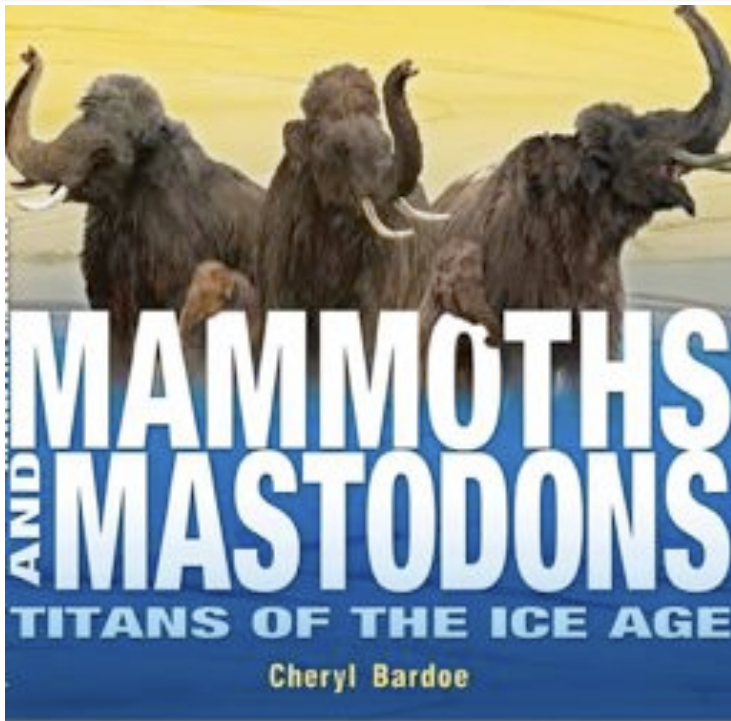


Educator Guide – Language Arts Activities



Ages 9-12, Abrams Books for Young Readers,
ISBN-10: 081098413X ISBN13: 978-0810984134

Mammoths and mastodons roamed the earth for millions or years, and then suddenly went extinct. What was everyday life like for these colossal cousins of the modern elephant? How did they fit into their Ice Age landscape? Why did they disappear?

Theories are raised and answers provided in this intriguing book that presents the latest research, drawing on the recent discovery of a baby mammoth that had been frozen in the arctic tundra for 40,000 years. By studying the extinct creatures, researchers hope to discover ways to keep elephants from suffering the same fate.

★ Junior Library Guild Selection

“Although the animals are long extinct, Bardoe makes clear their relevance, not least to the survival of today’s African and Asian elephants, and offers up plenty of intriguing sidebars and illustrations.” —The Washington Post

Cheryl Bardoe shares her love of writing and fascination for nature with young people through books and school visits. She also has an MFA in creative writing for children.

Mammoths and Mastodons connects to a traveling exhibition created by The Field Museum in Chicago. Visit www.fieldmuseum.org to find out where your students can see the exhibition.

Author photos in this document taken by Cathryn Montoya.

Also by this Author

Gregor Mendel: The Friar Who Grew Peas

Abrams Books for Young Readers
ISBN10: 0810954753 ISBN13: 978-0810954755

★ NCTE Orbis Pictus Honor

★ ALA Notable Book ★ IRA Notable Book

The Ugly Duckling Dinosaur

Abrams Books for Young Readers, Spring 2011

Activities in this guide support NCTE National Language Arts Standards:

■ 1 Students read a wide range of print and nonprint texts to build an understanding of texts, of themselves, and of the cultures of the United States and the world; to acquire new information; to respond to the needs and demands of society and the workplace; and for personal fulfillment. Among these texts are fiction and nonfiction, classic and contemporary works.

■ 3 Students apply a wide range of strategies to comprehend, interpret, evaluate, and appreciate texts.

■ 4 Students adjust their use of spoken, written, and visual language (e.g., conventions, style, vocabulary) to communicate effectively with a variety of audiences and for different purposes.

■ 5 Students employ a wide range of strategies as they write and use different writing process elements appropriately to communicate with different audiences for a variety of purposes.

■ 7 Students conduct research on issues and interests by generating ideas and questions and by posing problems.

Activity 1: Identifying Literary Elements of Nonfiction

Objective: Students identify different visual and textual elements and evaluate their effects in nonfiction.

Illinois LA Standards: 1C Comprehend a broad range of reading materials. 2A Understand how literary elements and techniques are used to convey meaning.

Step 1: Lead a guided discussion to identify literary elements in Mammoths and Mastodons:

■ Narrative text ■ Expository text
■ Sidebars ■ Chapter headings and subheads ■ Captions ■ Quotes from expert sources ■ Glossary ■ References ■ Index ■ Photographs ■ Scientific illustrations ■ Maps ■ Diagrams ■ Image credits (See Nonfiction Elements sheet).

Step 2: Make the book available for students to read on their own for 15 minutes.

Students do not need to read the entire book. Nor do they need to start on page one. They should read any of the elements in whatever way they like. After reading, students should take 5 minutes to sequence *how* they looked at the elements in the book. Did they start on page one? Did they flip through looking only at pictures and captions? Did they start with a specific headline? When did they look at pictures or read the sidebars?

Step 5: Assign each small group to investigate different elements in the book.

- What kind of information is communicated through this element?
- Where is the element found?
- How is each element best suited to communicate particular kinds of information? What are some limits on what each element can communicate?
- How does each element contribute to the experience of reading the book as a whole?

Step 6: Student groups report findings. Point out where there is overlap between the elements. Why is it useful to communicate the same information in multiple ways? (see Nonfiction Elements sheet below for more detail about the uses of each element.)

Step 7: Discuss the relationship between text and visuals.

- Are images placed close to or far away from text on the same subject?
- Identify the qualities of a good caption.
- What would readers miss if this book had only images and captions?
- What would readers miss if the book had only text, without images?

Reading this book from start to finish offers the most in-depth, cohesive experience. However, I know that some readers won't do this. Multiple points of interest create many chances for a book to engage readers.



Step 3: Discuss students' reading experiences.

- Which elements attracted their attention?
- Why did they start where they did?
- How did where they started affect their experience of the story?
- How do the many ways readers absorb information influence a nonfiction book?

Step 4: Assign students to small groups and copy pages 32-33 for each group. Ask students to label: chapter heading, diagram, captions, historic illustration, main text, sidebar, expert quote, expository text, narrative text (in sidebar).

Alone, the images and captions give a cohesive overview, but not a depth of information. The text could stand alone, with extra explanations to make up for no pictures. However, images attract the reader's eye and reinforce that the subject matter is real. Plus, some information—like how tusks are layered—is easier to understand visually than through words. So really, the text and images are strongest together.

Activity 2: Writing for an Audience

Objective: Model how nonfiction authors guide the focus of their writing by thinking about their audiences.
Illinois LA Standards: 3B Compose well-organized and coherent writing for specific purposes and audiences. 3C Communicate ideas in writing to accomplish a variety of purposes

Note: Do steps 1-4 before students read Mammoths and Mastodons.

Step 1: Ask students to write down a list of what they think they know about mammoths.

Step 2: Direct students to make a list of questions they have about mammoths.

Step 3: Have students share what they know and their questions.

Step 4: Compare student's list of questions to the Excerpt from the Author's Notebook (below). Discuss what questions the students' and author's lists have in common.

Step 5: Give students an opportunity to read the book (either individually or as a class.)

If one person has a question, other people likely have the same question. So, one way to get started thinking about audience is to make a list of all the questions that the writer has.

Writers must also be aware of specific interests that their audiences have. For example, because I was writing for young readers, I was on the lookout for parts of the story that involved kids. Most news reports about the baby mammoth are written for adults, and don't mention that two young brothers were the first to spot the 40,000-year-old baby mammoth. I knew that was important information for young readers—and so that is where the story starts.



Step 6: Discuss:

- Where were students' questions answered?

Example: "How are elephants and mammoths related to each other?"

Topic is covered on pages 1, 5-7, 10-12, 19-27, 32, 39-40.

- What info was used to answer the questions?

Example: "How are elephants and mammoths related?"

p. 1 suggests that the baby mammoth found in the snow looked like an elephant

p. 5-7. tells that mammoths and elephants are so closely related that scientists can study about one species to learn about the other.

p. 10 and 12-13 identify the evolutionary relationship between these species.

p. 19-27 show how scientists look at elephant behavior to help interpret fossil clues about mammoth behavior.

p. 32 identifies how genetically similar the species are.

p. 39-40 gives a case study of how information learned from mammoths is being used to help elephants.

- What types of elements—different kinds of text and graphics—were used to present the information?

Example: "How are elephants and mammoths related?"

p. 8, 25 Quotes from expert sources.

p. 19-27 Narrative scenes

p. 5-7, 19-27 Expository texts

p. 12-13 Diagram

p. 3, 18, 20, 40 Illustration and photos

- Which of the students' questions remain unanswered? Why might a book not be able to answer every question about a topic?

■ If students were to insert the answers somewhere into the text, where would they connect it and why?

- Or do they think the question deserves a new article/book of its own?

Activity 3: Focusing a Writing Topic

Objective: Identify students' personal interests as a method for narrowing broad topics. This exercise can work for nonfiction writing projects in connection to any unit.

Illinois LA Standards: 3C Communicate ideas in writing to accomplish a variety of purposes.

Step 1: Model steps 2-4 by selecting a topic and working together as a class before students work as individuals.

Step 2: Students select topics and complete the Nonfiction Story Starter sheet. (below)

Step 3: Based on their Story Starter sheet, ask students to write one sentence that describes what their story will be about.

Example 1: "Mammoths and Mastodons is about how scientists piece together the latest discoveries about these extinct creatures and hope to prevent the extinction of other species."

Example 2: "This story is about how jaguars are powerful predators." (Instead of, "This story is about jaguars.")

Step 4: Use the story summary to focus research. Ask students to list questions they need to answer in order to write their stories. Keep questions directly connected to the story summary. (see sample)

Step 5: Students gather research to answer the questions for their stories.



All the ways that scientists examined the baby mammoth are amazing. However, what was critical for this story, was how Lyuba's tusks confirmed Dr. Fisher's data from other tusks. Tusk research could reveal more about why mammoths went extinct and is being used in elephant conservation.

I needed room to fully explain tusk research to readers. Listing other scientific methods would raise questions in readers' minds that I wouldn't have room to answer.

Step 6: Read pages 15-17 of Mammoths and Mastodons. Also read "From the Clipped and Snipped File" (below). This is an excerpt from an early draft that did not make it into the final text of *Mammoths and Mastodons*. Discuss:

- Is the info that got trimmed interesting?
- What part of the info remained in the final text? (p. 18, two sentences in bottom paragraph.)
- Why wasn't the rest used?
- What else could the writer do with this info?

Step 7: As students write their nonfiction stories, use the summary sentence to keep the story focused.

- Any information gaps that make that story unclear should be filled in.
- Any information that isn't needed to tell that specific story should be put to the side.
- Students can use "extra" info as sidebars, or decide not to use it at all.

Step 8: Discuss students' decisions about what information to use and what to leave out.

- Ask students to give examples of information that they left out of their stories, and explain why.
- Ask students to give examples of information they used and explain why it was critical to the story.

Extension activity: If students have studied the literary elements of nonfiction (Activity #1) ask them to include at least three elements in their stories, plus references.

Literary Elements of Nonfiction

Text Elements

■ Chapter headings

Examples: p. 1, 5, 9, 15, 19, 29, 32, 35, 39.

Where found: At the start of each major section.

Type of info: Overview of content for that section.

Key function: Headlines are guideposts that represent a single important idea at the heart of each chapter. This helps readers predict information and focus their attention. Strong headlines use language to heighten interest in a topic. i.e. “Surprise in the Snow” and “The Mammoth Mystery” tap into our innate human curiosity. Headlines pack a lot of power into a few words!

■ Subheads

Examples: Brown text on p. 19, 20, 22, 24, 26, 27.

Where found: Within chapters, to separate large chunks of information.

Type of info: Brief overview of content.

Key function: Like chapter headings, subheads are also guideposts. They focus readers on smaller ideas that work together to support the main idea of a chapter. Subheads can also unify information as they organize it. The subheads on p. 19-27 in *Mammoths and Mastodons*, for example, follow an alternating pattern between presenting an “Episode” of daily life and “Behind the Scenes” information. This pattern indicates to readers that they are reading three different examples of equally important information.

■ Narrative text

Examples: Throughout book. First example is story of boys finding frozen baby mammoth on p. 1-3. Scenes of mammoth and mastodon life in blue boxes on p. 19, 22, 26 offer easy comparisons with expository text in same chapter.

Type of info: Scenes of action in specific moments.

Key function: Narrative writing tells stories—which are made up of sequences of events. Notice that narrative text may require description and explanation, just like expository writing. In this book, narrative and expository writing are blended to create text that is active and informative.

■ Expository writing

Examples: Throughout book. Expository text in the “Behind-the-Scenes sections on p. 20-22, 24-25, 27 offer easy comparisons with narrative scenes in that same chapter.

Type of info: Descriptions, explanations, outlining scientists’ theories, connecting facts together.

Key function: The purpose of expository writing is to convey information or explain something. Note, however, that expository writing can use metaphors, humor and attention to language, just as in narrative writing.

■ Quotes from expert sources

Examples: Dr. Dan Fisher quoted on p. 6-8, 16, 27, 31, 33, 37-38. Dr. Jacqueline Codron quoted on p. 21 sidebar, 40. Dr. Larry Agenbroad on p. 25.

Where found: Quotes are integrated into the story as a whole, connecting dire

Type of info: Scientists’ theories, questions, and explanations, in their own words.

Key function: Quoting scientists’ directly, rather than just paraphrasing their ideas, reinforces that science is a human endeavor. The quotes convey authority in the text because readers are hearing firsthand from experts. The quotes also bring the reader a variety of voices other than the author’s, because the scientists are distinctive in their expressions.

■ Captions

Examples: Thin text in the margins. Examples can be found on every 2-page spread.

Where found: Close to the image they explain.

Type of info: Explain what is happening in an image and connect that image to the larger story.

Key function: The best captions add information to a story, rather than just repeat information that from the main text. Most importantly, a caption must help readers interpret an image. If room is available, a caption provides context about how the image connects to the main story. Look at the captions on page 24. The second sentence in each adds information that isn’t in the main text.

■ Sidebars

Examples: Text in brown and tan boxes that run along the sides of the pages. p. 6, 7, 9, 10, 21, 22, 25, 31, 32, 38, 41

Where found: Near related ideas in the main text.

Type of info: Short, specific bits of information.

Key function: Sidebars cover information that is relevant, but which would bog down the main story. They provide additional information that isn’t in the text. The sidebar on p.6 answers an important question readers have, but bringing up dinosaurs in the main text would lose focus from the main story.

Visual Elements

Where found: Photos, illustrations, maps and diagrams are all located as closely as possible to the main text to which they are related.

Key function: For all of these items, a visual really is worth 1,000 words. An author can tell readers that the baby mammoth was found on the other side of the earth, near the Arctic Circle, but readers won't have a clear visual in their minds if there isn't a clear visual on the page. Similarly, the author can tell readers that a circular slice from a mammoth tusk has rings like those inside a tree, but by providing a picture, the reader can see what the scientist saw, and make the discovery for themselves.

Images in a nonfiction book often tell a complete story so that if readers flipped through a book looking only at the images, and reading only the captions, they would have a cohesive overview of the story.

■ Photographs

Examples: Throughout book.

Type of info: Photos let reader be "present" alongside scientists in making discoveries and seeing wonders of the world. They also remind readers that the subject matter is real.

■ Scientific illustrations

Examples: Cover, p. 4, 12-13, 18, 23, 26, 29,

Type of info: Depicts Ice Age animals as if they were alive—something that no photo can do. These illustrations are based on detailed scientific data. You may want to discuss with students the differences between the scientific illustrations of daily life with the

illustration on page 34, which conveys a mood of mystery, rather than scientific information.

■ Maps

Examples: p. 2, 8, 35

Type of info: Maps show spatial relationships, helping readers locate where things happened.

■ Diagrams

Example: p. 12-13, 32

Type of info: Demonstrate relationships between things. The diagram on p. 12-13 shows the evolutionary relationships between species over time. The diagrams on p. 32 show different ideas about mammoth bones.

Back Matter Elements

All the information that appears on pages 42-44 after the conclusion of the main text is called "back matter."

■ Glossary

Type of info: Definitions of specialized vocabulary that might be new for readers of the book.

Key function: To help young readers feel confident with the content in the book.

■ References

Type of info: Identifies the source of information used in the book. Note that some of the sources listed are original interviews conducted by the author. This is a good example for showing students that not all information on a given research topic is already written down somewhere else.

Key function: A nonfiction book is only as good as its source materials. Listing references gives readers an opportunity to evaluate the credibility of sources

for themselves. It also lets readers know where they can go to find more information about the topic.

■ Index

Type of info: Identifies the pages where key topics are covered.

Key function: To help readers find information.

■ Image credits

Type of info: The people or organizations that provided images.

Key function: Similar to references. Identifying the sources of imagery allows readers to evaluate the credibility of those images suggests where readers can go to find out more about a topic.

Excerpt from the Author's Journal



Cheryl Bardoe

Before writing *Mammoths and Mastodons: Titans of the Ice Age*, I didn't know much about these animals. I had seen skeletons at museums and heard about discoveries in the news every now and then. Scientists seemed to know a lot about these animals, compared to other extinct creatures, but I didn't know why. Below are questions I wrote down in my journal before I ever opened a book or interviewed a scientist.

When I wrote these questions, I had no idea what final book would look like. But I knew what I was curious about, and if I wondered about these questions, then so would many readers. I used these questions to guide my research.

■ *Where did mammoths live? What did they eat? What were their daily lives like?*

■ *How do scientists seem to know so much about mammoths? Why don't they know as much about other extinct animals?*

■ *What's the difference between a mammoth and a mastodon?*

■ *Why do people find frozen parts of mammoths more often than other animals?*

■ *How could the baby mammoth Lyuba have been preserved whole for so long? How did she die?*

■ *What is so special about the baby mammoth? What do scientists*

think they can learn from this fossil that they couldn't before?

■ *Why did mammoths go extinct? Why do scientists care so much about this question?*

■ *Did people hunt mammoths? How did they attack such a large animal with prehistoric weapons?*

■ *How are mammoths related to elephants?*

■ *What are the coolest mammoth fossils that have been found? Do kids ever find them?*

■ *Can scientists really clone a mammoth?*

Nonfiction Story Starters

I think the most interesting part of this topic is...

What surprises me about this topic?

What makes people say, "Wow!" about this topic?

Excerpt from the Author's Snipped and Clipped File...

This text was in one of Cheryl Bardoe's early drafts of Mammoths and Mastodons: Titans of the Ice Age...

“Dr. Fisher is coordinating an international team of scientists to analyze the baby mammoth Lyuba. In the first year after Lyuba was recovered, scientists: 1) examined the outside of her body, 2) x-rayed her body, 3) used a CT scanner to make detailed, 3-dimensional pictures of her insides, 4) measured radiocarbon to determine her body's age, 5) investigated the riverbank where she was found, 6) compared microscopic pictures of her body tissues to elephant tissues, 7) analyzed body tissues for bacteria, 8) stained samples from her muscles, fat and teeth to see cell structures, 9) explored her guts with a teeny camera, 10) opened her chest to see inside, 11) inspected the airways in her lungs, 12) dissected the sediments stuffed into her trunk and mouth, 13) dissected her abdominal area, 14) removed pieces of her intestines to see what was inside, 15) assessed the acidity of her muscles and fat to see if they were healthy before she died, 16) gathered genetic samples, 17) studied her teeth and tusks. Whew!

Early conclusions from all that work tell us Lyuba was healthy before she died suddenly by choking on sediment and suffocating.”

Here's the final text that was in the book...

“In the first year after Lyuba's discovery, scientists explored her guts with a tiny camera, viewed her cells under a microscope, and used a CT scanner to take detailed pictures of her insides. They concluded that Lyuba was fit as a fiddle before she choked on mud at one month old.