

SCIENTISTS IN THE FIELD *Where Science Meets Adventure*

DISCUSSION AND ACTIVITY GUIDE

The Call of the Osprey
BY DOROTHY HINSHAW PATENT

About the Series



The Call of the Osprey is part of the award-winning Scientists in the Field series, which began in 1999. This distinguished and innovative series examines the work of real-life scientists doing actual research. Young readers discover what it is like to be a working scientist, investigate an intriguing research project in action, and gain a wealth of knowledge about fascinating scientific topics. Outstanding writing and stellar photography are features of every book in the series. Reading levels vary, but the books will interest a wide range of readers.



The Call of the Osprey
by Dorothy Hinshaw Patent
Photography by William Muñoz

About the Book

"If you want to learn about contamination of rivers, just ask the osprey." Dorothy Hinshaw Patent describes the efforts of scientists who are doing just that with a long-term study of the osprey outside Butte, Montana, in one of the largest Superfund sites in the country. The scientists are working to understand the effects of pollution on the environment through their research on these remarkable birds.

About the Author

Dorothy Hinshaw Patent has always loved nature and the outdoors. After receiving her PhD in zoology from U.C. Berkeley, she decided to share that love by writing for children. She has now written more than 130 books, many of them winning awards such as an Orbis Pictus Honor, ALA Notables, Outstanding Science Trade Book, Washington Post/Children's Book Guild Nonfiction Award, Edward O. Wilson Biodiversity Writing Award and many more. While writing this book, Dorothy visited ospreys many times, including donning a harness and hard hat and being lifted high in the air by a roofing truck to view an osprey's nest. She lives in Montana.

About the Photographer

When William Muñoz graduated from high school, his parents gave him a camera, and he's been taking photographs ever since. He has frequently worked with Dorothy Hinshaw Patent and they have done more than 100 books together. Mr. Muñoz lives in Montana.

Houghton Mifflin Harcourt Books for Young Readers

Visit www.sciencemeetsadventure.com for authors' Adventure Notes, teacher resources, videos, and more!

Pre-Reading Activity

Have students create a log for a set period of time (a week, two days, or more) listing every single thing they put in their mouth. The older the students, the more specific they should be with the list. “Twelve ounces of orange juice, one piece of buttered rye toast, etc.” Use this list to have students compose a response to “You are what you eat.” Students should state whether they are vegetarians, carnivores, omnivores, etc.

Take a picture of an old tree trunk or an abandoned nest or the entrance area of an animal’s burrow, etc. Do NOT include any animals in the picture. Have students scrutinize the pictures and list predictions for what animals may have been present and for what the animal was doing. Students should cite evidence from the picture to support the prediction. How do we document the presence of a creature when we do not see the animal?

Make sure students have a thorough understanding of how Superfund sites are created, identified, and improved.

Discussion Questions

How are the privacy needs of animals different from the privacy needs of humans—or are they different?

Many scientists believe that serious researchers should not name wild animals. They believe it injects a bias into objective behavioral observations. Other scientists believe that naming wild animals encourages closer, better observations and makes it easier to speak to colleagues about the animals. Was it appropriate for the scientists to name the ospreys Iris and Stanley?

Why can it take so long to clean up a Superfund site? How much financial responsibility should the government assume for this cleanup effort? If the responsible party refuses to pay or is unable to pay, what should happen?

Ospreys have been known to build nests on electric power poles, which subjects them to the risk of electrocution. Should power companies be required

to provide poles that minimize the risk or to relocate nests? Should the government pay for this relocation or should it be an operating expense?

What can ospreys teach humans about living in a family?

Applying and Extending Our Knowledge

Before we read even one word of the text, we see at least five pictures of osprey nests. Look carefully at these pictures.

- Build a nest with items from brush piles, recycle bins, or other sources that will not deplete natural resources other creatures need. Build your nest without using tools, as a bird does. Write a justification of your nest, explaining why the eggs will not break, why the nest will stay together, and what the nest provides both the parents and the eggs and the hatchlings.
- Find an abandoned nest and take a picture. Compare this nest with the osprey nests and create a Venn diagram or other visual that compares and contrasts the two nests.
- Carefully examine the nest to determine how it is held together.
- What other creatures construct nests similar to the osprey nests? Again, what are the similarities and what are the differences?
- Research information about nests from places like the Cornell Lab of Ornithology or similar places closer to your location to find out what scientists believe about the purpose and function of nests. Do all birds make a nest?

Common Core Connections

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.W.7.1

Write arguments to support claims with clear reasons and relevant evidence.

CCSS.ELA-Literacy.W.7.1.b

Support claim(s) with logical reasoning and relevant evidence, using accurate, credible sources and demonstrating an understanding of the topic or text.

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On page 8 we read, “*This study focuses on what has been the largest Superfund site in the country, an area that includes a 120-mile stretch of the Clark Fork River running from the mining town of Butte, Montana, to the former Milltown Dam a few miles east of Missoula. The Superfund project aims to remove the millions of tons of mining waste contaminated with heavy metals and restore the natural environment.*”

- Find the Superfund site closest to your location and present an online (or poster) visual tour of the site. Why is the location a Superfund site? What damages were done to the local environment? What has been done up to now or what is proposed to mitigate the damage? What animals depend on this area? Any endangered animals?
- The area described in the quote above is home to ospreys. Scientists study ospreys to find the type and amount of contaminants. Do scientists exclusively study the ospreys in this site? What other animals would yield the same information? Make an annotated chart of the animals in this area briefly describing what you predict each animal would tell you about the health of the Superfund site.

Common Core Connections

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.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.W.7.6

Use technology, including the Internet, to produce and publish writing and link to and cite sources as well as to interact and collaborate with others, including linking to and citing sources.

Erick Greene tells students on page 12 that there is no other bird quite like the osprey. We read, “*These birds are related to hawks and eagles, but they’ve evolved as specialists to capture fish.*”

- Prepare an online presentation defining eagles, hawks, and ospreys and showing viewers representatives of all the different types of these birds.
- In the presentation, make sure to explain the differ-

ence between these birds, being especially careful to explain similarities and differences in their diets.

- Make a map showing where ospreys live.
- There are several webcams set up to view ospreys in the wild. Pick a set time to begin viewing the ospreys. Each day at that exact time, tune into the webcam and take notes for fifteen minutes on what you observe. If this activity is done in groups, it will be more useful, if possible, to assign different times and to have as many different times as possible. Ideally, students could be assigned times in the morning, afternoon, and evening. Watch daily for at least a week. Remind students to get in the habit of documenting the date and time of each observation.
- Greene shows students the osprey’s toe and tells them it is flexible and can be turned backwards to grab and secure fish. Make a model schematic drawing or show online diagrams for how this toe works. Scientists and inventors often use animal attributes to plan new products for people to use to make life easier. Look at these models or drawings or diagrams of the osprey toe and speculate on possible inventions, products, or uses that could be made of this osprey feature. Write a brief annotation justifying your choice.
- Write a children’s story along the lines of one of the stories from Rudyard Kipling’s *Just So Stories* and explain how the osprey got his toe. Illustrate your story and share it with an elementary school class. Build in time to explain, in child-friendly language, facts about the osprey, especially its most unusual toes.

Common Core Connections

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.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.W.6.1

Write arguments to support claims with clear reasons and relevant evidence.

CCSS.ELA-Literacy.W.6.3

Write narratives to develop real or imagined experiences or events using effective technique, relevant descriptive details, and well-structured event sequences.

CCSS.ELA-Literacy.WHST.6-8.1

Write arguments focused on discipline-specific content.

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.

Like all birds, ospreys have lightweight bones. Unlike many birds, however, the osprey's wings are very oily. Greene explains that the oil repels the water, which keeps the osprey from getting waterlogged.

- Take two identical handkerchiefs or similar pieces of cloth. Dip one completely in vegetable oil or other safely handled oil, then set aside. Leave the other one oil-free. Investigate how long it takes an osprey to enter the water and then completely emerge from the water. Make sure to find one in which the osprey goes completely under water (sometimes the catch fish by skimming the top). Do this by watching videos and using a stopwatch. In separate tubs of water, dunk each piece of cloth for the same amount of time. Which piece has collected more water? Try this again with one piece of cloth covered in Vaseline (and to be on the safe side, wear gloves when using the Vaseline).
- Look at other features of the osprey. Design an advertising brochure convincing readers that the osprey is designed to dive in the water and catch fish for up to two decades. Make sure to take advantage of all osprey features and biology, including breathing. Make sure to cite all your sources.

Osprey risk electrocution when they build nests on power poles. Look at the picture on page 14. Notice what the power company did to make the pole unfit for an osprey nest.

- Do a survey of the wires and poles and roads and streets in your neighborhood—anything that could conceivably be of risk to the wild animals that share your environment. Create a scale of danger from minimal to serious for all the risks you spot. Then create two or three possible solutions to reducing

the risk.

- Advanced students may even prepare a financial analysis of the costs and prepare a cost/benefit analysis with a recommended plan of action. In some locations, your city manager or someone from your city's planning department might be willing to help students understand all of the elements that enter into a plan of this type.

Common Core Connections

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.WHST.6-8.1

Write arguments focused on discipline-specific content.

CCSS.ELA-Literacy.WHST.6-8.1.b

Support claim(s) with logical reasoning and relevant, accurate data and evidence that demonstrate an understanding of the topic or text, using credible sources.

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.6-8.7

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.

When we read the osprey statistics on page 17, we need to pay close attention to the weight of a full-grown osprey. We see that males weigh less than four pounds and that females weigh about a half pound more.

- Without doing any research, write a prediction for why you think females weigh more than males. After writing your prediction, check and cite several sources until you have enough different sources to feel comfortable with the answer. If you have a school librarian or a professional library media specialist at your school, consult with this person to help you find reliable sources. Compare the scientific answer with your prediction.
- Look at the pictures of osprey and videos of osprey. Look again at the statistic showing the wingspan. Is this a bird that looks like it only weighs three or four pounds? Can you build a model osprey with

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- a six-foot wingspan, the same wing size, the same body size, and the same size feet and head, and have it weigh less than five pounds?
- Look again at videos of the osprey pulling live fish from the water. How much do the fish weigh? Make a chart with your prediction for the range of fish weights. If possible, identify the type of fish caught and check average weights of that species. Write a persuasive essay explaining how strong an osprey is compared to other birds or other species. How does the osprey compare to humans in terms of body strength?
 - Draw or produce online a graphic showing an average osprey life cycle from egg to death.

Common Core Connections

CCSS.ELA-Literacy.W.6.2.a

Introduce a topic; organize ideas, concepts, and information, using strategies such as definition, classification, comparison/contrast, and cause/effect; include formatting (e.g., headings), graphics (e.g., charts, tables), and multimedia when useful to aiding comprehension.

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.6-8.1.b

Support claim(s) with logical reasoning and relevant, accurate data and evidence that demonstrate an understanding of the topic or text, using credible sources.

CCSS.ELA-Literacy.RI.7.1

Cite several pieces of textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.

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.6-8.3

Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.

Ospreys leisurely migrate south during the winter, but when spring arrives, they hustle back in half the time or faster. Osprey typically go to the same migration destination each year.

- Compose a piece of music (or find a piece of music) that suggests the pace of an osprey migration. Create a dance of the osprey migration and share it with younger students (perhaps to go along with

the story of how the osprey got its toes).

- Without doing any research, make a prediction for why the first part of the migration in the cold winter is so slow and why the return trip is so much faster. Design ways that your prediction could be tested. Now use your school librarian or media specialist to find reliable sources that answer this question (use the public library if your school does not have professional librarians). Is there consensus in the scientific community about why the migration is like this? Explain.

Common Core Connections

CCSS.ELA-Literacy.SL.7.5

Include multimedia components and visual displays in presentations to clarify claims and findings and emphasize salient points.

CCSS.ELA-Literacy.RST.6-8.1

Cite specific textual evidence to support analysis of science and technical texts.

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.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.WHST.6-8.1.b

Support claim(s) with logical reasoning and relevant, accurate data and evidence that demonstrate an understanding of the topic or text, using credible sources.

Chapter two discusses various dangers in the environment to the osprey, everything from the animals that prey on osprey or osprey eggs to silver mining.

- Make a chart showing everything that represents a risk to the osprey. Make a Hazmat code chart for all of these risks and label them according to your chart rubric.
- This chapter mentions the problems with DDT and other pesticides. Many farmers depend on pesticides to bring in the crops that pay their mortgages and other bills. Prepare a mock trial arguing for or against banning pesticides. It may be useful to have some students practice arguing the merits of a position they personally oppose.

Common Core Connections

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.W.7.3

Write narratives to develop real or imagined experiences or events using effective technique, relevant descriptive details, and well-structured event sequences.

CCSS.ELA-Literacy.SL.7.4

Present claims and findings, emphasizing salient points in a focused, coherent manner with pertinent descriptions, facts, details, and examples; use appropriate eye contact, adequate volume, and clear pronunciation.

Patent is compelled to share information about the team. In the section entitled “Meet the Scientists” (p. 30–31) she provides information about the scientists.

- Make a class book modeled after these descriptions forecasting what each class member would offer to a scientific team. This is a venture into speculative nonfiction—the goal is to honestly envision ourselves as scientists (regardless of whether or not that is our current career goal). List skills that we have or see ourselves developing that would be of use to the team.
- Encourage students who do have an existing science passion to adapt their biographical entry to fit a project related to their current interest.

Common Core Connections

CCSS.ELA-Literacy.W.7.2 Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.

CCSS.ELA-Literacy.W.7.2d Use precise language and domain-specific vocabulary to inform about or explain the topic.

CCSS.ELA-Literacy.WHST.6-8.1 Write arguments focused on discipline-specific content.

On page 32 we read, “If you want to learn about contamination of rivers, just ask the osprey. They can’t tell you directly, but their blood and their feathers can reveal what they’ve been eating.” This quote begins the chapter entitled “You Are What You Eat.”

- Think of all the healthy food we consume and all of the junk food we devour. Write a poem about who you are in relation to the food you eat, both good and bad.

- Later in this chapter, we read that scientists also collect sediment samples. These sediments are filled with arsenic, cadmium, copper, and more that leach into the soil and into the water, which in turn, is filled with the fish that the osprey eat. Think about the local food you eat and think about possible contaminants in your area, as well as in the areas of the food that composes the bulk of your diet. Go back to your poem and revise it based on the soil and growing conditions in your neighborhood.
- In addition to arsenic, cadmium, and copper, this chapter also speaks of lead, zinc, mercury, selenium, and even twine. Make a poster showing all of these risks and any others that come from Superfund sites in your area. Make sure your poster explains what the substance is, what it does to the environment, what its value is (why do people mine copper), and other problems associated with the mining.

Common Core Connection

CCSS.ELA-Literacy.W.7.3

Write narratives to develop real or imagined experiences or events using effective technique, relevant descriptive details, and well-structured event sequences.

CCSS.ELA-Literacy.W.7.2d Use precise language and domain-specific vocabulary to inform about or explain the topic.

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.6-8.7

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).

On page 44 we read about the adventures of Iris and Stanley.

- Read this section and rewrite it as a play for students or as an opera or as a musical or as a picture book. As always, any time we use the work of another, remember to give credit to Dorothy Hinshaw Patent and William Muñoz.
- Perhaps your class could find a nest site in your area and hook up a webcam to watch local birds and create your own adventure story? If a webcam is not possible, perhaps you could create teams of students assigned to collect daily photographs of the nest and birds (without harassing the bird family).

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Common Core Connection

CCSS.ELA-Literacy.W.7.3

Write narratives to develop real or imagined experiences or events using effective technique, relevant descriptive details, and well-structured event sequences.

CCSS.ELA-Literacy.W.7.2d Use precise language and domain-specific vocabulary to inform about or explain the topic.

CCSS.ELA-Literacy.RST.6-8.3

Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks

Further Reading

Suss, Janie. *Oscar and Olive Osprey: A Family Takes Flight*. Synergy Books, 2010.

Other Websites to Explore

Osprey – National Geographic
animals.nationalgeographic.com/animals/birds/osprey

The Biomimicry Institute

www.asknature.org

A section of the Biomimicry Institute's website where students can learn about some of the adaptations in nature that might be or have been used by people.