds. Each spring, they leave beaches in Florida, the Caribbean, and South America and travel to the Arctic to nest and raise their young. Some travel almost halfway around the Earth.”
Feature Story:
Available for grades K-1, 2-3, and 4-5 as:
- Text-only
- Illustrated book
- Electronic book

The Dance of Life

As the water retreats, tiny animals scurry to bury their sand-colored shells in the sand. These are mole crabs. One is caught and pulled up in a jet-black beak. The hunter, a small dusty-white bird with long legs and delicate feet, scrambles up the beach to escape the waves.

As she runs from the water, she swallows a mole crab whole, then turns to look for more. She is a type of shore bird called a *sanderling*.
Question-Answer Relationship

Four categories of questions

Right There
Think and Search
Author and Me
On My Own

QAR template created for use with Feature Story

Read each question, and label it with one of the four types of QARs. Then answer the question. Remember that the four types of QARs are:

In the Book: Right There
In the Book: Think and Search
In My Head: On My Own
In My Head: Author and Me

1. What do sanderlings eat?
   QAR type: _______________________________
   Answer: _______________________________

http://nsdl.org
Compare and contrast sanderling habitats

Beaches

Arctic tundra

http://nsdl.org
Migration

Create a model Arctic Tern and simulate behaviors and migration

Map migration routes and develop geographic awareness

Read children’s literature

http://nsdl.org
Let’s pause for questions from the audience....
Bird study: Penguins

*Titles from our virtual bookshelf:*

- *A Mother’s Journey*
- *Caroline Arnold’s Animals: A Penguin’s World*
- *My Season with Penguins: An Antarctic Journal*
- *Penguins*

**Penguins units: SeaWorld Education Department**
Interdisciplinary units – science, math, geography, and language arts.

**What’s Happening to the Emperor Penguins?**
Students consider the impact of the changing Antarctic environment on Emperor Penguin populations.

http://nsdl.org
Runs from mid-October through January. Students follow Adelie penguin families as they raise their chicks at Cape Royds by logging in daily.

Students can create a fieldbook with weather conditions and nest status.

More Adelie activities at http://www.penguinscience.com/education/
Have you done CITIZEN SCIENCE?

A. Yes
B. No
C. I don’t know!
Citizen Science: Anyone can gather data!
Your Counts Really Matter!

http://nsdl.org
Project FeederWatch: Integrating Real-Time Science and Math

by Jessica Fries-Gaither

Project FeederWatch is a citizen science project operated by the Cornell Lab of Ornithology and Bird Studies Canada. Participants identify and count birds that visit feeders during the winter. Data is submitted to help scientists monitor bird populations across the North American continent.

In addition to involving students in real-time data collection, Project FeederWatch provides many possibilities for cross-curricular integrations. We've focused on math; many more content areas and suggestions appear on the Project FeederWatch web site. A newly launched Homeschooler Guide provides support for those participating outside a traditional classroom. Many of the activities in the guide could be modified for classroom use as well.

IDEAS FOR MATH INTEGRATION

Data Collection
Students are required to keep accurate records of bird counts as they participate in the project. Teachers can use this project to teach elements of data analysis, including the creation of data tables and use of tally marks.

Data Analysis
Teachers can also have students analyze their data by creating bar graphs showing the various species that visit the feeder, line graphs that show the number of visits over the course of a week, and so on. This is also a way to teach concepts such as mean, median, and mode (number of visits, species) with real-world data.

Ratios, Fractions, Decimals, Percents
Bird data could also be used to illustrate ratios, fractions, decimals, and percents. For example, a student might notice that out of four birds to visit the feeder on a given day, one was a cardinal. The student could then express that data as a ratio, fraction, decimal, and percent.
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Professional Learning

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BROADCAST
Birdwatcher's Delight: Birds and Inquiry Learning: Podcast Episode 3
by Stephanie Chasteen, Jennifer Fee, Robert Payo
THANK YOU!

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http://nsdl.org  
http://beyondpenguins.nsdl.org  
http://www.birds.cornell.edu/
Learn about new tools and resources, discuss issues related to science education, find out about ways to enhance your teaching at:

http://expertvoices.nsdl.org/learningdigitalK12
http://twitter.com/nsdl

Resources from this seminar:
http://www.diigo.com/list/nsdlworkshops/web-sem-birds
Search for “diigo nsdl workshops birds”
Welcome to Your Professional Development

The Learning Center is NSTA's e-professional development portal to help you address your classroom needs and busy schedule. You can gain access to more than 3,300 different resources that cater to your preference for learning. Over 925 resources, such as journal articles, science objects, and web seminars are available for free. A suite of practical tools such as My Library, My Transcript, and My Professional Development Plan and Portfolio tool help you organize, personalize, and document your growth over time. If desired, you may review an archived Web Seminar overview of the NSTA Learning Center, or download the "How to Guide" PDF (2.7 MB).

Explore Learning Opportunities

- **By Subject**
  - Earth & Space Science
  - Life Science
  - Physical Science

- **By Grade Level**
  - Elementary
  - Middle School
  - High School
  - College

- **By State Standards**
  - Select your state to begin:
    - Choose a state

Do-It-Yourself Learning

Learn at your own pace online with these 1-2 or 8-10 hour interactive activities.

Live Online Seminars & Classes

Learn online from certified instructors with your colleagues. 1-2 hour seminar, week and month long courses are available. Earn state

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