

# BEAUTY AND THE BEAK

by Deborah Lee Rose  
and Jane Veltkamp

## EDUCATIONAL GUIDE

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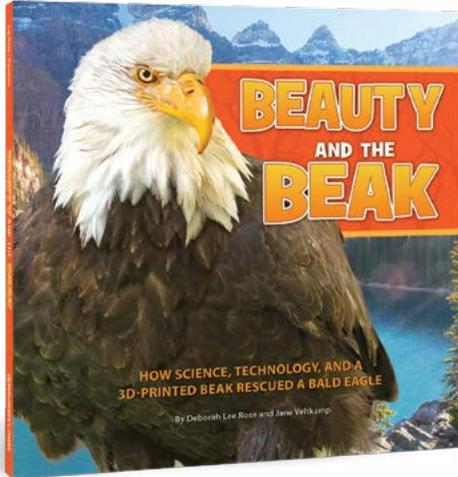
CALIFORNIA READS  
2016-2017  
Recommended Title  
California Teachers Association

**HOW SCIENCE, TECHNOLOGY, AND A  
3D-PRINTED BEAK RESCUED A BALD EAGLE**

# BEAUTY AND THE BEAK

HOW SCIENCE, TECHNOLOGY, AND A 3D-PRINTED BEAK RESCUED A BALD EAGLE

By Deborah Lee Rose and Jane Veltkamp (Persnickety Press 2017)



This breathtaking, nonfiction picture book tells the full story of Beauty, the bald eagle that was shot, rescued and received a pioneering, 3D-printed prosthetic beak. Beauty has been featured on Nat Geo WILD around the world and in news stories worldwide. BEAUTY AND THE BEAK follows Beauty close up from the moment she uses her baby beak to emerge from her egg, through her hunt when she uses her powerful adult beak to feed herself, to the day her beak is shot off leaving her helpless. This true, heartlifting story continues through her rescue, into months of engineering her prosthetic beak and intense hours of surgery, to the moment she takes the first drink of water by herself with her new beak.

BEAUTY AND THE BEAK captures the spirit and courage of this amazing bird and America's national symbol—whose species was endangered by human activity, only to be restored and thriving because of environmental conservation and human compassion. This book will resonate with stories of other animals endangered or in need, and with stories of humans, from young children to military veterans, in need of prosthetic limbs, who are being given new lives with state-of-the-art devices. *Book and guide cover photo by Glen Hush, © Jane Veltkamp.*

**Authors Deborah Lee Rose and Jane Veltkamp speak at schools, libraries, events and conferences. Jane also presents with live raptors in Idaho and nearby states. Contact Deborah via [www.deborahleerose.com](http://www.deborahleerose.com) and Jane via [www.birdsofpreynorthwest.org](http://www.birdsofpreynorthwest.org).**

## SEE BEAUTY THE EAGLE ON VIDEO

[HTTP://WWW.BIRDSOPREYNORTHWEST.ORG/BEAUTY-AND-THE-BEAK.HTML](http://www.birdsofpreynorthwest.org/beauty-and-the-beak.html)

## ENGINEER A MODEL OF BEAUTY'S BEAK

Design, make and test simple, hands-on models of Beauty's prosthetic beak.

<http://www.eie.org/engineering-everywhere/curriculum-units/prosthetics>

## DOWNLOAD AND COLOR A BALD EAGLE

Download at [bit.ly/baldeaglecoloring](http://bit.ly/baldeaglecoloring), courtesy of the Cornell Lab Publishing Group and Cornell Lab of Ornithology.



## DOWNLOAD FREE BEFORE/AFTER PHOTOS OF BEAUTY THE EAGLE

Download public domain photos from the U.S. Fish and Wildlife Service National Digital Library. <http://digitalmedia.fws.gov/cdm/singleitem/collection/natdiglib/id/17938>

## EXAMINE BEAUTY'S PROSTHETIC BEAK

For information about a 3D-printed replica of Beauty's new beak, visit [www.birdsofpreynorthwest.org](http://www.birdsofpreynorthwest.org).

## KEY WORDS

beak  
adaptation  
predator  
prey

Bald Eagle  
raptor  
endangered species  
symbol

prosthetic  
3D printer  
biologist  
engineer

wildlife  
ecosystem  
environment  
conservation

## READ BEAUTY AND THE BEAK

- Where was Beauty born and what time of year?
- How does a bald eagle use its beak to survive?
- What do Bald Eagles eat?
- What happened after Beauty's beak was shot?
- What idea did Janie have to help Beauty?
- How did Nate use a 3D printer to help Beauty?
- Who worked on the team to engineer Beauty's new beak? What jobs did they do?
- Why did surgery to attach the beak take so long?
- How did Janie know the 3D-printed beak worked?
- Does Beauty still have her prosthetic beak?



Photo © Jane Veltkamp, from the book BEAUTY AND THE BEAK

## READ.ANSWER.DISCOVER

**1.** Bald Eagles are raptors or birds of prey. What *adaptations* make Bald Eagles and other raptors such powerful hunters?

**2.** By the time they're six weeks old, Bald Eagles have a full adult wingspan—sometimes more than 6 feet (2 meters) wide! *Get someone to measure your armspan. How do you measure up to a Bald Eagle?*

**3.** Janie Veltkamp, who led Beauty's beak team and takes care of Beauty, is a raptor biologist. Handling raptors takes special training, equipment and even clothing. What does Janie wear when she works with Beauty? Why?

*Learn more about Janie's work at [www.birdsofpreynorthwest.org](http://www.birdsofpreynorthwest.org).*

**4.** Why did Janie need an engineering team? What jobs do the team members do in everyday life? How did they work together?

*On your own or as a team, you can design, make and test models of Beauty's damaged and prosthetic beaks with special STEM engineering activities from Museum of Science, Boston. [www.eie.org/engineering-everywhere/curriculum-units/prosthetics](http://www.eie.org/engineering-everywhere/curriculum-units/prosthetics)*

**5.** Beauty can never go back into the wild because she depends totally on human help. What help must Janie give her?

**6.** Choose a photo from the book, *BEAUTY AND THE BEAK*. Write your own story, poem, essay or song about it, or make a video.

What did you learn from this photo? Search the U. S. Fish and Wildlife Service National Digital Library for more Bald Eagle photos.

<http://digitalmedia.fws.gov/cdm/search/collection/natdiglib/searchterm/bald%20eagle>



Photo © Jane Veltkamp, from the book *BEAUTY AND THE BEAK*

## READ.ANSWER.DISCOVER

- 7.** Visit a place or event to see a wild eagle or an eagle being cared for by people. Invite someone who works with eagles or raptors to visit your school or site. Ask them about their work: **What's the hardest/coolest thing in your job? How do you get an eagle or raptor to trust you? How do you help raptors return to the wild?** *Read about Raptor Biologists for a Day. <http://usfwspacific.tumblr.com/post/125525169525/raptor-rapture-bird-enthusiasts-play-biologist>*
- 8.** In the past, Bald Eagles were endangered because they were illegally shot, poisoned by pesticides, and human activity reduced the size and quality of their habitat. **How can you help conserve wild bald eagles and other species for the future?** Learn more about conservation from the Cornell Lab of Ornithology. <http://www.birds.cornell.edu/page.aspx?pid=1666>
- 9.** Where do scientists and engineers get ideas for new things, like Beauty's beak? *Do you have an idea for something new? Where did you get the idea?*
- 10.** More and more animals and humans are getting prosthetic devices thanks to 3D printing. Some parts, such as artificial hands for children, are being engineered by students, teachers and family members as well as scientists and engineers. *If you were designing and making a new kind of prosthetic body part, what would it be? Who would use it? How would it work? Draw or make a model or video of your idea — or 3D print it. Show or describe how it works to your teacher, classmates, family and friends.*

## CLOSE READING OF BEAUTY AND THE BEAK

Lori Oczkus, literacy consultant and author

*Just the Facts: Close Reading and Comprehension of Informational Text*

Using animal books like BEAUTY AND THE BEAK in the classroom takes advantage of children's natural curiosity—and students actually enjoy reading informational text. **Now more than ever, our students need powerful strategies and skills such as close reading to help them better understand challenging texts.** Close reading is an instructional strategy that involves choosing a rigorous text portion to reread a number of times, for purposes such as asking questions, summarizing, searching for text evidence, gleaning information from text features like captions or headings, or analyzing the author's tone, intent and impact of using specific words and phrases.

You can make close reading lessons about BEAUTY AND THE BEAK engaging in many different ways, for example: give students copies of a portion of the text to reread (and even to share at home with their families); pause throughout the lesson so table teams or partners can discuss the passage; have students mark copies of the text with colored highlighters or use sticky notes and symbols; let students choose which part of the text to reread. Then encourage your students to share, explain or show what they learned about BEAUTY AND THE BEAK from their close reading.

# LEARN MORE ABOUT BALD EAGLES

## BALD EAGLE CONSERVATION

Rachel Carson ([www.fws.gov/rachelcarson](http://www.fws.gov/rachelcarson)) was an environmentalist who wrote the famous book *Silent Spring*. Her work helped convince the U.S. government to stop the use of DDT, a pesticide that was killing bald eagles by weakening their eggshells. *Write a letter or give a talk, as if you were Rachel Carson, about protecting and helping Bald Eagles.*

The number of wild bald eagles is going up. Scientists helped keep the species from becoming extinct by carefully moving many baby bald eagles to different parts of the U.S. mainland. Babies from regions with lots of bald eagles were reintroduced to regions with few Bald Eagles. The babies then ended up raising their own families in their new locations. *Imagine you're a scientist raising a baby eagle in the wild, after it's been moved. What would the baby need from you to survive? What steps would you take so the baby can grow up wild and not dependent on humans?*

As Bald Eagle populations recover, they need more wild habitat where they can live safely and thrive. Bald Eagles are protected by the U.S. Fish and Wildlife Service, but they still get hurt or killed by technology when they collide with power lines, cars or trains. Eagles are also seriously injured or killed when they are illegally shot, and will die of lead poisoning if they eat prey that was shot with a lead bullet. If bald eagle populations start going down, scientists will know something in the environment is harming them and could harm other species too. This is why bald eagles are a critical bioindicator species. *Read or write a news story about human impact on Bald Eagles.*

## BALD EAGLE SYMBOLS

Since June 20, 1782, the Bald Eagle has been part of the Great Seal of the U.S. Bald Eagle symbols are found many places, like on money and in ads. *Find three bald eagle symbols. What do they mean?*

Bald Eagles are a major symbol in Native American culture and traditions, art and legends. *Create your own art including a Bald Eagle symbol, perhaps in a model totem pole, a mask, a mural or a video.*

## WATCH AND CELEBRATE BALD EAGLES

Watch bald eagles in the wild, at a zoo, raptor center, wildlife center or eagle festival, or online via live eagle cam. Celebrate bald eagles anytime including: Mid-March: National Wildlife Week | 4/22: Earth Day | Second Saturday in May (U.S.): International Migratory Bird Day | 6/20: "National Bald Eagle Day" —many states celebrate the anniversary of the Bald Eagle first appearing as the national symbol on the Great Seal of the U.S. (1782) | June 28: Anniversary of announcement that bald eagles would be taken off the Endangered and Threatened Species List (2007) | July 4th: U.S. Independence Day.

## BALD EAGLE RESOURCES

- **Cornell Lab of Ornithology:** [https://www.allaboutbirds.org/guide/Bald\\_Eagle/id](https://www.allaboutbirds.org/guide/Bald_Eagle/id)
- **U.S. Fish and Wildlife Service:** <https://www.fws.gov/midwest/eagle/recovery/index.html>
- **U.S. Fish and Wildlife Service Digital Library images:** <http://digitalmedia.fws.gov/cdm/search/collection/natdiglib/searchterm/bald%20eagle>
- **National Wildlife Federation:** <https://www.nwf.org/wildlife/wildlife-library/birds/bald-eagle.aspx>
- **Audubon:** <http://www.audubon.org/field-guide/bird/bald-eagle>



USFWS photo

# STANDARDS

## COMMON CORE STANDARDS/English Language Arts Standards

### **READING/LITERATURE**

**Grade 3** – Explain how specific aspects of a text’s illustrations contribute to what is conveyed by words in a story.

**Grade 4** – Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text.

**Grade 5** – Determine the meaning of words and phrases as used in a text, including metaphors and similes.

### **READING/INFORMATIONAL TEXT**

**Grade 3** – Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect. Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur).

**Grade 4** – Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text. Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears.

**Grade 5** – Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific information in the text. Explain how an author uses reasons and evidence to support particular points in a text, identifying which reasons and evidence support which point(s).

**Grade 6** – Analyze in detail how a key individual, event, or idea is introduced, illustrated, and elaborated in a text (e.g., through examples or anecdotes). Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings.

### **WRITING/RESEARCH**

**Grade 3** – Conduct short research projects that build knowledge about a topic.

**Grade 4** – Conduct short research projects that build knowledge through investigation of different aspects of a topic. Draw evidence from literary or informational texts to support analysis, reflection, and research.

**Grade 5** – Conduct short research projects using several sources to build knowledge by investigating different aspects of a topic. Draw evidence from literary or informational texts to support analysis, reflection, and research.

**Grade 6** – Conduct short research projects to answer a question, drawing on several sources and refocusing the inquiry when appropriate.

## CALIFORNIA SCIENCE STANDARDS - LIFE SCIENCE GRADE 3

Adaptations in physical structure or behavior may improve an organism’s chance for survival. Students know plants and animals have structures that serve different functions in growth, survival and reproduction.

## CALIFORNIA SOCIAL SCIENCE STANDARDS - GRADE 3

Know the histories of important local and national landmarks, symbols, and essential documents that create a sense of community among citizens and exemplify cherished ideals (e.g., the U.S. flag, the **Bald Eagle**).

## NEXT GENERATION SCIENCE STANDARDS (NGSS)

### **CROSSCUTTING CONCEPTS: Influence of Science, Engineering and Technology on Society and the Natural World**

People’s needs and wants change over time, as do their demands for new and improved technologies. Engineers improve existing technologies or develop new ones to increase their benefits, decrease known risks, and meet societal demands.

### **DISCIPLINARY CORE IDEAS: Defining and Delimiting Engineering Problems**

Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account.

### **SCIENCE AND ENGINEERING PRACTICES: Engineering Design**

Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

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*U.S. Fish and Wildlife Service photo*

**Beauty's story made world news and has been featured in Nat Geo WILD TV's "Unlikely Animal Friends" aired in 130 countries, the National Wildlife Federation's *Ranger Rick* children's magazine, as a Green STEM Resource on the NWF Eco Schools website, and on the National Academy of Engineering's EngineerGirl website.**

## AUTHORS

**Deborah Lee Rose** is an internationally published, award-winning author of 15 children's books including *Jimmy the Joey: The True Story of an Amazing Koala Rescue*, *Reading is Fundamental/Macy's Multicultural Multicultural Collection* and *Notable Social Studies Trade Book for Students K-12*, and *Into the A, B, Sea* (a quarter million copies sold). She directed communications for the NSF-funded, ALA/AASL award-winning STEM education website [Howtosmile.org](http://Howtosmile.org), and was senior science writer for UC Berkeley's renowned Lawrence Hall of Science. She served as Director of Communications for Lindsay Wildlife Experience, which includes the first wildlife rehabilitation hospital established in the U.S. She lives in Walnut Creek, CA. Visit her website at [deborahleerose.com](http://deborahleerose.com).

**Jane Veltkamp** is a raptor biologist and rehabilitator, wildlife educator, trained nurse, and master falconer. She led the team who developed Beauty the Bald Eagle's prosthetic beak. She is founder and executive director of Birds of Prey Northwest, a raptor center which educates the public about raptor conservation, and which has provided medical treatment and rehabilitation to thousands of injured birds of prey to return them to the wild. She spent ten years of her career reintroducing ospreys and peregrine falcons to regions where they had disappeared from their habitat in South Dakota and Indiana. She rescues and cares for Bald Eagles, including Beauty, near Coeur d'Alene, Idaho by permit from the U.S. Fish and Wildlife Service. Visit her website at [birdsofpreynorthwest.org](http://birdsofpreynorthwest.org).

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