

Karla Ferraro Teacher- Ranger-Teacher Program

Unit Plan title: Investigating Bird Adaptations and Behavior in the JBWR. Grades 6-8

Three part unit plan includes instructions for pre-visit, self guided tour and post-visit culminating project , rubric assessments and student worksheets. Content standards included : Common Core, New Generation Science standards and NYCDOE Scope and Sequence.

Common Core Standards for ELA Middle School Science

[CCSS.ELA-Literacy.RST.6-8.1](#) Cite specific textual evidence to support analysis of science and technical texts.

- [CCSS.ELA-Literacy.RST.6-8.3](#) Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.
- [CCSS.ELA-Literacy.RST.6-8.7](#) Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).
- [CCSS.ELA-Literacy.RST.6-8.9](#) Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.
- [CCSS.ELA-Literacy.WHST.6-8.2](#) Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
- [CCSS.ELA-Literacy.WHST.6-8.2f](#) Provide a concluding statement or section that follows from and supports the information or explanation presented.
- [CCSS.ELA-Literacy.WHST.6-8.4](#) Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
- [CCSS.ELA-Literacy.WHST.6-8.6](#) Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas clearly and efficiently.
- [CCSS.ELA-Literacy.WHST.6-8.7](#) Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.
- [CCSS.ELA-Literacy.WHST.6-8.8](#) Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.
- [CCSS.ELA-Literacy.WHST.6-8.9](#) Draw evidence from informational texts to support analysis reflection, and research.

New Generation Science Standards

MS-LS2-4. Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations. [

MS-LS2-2. Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems. [

MS-LS2-5. Evaluate competing design solutions for maintaining biodiversity and ecosystem services.*

MS-LS2-1. Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem

MS-ESS3-5. Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.

NYC DOE Scope and Sequence for Science middle school

6th grade

- Biological classification systems LE 1.1h
- Flow of energy and matter through food chains and food webs, LE 5.1c, LE 5.2a, LE 6.1a-c
- Methods for obtaining nutrients
- Global Warming: natural cycles vs. human impact LE 7.2d, PS 2.2r, ICT 1.4,
- Classify living things according to a student-generated scheme and an established scheme.
- Interpret and/or illustrate the energy flow in a food chain, energy pyramid, or food web.
- Identify structure and function relationships in organisms.
- Populations and definition of species LE 1.1h, LE 7.1a
- Communities LE 7.1a
- Ecosystems (including basic abiotic factors such as water, nitrogen, CO₂, and oxygen) LE 7.1a, LE 7.2a,b, ICT 1.2 2.1-2.3, 4.1, 5.1, 5.2, 6.1, 6.2, IPS 1.3

7th grade

- Identify structure and function relationships in organisms.
- Develop and use a dichotomous key.

8th grade

- Environmental concerns: Acquisition and depletion of resources; Waste disposal; Land use and urban growth; Overpopulation; Global Warming; Ozone depletion; Acid rain; Air pollution; Water pollution; Impact on other organisms LE 3.2b, **LE 7.1e**, LE 7.2c,d, ICT 1.2, 1.4,2.1-2.3, 4.1, 4.2, 5.1, 5.2, 6.1, 6.2 IPS 1.1-1.4, IPS 2.1
- Sources of variation in organisms LE 3.1a
- Adaptations LE 3.1a-c

STAGE 1:

Understanding goals:

- Students will be able to use printed and computer resources to predict the presence of birds on scheduled day of trip to JBWR. Use field guides to identify unknown pictures of birds provided.
- Using ebird.com and a list of birds of JBWR they will predict their availability for that part of the year. They will also do background reading on their natural history. They will relate physical and behavioral adaptations to their environment, by charting bird behavior on an ethogram . Analysis of the student generated data will allow them to draw conclusions about the birds lifestyle. They will represent this data on a bar graph. Students will also catalog the abiotic factors in separate areas of park and complete guiding questions on a worksheet.
- They will create a flip book project that includes researched and data from field research and personal experiences as well as secondary research from Ebird.com resources. Project will synthesize their research to come up with a plan for park rangers to use park resources to ensure survival of that species. The flip book will also include a food chain that shows the bird's trophic level in its community.

Essential questions:

- How do the body structure and behavior of birds help them survive in their environment?
- How can behavior be recorded and analyzed quantitatively?
- Based on their research, what are some potential threats to this particular species in terms of habitat /climate change? What are solutions to help ensure their survival?

Stage 2 Assessment evidence

Pre-trip:

- Ebird.com hypothesis on bird availability,
- Student practice of video ethogram completed. Rubric provided on workbook.

Day of trip : Student will locate live birds to observe and record findings on worksheet provided. When birds are identified and behavior list updated, student will complete an ethogram in each location. Student will generate a bar graph and draw conclusions based on observations and bar graph. They will also record abiotic conditions in researched areas. Students will devise ways that park managers could promote the survival of their species.

Post trip assignment : Student will research observed birds to create a flip book which will include researched information as well as field research. It will include...

- Picture of one researched bird, common and scientific name, student's name and class
- Bird facts learned by first-hand experience and print/ internet resources.
- Range, migration, habitat type
- A graph showing ethogram behavior data and conclusions draw, and design for future research.
- A park management plan to improve the survival rate of chosen species of bird.
- Draw a food web showing the birds trophic level in its community.
- Venn diagram to compare similarities and difference between two birds. Cite sources.

Stage 3 Learning Plan

How can we study bird adaptations and behavior in the wild using ethograms?

Previsit. 2 45 minute periods or 90 minute double period.

1. Students will be informed of an upcoming field trip to Jamaica Bay Wildlife Refuge to observe migrating birds in the park. Students will use Gateway National Recreation Area publications and an internet database from Cornell University, such as EBird, to predict if certain birds might be available during that season.
2. Students will brainstorm all the characteristics that make birds unique, while teacher posts or distributes pamphlets that lists of Birds found in Jamaica Bay. They will choose at least two birds to investigate. They will use Ebird website data to help predict if their chosen birds will be available that part of the year, since some are rare or migrate. If they cannot support their prediction with evidence from the data, they want to choose a different species of bird. The goal is to have some background of birds and particular species before the trip.
3. Record their chosen bird to study and hypothesis on the pre-trip sheet. Their hypothesis should be supported with an independent variable, dependent variable and background research evidence. Simply put, an "If, then because," statement.

An educated prediction for this case may look like....

IF the date of our trip is in the late Spring, (independent variable), THEN we should expect to see X birds, (dependent variable), BECAUSE (cite the supporting background data here.)

4. Students will work with partners to predict and research their bird using class field guides in library and computers.

Break point

Students will practice observing bird behavior and record their detailed observations on charts called ethograms.

1. Choose a bird video that lasts at least 90 seconds. Allow the student to watch it and list the behaviors they do in their journals. Show the video again and instruct the student to put tally marks next to the behavior. Black Skimmer Video <http://estuaries.noaa.gov/Estuarylive/VideoGallery.aspx?ID=3>
2. Provide students with the classroom video ethogram practice sheet. Ask students why would scientists break up the observation time into smaller intervals? Define specialized bird behaviors such as preening, etc.
3. Choose a time keeper that will inform the class when it has reached 30 seconds. They will start a new line on their ethogram after each 30 second interval is over.
4. Ask student, "How did the observation data change from the first video showing to the last? Is your data different from your partners? Why?"
5. Watch a second 90- second video and complete the second ethogram. Students will compare and contrast their similarities and differences on a Venn diagram. Review answers on bird fill in sheet.

How could ethograms be used to learn about animal behavior?

Day of Trip

Materials : Journals with Bird Workbook sheet, field guides and apps, binoculars, pencil, clipboard, timers.

1. Review rules of park and importance of respecting the quiet for other birders. Valuable opportunities will be lost if you scare the birds away.
2. Teacher will choose 2 distinctly different areas as a way to introduce a potential independent variable to the experience. They can compare upland bird communities to aquatic species, or salt water areas to fresh water pond habitats.
3. Students will use field guide & keys to identify at least 2 birds. They will utilize **ethograms** to focus observations, record behaviors, graph and analyze data to better understand how these animals are physically and behaviorally adapted to surviving in their ecosystem. Review what kind of abiotic conditions affect this area.
4. If students did not see their research birds they may check the visitor bird list located under the wooden near the park headquarters, and continue observing other species.
5. Encourage note taking, picture taking and drawings. All of these recorded observations will create further interest in questions they can investigate as part of their culminating project.

Post visit:

Students will use printed materials and internet resources and personal experiences to create a flip book museum wall. Flip books are compact ways to display genuine articles of student work in a confined space such as a bulletin board.

Submit Data to eBird.

Students will write names of birds sighted on chart paper. This class bird list can be referenced so students can know if their bird was spotted in the park that day. They will register and log onto eBird and submit data for the date, place and species of birds seen. Adding this small bit of information to a national data base, students can help track birds and help scientists all over the globe discover how birds live and what changes will happen due to climate change.

Culminating Activity Flip Book Suggested Topics and Rubric

Flip Book Rubric	Mastery	Developing	Needs improvement
Cover page includes names and pictures of two birds that will be compared.	Also includes the scientific names of the birds in addition to pictures	Also includes names and class of students	Did not label cover page
Map showing range and migration patterns	2 Maps labeled with range and /or migration data for each bird	One map labeled with both birds range/ migration information	One map for one bird or lacks range information.
Abiotic factors that affect wildlife. What type of ecosystem is each bird adapted for	Compare the abiotic conditions in 2 different locations in the park and how the	Compare the abiotic conditions in 2 different areas in the park.	List abiotic conditions in one park of the park.

living?	birds were or were not adapted to that area.		
Venn Diagram compares physical adaptations and body structures.	Includes 3 facts in each bubble for a total of least 9 facts.	Includes no more than 6 facts.	Includes 3 or less facts
Reproduction What reproductive adaptations does each bird have to ensure the survival of the chicks?	Includes all 4 points of information of mate selection, nest preparation, eggs incubation and chick fledging for each bird.	Includes only 2 points of information for each bird	Includes one or less points of information for each bird
Create a food chain with other organisms in this community	With at least 5 members. Labeled producer, consumer, scavenger, etc.	With 4 members,	With 3 members or less Or not labeled
Field trip hypothesis reflection. State conclusion from ethogram behavior study.	Conclusion includes a claim, evidence and supporting background information.	Includes 2 parts of the conclusion.	Includes one part of the conclusion,
Further research plan: How would you answer new questions that arose from your study?	"If, than, because" hypothesis statement complete, Detailed experiment plan included.	"If, than, because" hypothesis statement complete.	"If, than, because" hypothesis statement incomplete.
Civic action: What changes would you recommend to the park to ensure the survival of the species you researched?	Includes ideas for both birds researched. Suggestions supported by research.	Includes ideas for one birds researched. Suggestions supported by research.	Includes ideas for one bird or not supported by research.
Cite sources	At least 5 sources cited and referenced	3 to 4 sources cites and referenced	Plagiarized material by not citing the author who wrote it.

To create a flip book, fold 5 pieces of 8.5x11 inch computer or construction paper in half and staple. You may choose to stagger the pages to create a fanning effect on the bottom. Student may change the order of topics listed above or may be created as a PowerPoint slideshow.

Sources

- Common Core Standards: <http://www.corestandards.org/ELA-Literacy>
- Next Generation Science Standards for Middle school : <http://63960de18916c597c345-8e3bed018cb857642bed25a591e65353.r63.cf1.rackcdn.com/K-12%20Topics%20Combined%206.10.13.pdf>.
- NYC DOE Scope and Sequence for Science Middle School <http://schools.nyc.gov/Documents/STEM/Science/K8ScienceSS.pdf>.
- Bird Information <http://www.birds.cornell.edu/AllAboutBirds/studying/birdsongs/>.
- Ebird data base <http://ebird.org/content/ebird/>.
- Ethogram <http://www.ethosearch.org/>.
- NOAA Estuary Education Website <http://estuaries.noaa.gov>
- Gateway National Park <http://www.nps.gov/gate/index.htm>.