



# SCIENTISTS IN THE FIELD

Where Science Meets Adventure

DISCUSSION AND ACTIVITY GUIDE

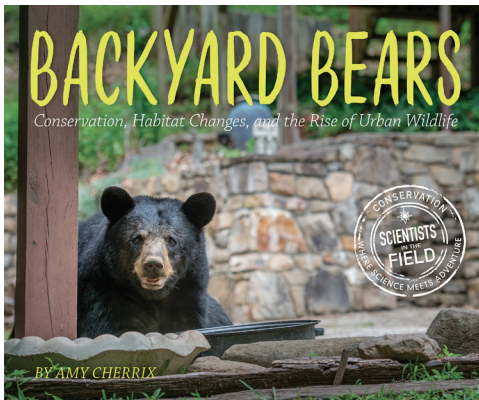
*Backyard Bears: Conservation, Habitat Changes, and the Rise of the Urban Wildlife*

BY AMY CHERRIX

### About the Series



*Backyard Bears* 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.



### About the Book

We are far more frightened by bears than we are of other, statistically more logical animal threats. As we intrude ever deeper into the habitat that has sustained black bear populations for centuries, our interactions with bears, of course, increase. *Backyard Bears* travels with four dedicated wildlife biologists searching for answers that will allow people and black bears to coexist. While this book is set in Asheville, North Carolina, the answers this team of scientists document will have applications to other areas in which people encroach upon bear territory. It even has applications for other wild animal/human exchanges.

### About the Author

*Backyard Bears: Conservation, Habitat Changes, and the Rise of the Urban Wildlife*  
by Amy Cherrix  
9781328858689

This is Amy Cherrix's second title for the Scientists in the Field series and this book is literally set in her own backyard! Known for seeking out the arcane science fact, Amy also has written about celebrities for TV Guide. Amy earned a master's degree in children's literature and is the children's book buyer for a "fiercely independent" bookstore. She has taught graduate courses in young adult fiction. Have interesting science news to share? Send her a tweet @acherrix. You will find more about Amy at amycherrix.com.

### Pre-reading Activities

Take a walk with your students around outside your school or in your neighborhood. Have the students point out plants that are weeds. Point out insects, bugs, rodents, birds, or other animals in your area that are out of balance and considered to be unwanted pests. Take pictures or make a list of them. Back in the classroom, have a discussion about why these particular organisms are unwanted. Look them up in a field guide, in a reference book, or online. Find out where these organisms exist naturally. Discover any benefits they may have to their native territories. Do plants or animals think of themselves as pests, invasive species, weeds, etc.? Could humans be an invasive species?

Houghton Mifflin Harcourt Books for Young Readers

Visit [www.sciencemeetsadventure.com](http://www.sciencemeetsadventure.com) for authors' Adventure Notes, teacher resources, videos, and more!

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What does “conservation” mean? When it is paired next to “habitat changes,” is there an implied contradiction? What does the word “urban” mean? When “urban” modifies “wildlife,” what does that suggest?

Review scientific nomenclature germane to animal classification, specifically the differences in the various bear species. Is there any literature that suggests differences between the urban and rural versions of, say, raccoons, mice, or any other creature?

Since much of the focus in this book involves changing perceptions of urban bears and learning to live with them, have a discussion on what we risk when we only consider first impressions and public perceptions based on gossip or folklore. Make a list of behaviors or words and phrases that people use to stereotype animals based on their supposed value as a species. Discuss how this happens. Are there any animals that students believe are more or less useful? Examine carefully these assumptions.

Have students write down predictions about what would happen to their town if it has large mammals such as black bears. What would the bears eat? Where would they live? Have them add predictions about an average week or month of bear activity, behaviors, social structure, or movement. Revisit these predictions and update them as required by reading and newly discovered information.

When knowledge becomes accepted as truth, people have a tendency to merely accept it without much comment or thought. Examine why the general public used to think that animals such as wolves should be shot on sight. Why do people kill bats or snakes or spiders? Discuss why people change their minds or not. We have people who could easily kill any spider. Yet these same folks are terrified to even be in the same room with one. Is that sort of irrational fear possible to change? How?

Create an annotated list of all organisms (plants or animals) with a bad reputation. Include on the annotation the nature of the reputation and the predicted amount of truth in that mistaken perception. Include any interesting cultural differences.

*Discussion Questions*

What is the role of science in confronting irrational fears? Does it make a difference when part of the fear is based on solid fact? Is there a place for the government to intervene when local tradition defies science? Would an environmental plan, for example, that calls for the introduction of bears into an urban area be worth considering? If so, what factors would lead to proposing such a plan? If not, why not? When does personal responsibility outweigh the public’s need to be protected? Should there be an acceptance of risk in a community that is also the habitat of potentially dangerous animals?

How do we approach people about considering the value of animals like black bears, sharks, feral chickens, urban turkeys, starlings, bats, wolves, spiders, crows, etc.? If we cannot talk someone out of believing that an organism is a danger or a pest, are other incremental goals possible? What would be a worthwhile goal with such a person?

Have you ever panicked when in the presence of an animal that you considered to be a threat of some sort? What steps did you (or others) take to calm down? Why do you think you reacted the way you did? Is there something you or others could have done to keep you from panicking?

What do we need to do to make sure that the average citizen has a better understanding of what is involved in an ongoing research project on a single animal? What steps would you take to explain to a non-science-oriented group of people why we would spend so much time researching animals like black bears?

*Applying and Extending Our Knowledge*

This book is set in Asheville, North Carolina, a city in the Blue Ridge Mountains in western North Carolina.

- What characteristics of Asheville make it a good habitat for black bears? Prepare a presentation that documents black bear habitat requirements. Link these requirements with images and other information about Asheville that documents how each need is met.

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- Since 2000, the population has increased 20%. Why are people moving to Asheville? Research the growth and prepare infographics collating bear and people growth. Prepare a report that presents the range of possibilities for bears and people in the year 2050. Can Asheville sustain the population growth for both people and bears without sacrificing the quality of life for either?
- Research black bear ranges and find cities in these ranges with over 80,000 people. Report on cities that are also dealing with bear problems and ones that could expect to have problems with bears in the next 25 years.

### Common Core Connections

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- CCSS.ELA-Literacy.SL.7.4 Present claims and findings, emphasizing salient points in a focused, coherent manner with descriptions, facts, details, and examples; use appropriate eye contact, adequate volume, and clear pronunciation.
- CCSS.ELA-Literacy.W.6.1(a-d) Write arguments to support claims with clear reasons and relevant evidence.
- CCSS.ELA-Literacy.RI Trace and evaluate the argument and specific claims in a text, distinguishing claims that are supported by reasons and evidence from claims that are not.
- CCSS.ELA-Literacy.RI Delineate and evaluate the argument and specific claims in a text, assessing whether the reasoning is valid and the evidence is relevant and sufficient; identify false statements and fallacious reasoning.
- CCSS.ELA-Literacy.W.6.2 Write explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of content.
- CCSS.ELA-Literacy.RI Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.

There are eight bear species in the world. In addition, this book specifically mentions several other organisms: American chestnut trees (and *Cryphonectria parasitica*), *Panthera pardus*, *Canis latrans*, *Gallus gallus domesticus*, *Meleagris gallopavo*, *Sturnus vulgaris*, *Sus scrofa*, and *Hydrochoeris hydrochaeris*.

- Create a presentation showing the different types of bears. Create cards with annotations showing each bear's vital statistics, including size, range,

color variations, markings, diet, etc.

- Compare the different species to the black bear. Create a Venn diagram (or similar) comparing and contrasting the different bears. Create a graph showing the relative abundance of the different bear species worldwide. Justify your graph and write a short defense of your research.
- Make a map with an overlay showing the ranges of the various bear species. Create a key that gives an idea of the number of bears in any given region. Work with your librarian on ways to research to provide accurate information.
- Have groups of students pick one or more of these animals and prepare similar cards, visuals, and graphs, adding an additional graph or diagram comparing each animal to the black bear.

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One important question these wildlife biologists are attempting to answer is whether urban bears are evolving or adopting behaviors that are not seen with black bears in remote areas.

- Research other areas that are home to black bears. Look for information discussing the density of the bear population, what they are eating, height, weight, gender ratios, how far they are traveling, how many cubs there are, and other questions that student groups develop together. Create a graph with this information from all the bear locations considered.

Have students spend time online looking for over-hyped, exaggerated, or incorrect bear stories. Play a game in which one student finds a verifiable story about black bears. Once the story is ready, four other students invent stories to pass off as true stories. The four bogus stories are passed into the student with



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the real story. These stories are then mixed up and read randomly. Students listen to these five stories and vote on the one they think is the true story. Points are given to the students with false stories that receive votes. Points are given to the student with the true story if a student does not vote for it. Adjust as required for your group.

Take a look at picture books or children's stories about bears. Read "Goldilocks and the Three Bears and other bear stories. Have students identify the bear species (if possible) and fact check the books and annotate all instances in which they depict bear behavior incorrectly or incompletely.

Look at all the pictures in *Backyard Bears* and use them as the basis for creating a children's picture book about these black bears. The goal of this book is to show young elementary school students ways to live with black bears safely. Adapt this activity to write about specific animals in your neighborhood with the same goal of learning how to live together. Draw and write picture books to share with young students. As much as possible, depict black bears accurately. Perhaps write a skit, play, musical, or story from the bears' perspective.

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On page 26 we read: "In order to make informed decisions, human beings must carefully observe the ways in which animal populations behave, move, and grow. Yet, historically, human beings have not always made decisions in the best interests of wildlife, especially black bears."

- There are plenty of well-known blunders that humans have made while trying to manage animal populations. Research poor decisions by humans to control animal populations. Pick five different decisions and create a presentation that compares and contrasts the types of mistakes made. Is there a common denominator? In hindsight, what changes to scientific procedure or government process should have been made to avoid the mistakes?
- What historical mistakes have humans made with regard to black bears? Why did these mistakes happen? Is there a common denominator?
- Keeping the above quote in mind, brainstorm with your students what kinds of organisms the class could observe in an outdoor area. Make predictions for what animals will be there and what these animals will do. Then move outside and generate a list of animals found in a set amount of time. Make sure students add questions to the end of each entry about something they observe. Generate a procedure with the students for which animals to observe, what to observe, and when to observe these animals daily for the next several weeks.
- Create a field journal for animal observations, stressing the importance of dates, drawing, and description. The American Museum of Natural History has good information about field journals here: [www.amnh.org/explore/curriculum-collections/biodiversity-counts/what-is-biodiversity/doing-science-researchers-and-exhibition-staff-talk-about-their-work.-keeping-a-field-journal-1](http://www.amnh.org/explore/curriculum-collections/biodiversity-counts/what-is-biodiversity/doing-science-researchers-and-exhibition-staff-talk-about-their-work.-keeping-a-field-journal-1).
- Using natural markers, assign students a section of the area to monitor with a field journal. Make sure to map the site so the students are always observing the exact same location. For the next month (or longer), have students record their observations as regularly as time permits.
- Create a booklet of the questions students have. When appropriate, have these questions guide the

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next day's observations. Have students use their observations to formulate answers.

- Compare the class predictions before starting with what the class observes monthly (and at the end of the time period). What new predictions and hypotheses do the students have? What steps have been taken to avoid our tendency to make poor decisions germane to the management of other animal species?
- Your neighborhood probably has at least one similar animal/human conflict. What creature poses problems sharing resources? How is this conflict similar to the black bear conflict? How is it different? Create a Venn diagram (or similar) to show the comparison.

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On page 38, "It's a complex situation that is as much about people as it is about the bears. However, by relying on scientists to gather data before making decisions or rushing to snap judgments, we can better understand our environment. It can be uncomfortable to look at all sides of an issue you feel strongly about, especially when animals are involved. But when it comes to long-term conservation and wildlife population management, we must be willing to ask

tough questions about what is safe, realistic, and necessary in order to balance habitats shared by all living things."

- Considering that people have not always made the best choices for wildlife, especially bears, and considering that it is, nevertheless, crucial to plan for both people and bears, create something that depicts people and black bears at least fifty years in the future. Then predict at least one other reasonable alternative to your first one.
- The single most obvious problem with urban bears would be the risk of injury, primarily to humans, but to black bears as well. With the help of your school librarian, research instances in which black bears have injured humans. Prepare an executive summary explaining the most common scenarios leading to injuries from black bears. The summary should give an idea, based on data, of how risky it is to live near bears and the best precautions for avoiding injury. Page 66 already has six ways to avoid problems and advice on how to behave should you encounter a bear. Your summary should explain why these are good steps and indicate whether any of them are more useful than others. In other words, tie these steps to what you find out when exploring the history of black bear and human injuries.

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Pages 8–9 have information on high-tech tracking.

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Scientists use the data from the bears' radio collars to track their movements, map their territories, monitor their health, and more.

- Find the longitude and latitude of your school to the nearest degree. Describe the steps you took to get the correct coordinates.
- Using Google Maps, zoom into the location of your school. Print out maps for students and have them insert and label a grid showing precise locations where students move during a typical school day. Note where animals are found in your area and mark these on your maps.
- Share the GPS location. Discuss why it is important to have a standard reference. Discuss why a simpler numbering system might be easier for tracking student movements.

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Pages 22–25 provide vignettes of the four wildlife biologists, with all of them telling about their favorite part of this bear study.

- Think of research you have done. In small groups, discuss what steps you took to find the answers you were seeking, whether you enjoyed the research, whether the research took you to unexpected answers, how you knew you had enough information.
- Colleen's favorite bear fact has to do with the bear's weight gain in preparation for hibernation. This fact has her interested in what bears can teach us about diabetes and other health issues. Think about times in your own life in which learning one thing led you to new explorations. Write a song or poem about Colleen's favorite bear fact and how it motivates her to study diabetes, etc. Write an essay explaining why a bear's weight gain before hibernation might lead researchers to gain an understanding of diabetes,

osteoporosis, and muscle loss

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Take a look at the photo on page 27. Students may have relatives who remember being a part of groups observing bears in a similar setting.

- What does the adage “a fed bear is a dead bear” mean? Is it supported by research? Does the location of the bears change the relative truth of the adage? Write two persuasive essays exploring the opposite positions or write a longer, nuanced essay explaining how this adage works in Asheville.
- How do black bears help maintain the ecosystem? Write an essay showing what happens when there is a healthy black bear population and when the population can no longer be supported by the resources of that habitat.
- In your own area, what omnivores do you find? Share pictures of these animals. Does your region have a balanced predator/prey/omnivore relationship? Justify your answer.

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Throughout this book are descriptions of various frustrations that render scientific research problematic. Each of us may respond to these frustrations in a very different fashion. What seriously bothers one person may be a very minor issue to another.

- List the issues specific to studying black bears. Explain which one would bother you the most and, if different, which one would be most likely to compromise the research.
- In any research venture in the United States and most other countries, we deal with the critical issue of funding. With the help of your librarian, figure out how much it would likely cost to spend three months in the field studying black bears. Prepare a budget that includes transportation, lodging, food, supplies, equipment, data and communication costs, and other expenses one might have. Indicate a range of expenses that factor in best- and worst-case scenarios.
- While you may or may not live in an area that includes black bears, you do live in an area that has other wildlife that warrants investigation. Which animal in your area should be studied, either to help humans coexist with this animal, to increase their numbers, reduce their numbers, or for some other purpose? What would be your recommendation for a study plan?
- Cherrix has listed several reasons why studying black bears could be beneficial to society as a whole. Create an argument both in support and against continuing to fund black bear research.

Listen to the arguments of others in your class about this priority and decide which argument seems most persuasive. Explain why. If possible, send your argument to the wildlife biologists in Asheville for their feedback.

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### *Other Websites to Explore*

Bear With Us has a webpage devoted to all bear species. [bearwithus.org/8-bears-of-the-world](http://bearwithus.org/8-bears-of-the-world)

Discover Wildlife shows some of the locations for finding black bears. [www.discoverwildlife.com/animals/six-top-spots-see-black-bears-north-america](http://www.discoverwildlife.com/animals/six-top-spots-see-black-bears-north-america)

The National Wildlife Federation site on black bears: [www.nwf.org/Educational-Resources/Wildlife-Guide/Mammals/Black-Bear](http://www.nwf.org/Educational-Resources/Wildlife-Guide/Mammals/Black-Bear)

[www.bearwise.org](http://www.bearwise.org)

American Bear National Geographic: [www.national-geographic.com/animals/mammals/a/american-black-bear](http://www.national-geographic.com/animals/mammals/a/american-black-bear)

The National Park Association has information on the black bears in various National Parks across the country. [www.nps.gov/subjects/bears/black-bears.htm](http://www.nps.gov/subjects/bears/black-bears.htm) (Yellowstone has its own black bear page: [www.nps.gov/yell/learn/nature/black-bear.htm](http://www.nps.gov/yell/learn/nature/black-bear.htm).)

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The state of Michigan (and other states) has guidelines for dealing with bears. [www.michigan.gov/documents/dnr/michigan\\_bear\\_problem\\_management\\_guidelines\\_263207\\_7.pdf](http://www.michigan.gov/documents/dnr/michigan_bear_problem_management_guidelines_263207_7.pdf)

*Further Reading*

Herrero, Stephen. *Bear Attacks: Their Causes and Avoidance*, rev. ed. Guilford, CT: Lyons Press, 2018

Kilham, Benjamin. *In the Company of Bears: What Black Bears Have Taught Me about Intelligence and Intuition*. White River Junction, VT: Chelsea Green, 2014.

Masterson, Linda. *Living With Bears Handbook*, expanded 2nd ed. Masonville, CO: PixyJack Press, 2016.

Smith, Dave. *Backcountry Bear Basics*. Seattle: Mountaineers Books, 2006.

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