

Birds of Prey - Who Done it?

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Purpose: Students love to be detectives. This lesson will allow them to analyze and interpret data using wildlife cams (with a focus on Eagle cams) and pre-determined evidence to prove which bird of prey is stealing fish from a local resident's pond. This lesson is intended to allow students to apply previously gained knowledge on predator-prey interactions, patterns among organisms, and ecosystem viability to enhance or assess their knowledge of ecosystem populations. It also can be used as an introduction to ecology, ecosystems, or biome lessons. It is intended to be modified to suit that needs of the class, region, and grade level. While the best way to use this plan is through Google Classroom, it can be modified as paper and pencil work for schools who do not have access to computer labs or multiple workstations as it can be assigned in groups, as a whole class assignment, or independent research.

Objectives:

The students will be able to:

- Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organism in an ecosystem. (NGSS)
- Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems. (NGSS)
- Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms. (NGSS)
- Analyze and interpret data to provide evidence for phenomena. (NGSS)
- Construct an oral and written argument supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon or a solution to a problem (NGSS)

NGSS Standards:

- MS-LS2-1 – Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organism in an ecosystem.
- MS-LS2-2 – Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.
- MS-LS2-4 - Construct an oral and written argument supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon or a solution to a problem.
- MS-LS2-5 - Evaluate competing design solutions based on jointly developed and agreed-upon design criteria.

Common Core Standards (Language Arts and Math):

- RST.6-8.1, WHST.6-8.2, WHST.6-8.9, SL.8.1, SL.8.4, 6.SP.B.5

Grade Level: 6-8

Time: 3-5 days depending on class length, can be assigned as independent assignment depending on grade level

Resources needed:

- PowerPoint Presentations: 1 for students, 1 for the teacher (attached)
 - Birds of Prey – Who Done it? – Student Version
 - Birds of Prey – Who Done it? – Teacher Version
- Access to multiple computers or laptops with internet access
- Speakers
- Works best when used in conjunction with Google Apps when assigned through Google Classroom
 - See resources for a how-to video for Google Classroom

Vocabulary: ecology, ecosystem, population, predator, prey, biotic factors, abiotic factors, community, producer, consumer, carnivore, omnivore, herbivore, trophic level, biome, habitat, niche

Directions for the Teacher:

1. View both versions of the *Birds of Prey – Who Done it?* PowerPoint.
2. If using Google Classroom: Upload “Birds of Prey – Student Version” as a new assignment. Make sure to select “make a copy for each student” so that the students will be able to edit their document. If you are using this lesson as a whole class assignment, print a copy for each student. You will want to project the student version on the board. Don’t show the teacher’s version. It has all the answers.
3. Read the following passage to the students. Note: It is also on the provided PowerPoint.

Mr. Richardson has recently installed a large decorative fountain and fish pond in his backyard. When he comes home from work he notices that there are koi, large goldfish, and catfish missing from his pond! He does not have a camera but he does have a small tape recorder in which he can record up to 2 hours of sound per day. Mr. Richardson works during the day so he is not home to see when the fish go missing. No human tracks (footprints) have been found at the pond so Mr. Richardson is convinced that an animal is hunting his fish. He begins to search for clues. His findings are on the next pages. Please use your knowledge of birds of prey and any investigative techniques you may have learned to figure out which animal is taking the fish. Additional information: Mr. Richardson lives in Hillsborough, NJ on a large property along the Raritan River. The time of year is early spring. The pond measures 5ft deep (fountain is off center), 25ft x 16ft length. The following clues are left at the scene: Feathers, track marks, tape recording of the sounds captured from the pond.

4. Begin by asking students what their initial reaction to the scenario is. Group survey/discussion works best to jump start their ideas about what is happening to the fish. Students may know that Eagles are to blame right away. That’s ok! They still have to prove it.
5. Review the directions with the class by showing the students each page of the PowerPoint. Directions are on each page. Students should be instructed to edit the PowerPoint with their answers. This will be submitted to the teacher upon completion.

6. Suggestions for the teacher on how to guide students through the PowerPoint is included on the Teacher version.
7. If the teacher is assigning this project as independent work, students may refer to the PowerPoint at this time. Small groups work best for large classes. Everything you need is in the PowerPoint. If the teacher is completing this project as whole group instruction, then follow the student version step-by-step while students fill in their answers as you go along.

Extensions:

- After the case is solved have students research or brainstorm what Mr. Richardson can do to solve his problem with the Eagles.
- Have students build models of the pond with their proposed fix for the fish theft.
- Based off of student response to this lesson, I used this as an introduction to genetics and forensics. The next step is teaching DNA sequencing, fingerprint analysis, shoeprint plaster molds, dactyloscopy and microscopy, blood spatter analysis. Students referred to the eagle case with suggestions like: Can we get DNA out of the eagle feather? Can you take plaster molds of the bird tracks for comparison? Can you compare the sand near the pond to sand found in the eagle nest to confirm that these exact eagles were responsible? Do eagle feet have fingerprints like humans? Can we analyze the fish remains in the nest to see if they were indeed Mr. Richardson's fish?

Resources:

- Cornell University Bird Labs <http://cams.allaboutbirds.org/>
- Duke Farms Eagle Cam <http://www.dukefarms.org/Stewardship/WildlifeCams/eagle-cam/>
- Conserve Wildlife <http://www.conservewildlifenj.org/>
- Next Generation Science Standards <http://www.nextgenscience.org/get-to-know>
- Delaware Valley Raptor Center <http://www.dvrconline.org/>
- Blog by Diane Cook <http://www.frsd.k12.nj.us/site/Default.aspx?PageID=885>
- How-To Use Google Classroom Video <https://www.youtube.com/watch?v=VTWYf4PTLPw>

Contact: If there is any issue/problem with the PowerPoint presentations (which are essential to this lesson) please contact me at LKurzius@manvillesd.org or Lauren@kurzius.net.

Name:

Period: Due:

Mr. Richardson's Eagles - Grading Rubric

PowerPoint Page Number	What should be included?	Check off when Completed	Points	Score (For Teacher Only)
4	Eagle Cam Observation: 5 total observations from the cameras (fill in the chart). Must watch all camera linked on the slide. At least one observation from each. Type up a summary paragraph on the slide as well.		15	
5	Osprey Observation: 5 total observations from the cameras (fill in the chart). Must watch all camera linked on the slide. At least one observation from each. Type up a summary paragraph on the slide as well.		15	
6	Red-tailed Hawk Cam Observation: 5 total observations from the cameras (fill in the chart). Must watch all camera linked on the slide. At least one observation from each. Type up a summary paragraph on the slide as well.		15	
7	Great Horned Owl Cam Observation: 5 total observations from the cameras (fill in the chart). Must watch all camera linked on the slide. At least one observation from each. Type up a summary paragraph on the slide as well.		15	
8	Elimination Slide: Student must provide 3 points of evidence on this slide describing why they are eliminating any birds.		12.5	
10	Photo evidence: Student successfully identifies both pictures on the slide and provides evidence - either visual comparison or provide a link to support your claim.		15	
11	Photo evidence: Student successfully identifies both pictures on the slide and provides evidence - either visual comparison or provide a link to support your claim.		15	
12	Tracks: Student successfully identifies both pictures on the slide and provides evidence - either visual comparison or provide a link to support your claim.		15	
13	Elimination Slide: Student must provide 3 points of evidence on this slide describing why they are eliminating any birds.		12.5	
14	Sound recording: Student successfully identifies the sound recording and provides evidence – you-tube or other link to support your claim.		20	
15	Conclusion: Student must sum up their findings referencing at least 10 points of evidence.		25	

To see teacher comments, log in to Google Classroom and Review your returned PowerPoint/Google Slides.

Total Score _____/175 points