

A NEW TRAVELING EXHIBITION FROM **The Field Museum**



**MAMMOTHS
AND MASTODONS
TITANS OF THE ICE AGE**

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INTRODUCTION

Mysterious monsters from the past. Friendly characters from cartoons. Scientific discoveries from the frozen north. Mammoths and mastodons can be defined as all of the above—but which definition is correct?

The Field Museum's new traveling exhibition, *Mammoths and Mastodons: Titans of the Ice Age*, explores the lives of these enigmatic animals and the Ice Age environments they traversed. Featuring the award-winning artistry and interpretation of The Field Museum's Exhibitions Department, this exciting exhibition will fill 7,500–8,500 square feet (700–800 square meters) with a rich collection of fossils, touchable casts, preserved flesh, immersive media, and engaging interactives. Revel in the sheer size and diversity of the proboscidean family—from its ancestors in Africa, to the comparatively little dwarf mammoths that survived the Ice Age. Walk through the ancient landscapes where mammoths and mastodons lived, see their daily struggles to raise their families, and watch as today's scientists excavate, research, and learn more about these amazing animals and their eventual extinction.

The only large-scale traveling exhibition about mammoths and mastodons that is truly international in scope, *Mammoths and Mastodons: Titans of the Ice Age* will feature a slate of researchers from around the world, their current findings, and the global story of mammoths and mastodons over millions of years. Appealing to visitors of all ages, this exhibition will especially fascinate family audiences by tapping into their spirit of curiosity about the Earth today and its ancient past.

Visitors to the exhibition will...

- Develop a greater appreciation for the scientific process and explore cutting-edge research from around the world
- Investigate mammoth and mastodon family life, habitats, and the other species that called these places home
- Gain insight into evolutionary history and modern elephants, the living members of the proboscidean family tree
- Make connections between the extinction of mammoths and mastodons and conservation biology issues affecting today's planet.



HIGHLIGHTS

ARTIFACTS AND SPECIMENS

- More than 100 rare fossils and specimens from collections around the world including the specimen or model of Lyuba, the baby mammoth recently discovered in the Siberian tundra (and the most complete mammoth ever found)
- Sharp-tipped spear points and hunting instruments made by Ice Age hunters
- Some of the oldest art in existence: delicate ivory carvings and Paleolithic jewelry
- Fossil casts that allow visitors to explore intriguing details up close
- Full size, fleshed-out animals that create immersive scenes from the past

INTERACTIVES

- “Read” the life stories of these long-extinct creatures in the ivory tusks they left behind
- Crawl under a saber-toothed cat’s perch, feel the girth of a Columbian mammoth’s giant femur, and pet a mammoth coat to learn about cold-weather insulation
- Lock tusks with a fellow mammoth to joust for dominance
- Test the advantages and challenges of having tusks and trunks
- Try to lift a fraction of the amount of food mammoths consumed each day
- Build a mammoth bone hut and create your own cave art
- Track mammoths and their neighbors by following their footprints and match different mammoth species to their habitats—not all of which were frozen
- Hear and feel the distinctive sounds of elephant communication within a herd

MEDIA

- Watch a timelapse animation that transports you from the present to the ancient past
- Visit researchers in Siberia, California, Missouri, and the bottom of the North Sea, as they study DNA, excavate fossil remains, and solve the question of where the latest finds fit into the larger evolutionary picture
- Come face to face with a herd of mammoths emerging from a Pleistocene dawn
- Follow the arc of mammoth evolution, from the giant Columbian to the tiny dwarf, and investigate how shrinking ranges contribute to shrinking species
- Investigate the causes of the Pleistocene extinction: was climate change or over-hunting to blame?
- View stunning footage of elephant herds, and learn about conservation efforts currently underway



EXHIBITION SPECIFICATIONS

Size: Approximately 7,500-8,500 square feet (700-800 square meters). Minimum gallery height 13 feet (4 meters).

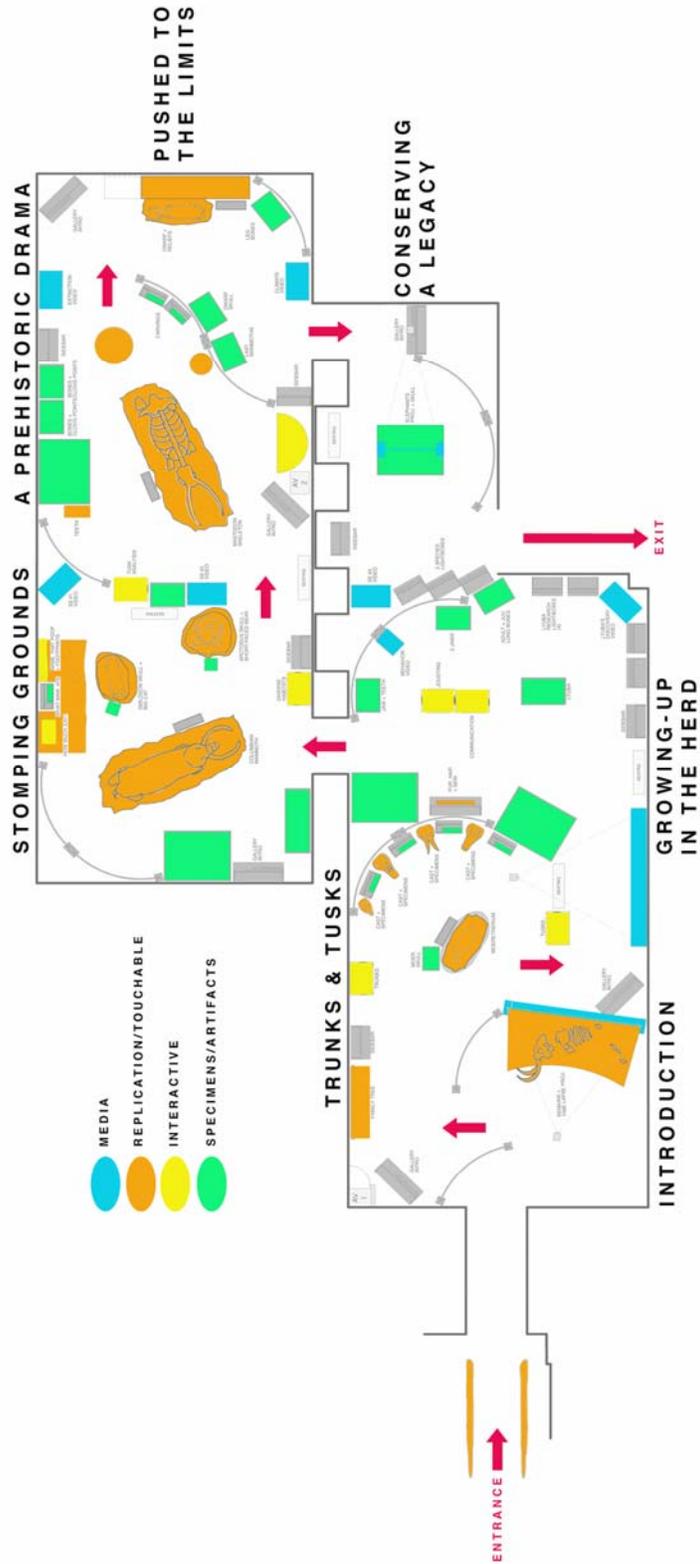
Rental Fee: \$300,000 USD for three months; please inquire about longer bookings

Shipping: One-way, inbound, paid by host venue (international arrangements, please inquire)

Language: All text in English; host venue may provide translation if desired

Support:

- Field Museum staff technicians lead onsite installation and de-installation
- Educator's Guide in English, including information for teacher, student, and public programs
- Link to robust exhibition website
- Exhibitor Toolkit in English, including logo, installation photographs, rights-free images, B-roll, press releases, and sample advertisements
- Range of wholesale products developed for the exhibition
- Installation and Design Manual in English, detailing exhibition layout, installation, and maintenance





EXHIBITION WALKTHROUGH

MAIN MESSAGES:

1. Mammoths and mastodons had a rich and complex social environment
 - Family structure and dynamics of the herd, from mating and childrearing to seasonal migrations
 - Social behaviors, such as visiting, playing, and mourning
2. Mammoths and mastodons impacted the Ice Age environment around them
 - These large herbivores affected the food sources of other plant-eaters and the carnivores that hunted them
 - Humans lived alongside mammoths and mastodons for thousands of generations, depicting them in art and hunting them to make food, clothing, & tools.
3. Mammoths and mastodons became extinct at the end of the Ice Age
 - Evidence and current theories on extinction, including the role of human hunters
4. Many research scientists study mammoths and mastodons
 - Theories and conclusions about these animals continue to change
 - Research methods and the scientific process

SECONDARY MESSAGES

1. For millions of years, proboscideans lived in a variety of habitats on four continents: Africa, Asia, North America, and Europe
 - Different species lived in different habitats
 - An Ice Age has various causes and characteristics
2. The proboscidean family tree has included many species, and stretches back millions of years
 - Mammoths and mastodons are different species and represent two different branches of this family tree
3. The mammoth and mastodon family tree has living members
 - Elephant evolution and the proboscidean family tree continued after the Ice Age
 - Many people are involved in helping living proboscideans avoid extinction

SECTION 1: INTRODUCTION

Mammoths and mastodons continue to capture our imagination in part because they lie literally beneath our feet. Bones are occasionally exposed at construction sites in the heart of a city and a complete baby mammoth, preserved in the flesh, was found on a riverbank in the Siberian Tundra. These animals also lived alongside our human ancestors, who depended upon these massive beasts for food, clothing, and shelter. Go back thousands of years to when mammoths and mastodons roamed the earth and the exhibition begins.

Objects and Displays

- Mammoth skeleton cast partially exposed in the ground
- Mammoth femur fossil

Interactives and Media

- Time-lapse video projection breezes from the past to the distant past, where the exhibition's story begins



SECTION 2: TRUNKS AND TUSKS: MEET THE PROBOSCIDEANS

Visitors will begin their journey 35 million years ago in the wetlands of northern Africa, where they will meet the ancestors of mammoths and mastodons whose teeth and tusks provide tantalizing glimpses into their evolutionary past. There were many species in the proboscidean family—nearly 160 species have been found so far—and they lived all over the world for millions of years. Visitors will become familiar with this diversity by comparing and contrasting their differences, tracking their migrations to the far reaches of the northern hemisphere, and exploring theories about trunk and tusk evolution and what these meant for the skulls that support them.

Objects and Displays

- Fleshed-out *Moeritherium*
- Fossil and cast skulls, jawbones, tusks, and teeth of mammoth and mastodon relatives
- World maps from different geologic periods, showing tectonic changes and resulting changes in proboscidean distribution

Interactives and Media

Interactives:

- “Try out” trunks to explore their benefits and uses
- Simulate evolutionary adaptations to see how skulls and other anatomical features changed to manage the weight of larger tusks



SECTION 3: GROWING UP IN THE HERD: THE LIFE OF A MAMMOTH

Enter the Ice Age landscape of Siberia to explore the complex social lives of woolly mammoths, and learn how family bonds played an important role in their development from birth, through teenage years, to mating rituals and, finally, death. See how a baby mammoth’s gender dictated its role in the herd and how matriarchal family groups emerged. Investigate social behaviors and conflicts in mammoth groups—including male interactions such as musthing battles for dominance. Examine migration patterns and learn how the mammoth's body hair, tusk length, ear shape, and tail length were adaptations to the cold weather of its environment. Meet scientists as they study ancient DNA and dig up the frozen remains of the latest Siberian finds.

Objects and Displays

- Recently-found preserved mammoth, Lyuba, from Siberia (specimen or model)
- Teeth, tusks, and skeletal remains of mammoths of different ages
- Fossils showing evidence of fighting
- Illustrations of family groups

Interactives and Media

Interactives:

- Hear, see, and feel recreations of woolly mammoth vocalizations
- Joust with another mammoth
- Feel musk ox fur to learn about insulation

Videos:

- The discovery of Lyuba and what scientists are learning from her
- How elephant behavior sheds light on mammoth fossil evidence
- Animated projection of a herd of woolly mammoths in their environment



SECTION 4: STOMPING GROUNDS: WHERE MAMMOTHS ROAMED

Mammoths and mastodons lived in a variety of habitats and climates, not all of them snow- and ice-covered and evolved unique adaptations to survive in these relatively warm places. Visitors will venture into some of these diverse ecosystems—from the famous Hot Springs site in South Dakota to the La Brea tar pits in Los Angeles. Encounter one of the largest members of the mammoth family—the Columbian mammoth—and its long-lost neighbors and enemies, such as short-faced bears, saber-toothed cats, camels, sloths, and dire wolves. Reconstruct the landscape (and animal diets) through the plant parts found in coprolites.

Objects and Displays

- Life-size replications of Columbian mammoth, saber-toothed cat, and short-faced bear
- Fossils and animal tracks of major carnivores and herbivores
- Real mammoth dung and botanical specimens of plants that made up the mammoth diet
- Panoramic illustration of a Pleistocene environment

Interactives and Media

Interactives:

- Match the proboscidean species with its habitat
- Which coprolite belongs to which animal?
- How much does a Columbian Mammoth eat?

Video: Learn how scientists reconstruct ancient habitats



SECTION 5: A PREHISTORIC DRAMA: SHARING THE STAGE WITH HUMANS

Travel to the Midwest region of North America and meet the American Mastodons. Learn the technological skills required for people to survive during the glacial period of the Pleistocene—and witness the relationship between humans and mammoths and mastodons. Compare the diverse traditions of Ice Age North America to Ice Age Eurasia and see examples of mammoth-inspired artwork created by Paleolithic peoples. Evaluate the evidence for current theories on the extinction of mammoths and mastodons: what did humans and climate change have to do with it?

Objects and Displays

- Cast skeleton of an adult mastodon
- Fossil skulls and tusks, including ones displaying evidence of butchering
- Spear points, atlatls, shaft straighteners, and tools
- Diorama of a hunting scene
- Paleolithic mammoth ivory carvings
- Digital reproductions of cave art

Interactives and Media

Interactives:

- See how tusks form and grow
- Virtually explore a cave complex and create cave art
- Compare mammoth, mastodon, and elephant teeth
- Construct a small-scale bone hut

Videos:

- How do scientists analyze tusks?
- Why did mammoths and mastodons go extinct?



SECTION 6: PUSHED TO THE LIMITS: MAMMOTHS IN MINIATURE

In the Channel Islands of southern California, meet dwarf mammoths, a much smaller cousin of the Columbian mammoth and no larger than a steer. Discover how these and other dwarf species of proboscideans survived long after the end of the Ice Age. Peek into life lived at a smaller scale, and learn how island-generated dwarfism is a common product of evolution. Meet some of the last populations of mammoths on Earth on Wrangel Island in the Arctic Sea and St. Paul Island in Alaska.

Objects and Displays

- Full-sized replication of dwarf mammoth positioned in front of bas-relief sculptures of the Columbian mammoth, elephant, and mastodon
- Fossils of Columbian and dwarf mammoths
- Panoramic mural of Santa Rosa Island inhabited by dwarf mammoths
- Illustrations showcasing unique dwarf mammoth features

Interactives and Media

- Video: The effect of geographic isolation, island biogeography, and climate change on mammoth evolution



SECTION 7: CONSERVING A LEGACY: THE SURVIVING COUSINS

Mammoths and Mastodons concludes with a journey back to the present, where visitors can recognize the living members of the proboscidean family tree—today’s African and Asian elephants. Reflect on the impressive history of mammoths and mastodons on Earth, review the evolution of these creatures through time, and witness the conservation efforts of today’s scientists. See how, for these creatures, threats today stem less from climate, and more from human factors such as poaching and increased competition for land and resources.

Objects and Displays

- Fossil skulls, jaws, and tusks
- Life-size photos and illustrations identifying features of each species

Interactives and Media

Videos:

- Watch conservation and anti-poaching efforts including elephant orphanages in Asia and Africa
- View elephant families in the wild





FINAL OBJECT LIST

SECTION	OBJECT DESCRIPTION	DISPLAY TYPE
1: INTRODUCTION	Life-Size Mammoth skeleton <i>in situ</i>	Replication
	Mammoth femur	Fossil specimen
2: TRUNKS AND TUSKS	Life-Size <i>Moeritherium</i>	Fleshed-out Replication
	<i>Phiomia</i> Lower Jaw	Fossil specimen
	<i>Deinotherium</i> Upper Jaw	Fossil specimen
	<i>Amebelodon</i> Jaw	Fossil specimen
	<i>Gomphotherium</i> Lower Jaw and Tusk	Fossil specimens
	<i>Moeritherium</i>	Touchable bronze sculpture
	Woolly Mammoth	Touchable bronze sculpture
	Columbian Mammoth	Touchable bronze sculpture
	Mastodon	Touchable bronze sculpture
	Dwarf Mammoth	Touchable bronze sculpture
	African Savannah Elephant	Touchable bronze sculpture
	<i>Moeritherium</i> Skull	Fossil cast
	<i>Moeritherium</i> Jaw	Fossil cast
	<i>Phiomia</i> Life-sized Head	Fleshed-out Replication
	<i>Deinotherium</i> Life-sized Head	Fleshed-out Replication
	<i>Amebelodon</i> Life-sized Head	Fleshed-out Replication
<i>Gomphotherium</i> Life-sized Head	Fleshed-out Replication	
3: GROWING UP IN THE HERD	Lyuba, Baby Mammoth	Fossil specimen or model (at venue's discretion)
	Woolly Mammoth Skull and Lower Jaw	Fossil specimens
	Woolly Mammoth Tusks	Fossil specimens
	Woolly Mammoth Molar	Fossil specimen
	<i>Mammuthus meridionalis</i> Molar	Fossil specimen
	<i>Mammuthus trogontherii</i> Molar	Fossil specimen
	Woolly Mammoth Skin Sample	Fossil specimen
	Woolly Mammoth Fur	Fossil specimen
	Woolly Mammoth Lower Jaws (x3)	Fossil specimens
	Rapid prototype of Lyuba's lower jaw	Replication
	Woolly Mammoth Humerus (x2)	Fossil specimens
	Woolly Mammoth Epiphysis	Fossil specimen
	Musk Ox Fur	Touchable specimens

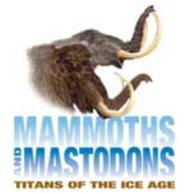
FINAL OBJECT LIST (CONT.)

4: STOMPING GROUNDS	Columbian Mammoth Skull	Fossil specimen
	Cottontail Rabbit Skull	Fossil specimen
	Pronghorn Antelope Skull	Fossil specimen
	<i>Arctodus</i> (Short-faced bear) Skull	Fossil specimen
	<i>Homotherium</i> Skull (Big Cat)	Fossil specimen
	Western Horse Skull	Fossil specimen
	Western Camel Skull	Fossil specimen
	Giant Sloth Skull	Fossil specimen
	Columbian Coprolite	Fossil specimen
	Herbarium Sheets Detailing Plant Diet of Mammoths (x6)	Specimens
	Life-Size Columbian Mammoth	Fleshed-out Replication
	Life-Size <i>Homotherium serum</i> (big cat)	Fleshed-out Replication
	Life-Size <i>Arctodus</i> (Bear)	Fleshed-out Replication
5: A PREHISTORIC DRAMA	Clovis Points Collected by William Clark of Lewis and Clark (x3)	Archaeological artifacts and casts
	Clovis Points and Tools from Kimmswick Site	Archaeological artifacts
	Clovis Points from Field Museum (x7)	Archaeological artifacts
	Solutrean Artifacts from Field Museum (x12)	Archaeological artifacts
	Stone/Ivory Carvings of Mammoths	Archaeological artifacts
	Horse Figure Carved in Mammoth Ivory	Archaeological artifacts
	Abri Blanchard Mammoth Ivory Necklace	Archaeological artifacts
	Cross-section of Mammoth Tusk	Fossil specimen
	Cross-section of Mastodon Tusk	Fossil specimen
	African Savannah Elephant Teeth	Touchable specimen
	Asian Elephant Teeth	Touchable specimen
	Mastodon Bones from Thomas Jefferson's Collection	Fossil specimens
	Mastodon Bones from Kimmswick Site	Fossil specimens
	Touchable Mammoth and Mastodon Teeth	Fossil specimens
	Life-Size Mastodon skeleton	Replication
	Small-scale Mammoth Bone Hut	Replication



FINAL OBJECT LIST (CONT.)

6: PUSHED TO THE LIMITS	Mammoth Bones from Wrangel Island, Siberia	Fossil specimens
	Mammoth Bones from St. Paul Island, Alaska	Fossil specimens
	Life-Size Dwarf Mammoth	Replication
	Columbian Mammoth Long Bones (x2)	Fossil specimens
	Dwarf Mammoth Lower Jaw	Fossil specimen
	Dwarf Mammoth Long Bones	Fossil specimens
7: CONSERVING A LEGACY	African Savannah Elephant Skull	Specimen



CURATOR AND CONTENT ADVISOR BIOGRAPHIES

Daniel C. Fisher, Ph.D. **University of Michigan**

Daniel C. Fisher completed undergraduate and graduate work in Geological Sciences at Harvard University (Ph.D., 1975) and was appointed to the Department of Geological Sciences at the University of Rochester. In 1979, he moved to the University of Michigan's Department of Geological Sciences and Museum of Paleontology, where he is now the Claude W. Hibbard Collegiate Professor and Curator of Paleontology.

Shortly after arriving in Ann Arbor, Fisher was called to several local sites where remains of mastodons had turned up during excavation of farm ponds. Evidence at some of these sites suggested that humans had been involved in postmortem carcass processing (butchery), and thus began a long-term interest in whether human activity was a significant cause of the late Pleistocene extinction of mastodons and mammoths. Fisher's recent studies of this question focus on using data on the structure and composition of mastodon and mammoth tusks to reconstruct aspects of their behavior, growth history, nutritional status, reproductive biology, and response to environmental conditions.

While still involved in work on North American material, Dr. Fisher has also expanded his research to include woolly mammoths in northern Siberia. His recent research includes an in-depth study of Lyuba, the most complete mammoth specimen ever found, which was discovered nearly intact in Siberia in 2007. Although remote in every sense from the Great Lakes region mastodons that originally attracted his interest, Dr. Fisher's arctic research is adding new insights to the scientific understanding of mammoth and mastodon paleobiology and late Pleistocene extinction.

William F. Simpson **Collections Manager, Fossil Vertebrates, The Field Museum**

With a background in both zoology and geology, Bill Simpson has focused his research on fossil mammals from the Badlands in South Dakota. Simpson managed The Field Museum's fossil preparation labs for twenty years before becoming Collections Manager of The Field Museum's extensive vertebrate paleontology collections in 2002. In addition to managing these vast resources, Simpson has remained active in a wide variety of field projects. In the last ten years, Simpson has accompanied expeditions looking for fossil mammals in the Chilean Andes, dinosaurs in sub-Saharan Africa, fossil fish in Wyoming, and dinosaurs and mammal-like reptiles from the Triassic and Jurassic in Madagascar. Simpson works with a variety of researchers from around the world and also teaches a fossil preparation course at the University of Antananarivo in Madagascar.

Additional curatorial assistance:

William A. Parkinson, Ph.D., Assistant Curator of Eurasian Anthropology, The Field Museum

Ian Glasspool, Ph.D., Paleobotany Collections Manager, The Field Museum

William J. Sanders, Ph.D., Assistant Research Scientist, Paleontology, University of Michigan



FRONT-END RESEARCH

TOPIC POPULARITY

Objective

The Field Museum surveyed general museum-goers (N=501) who do not often visit The Field Museum to determine the most popular topics in a group of 17 proposed exhibition topics.

Research Findings

Among exhibition topics drawn from various Field Museum subject areas (Anthropology, Botany, Geology, Zoology) *Mammoths and Mastodons* ranked #2. *Mammoths and Mastodons* also:

- Appealed strongly to infrequent or new visitors
- Appealed strongly to families

VISITOR EXPECTATIONS

Objective

The Field Museum surveyed visitors (N=50) and members (N=204) to assess content expectations and target audience age range for an exhibition about mammoths and mastodons. One phase of the survey examined, in detail, the display and interactive preferences of family visitors.

Results

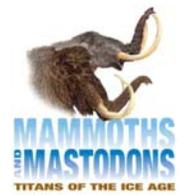
This front-end research predicts a high turnout of family audiences (especially those with children aged 7-10) and indicates that families desire age-appropriate tactile and interactive experiences.

Based on this research, the exhibition's content and design should appeal to all museum-goers, with a special focus on families. A layered exhibition experience should include:

- Hands-on, conversation-sparking interactives that feature tactile elements
- Imagination-stimulating settings of fantasy and wonder
- Accessible and comfortable environments that meet the physical needs of all ages

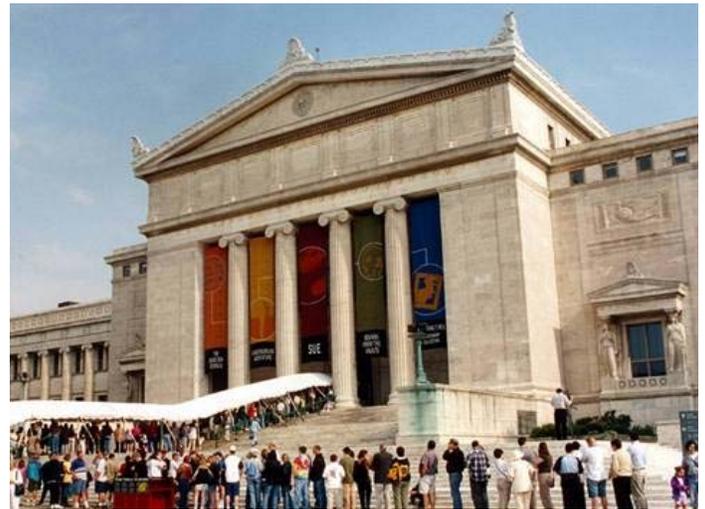
The surveys also solicited feedback from family audiences on their content expectations. Museum visitors expressed a wish to learn more about—and see:

- Real fossil specimens and recreated/fleshed-out replicas of mammoths and mastodons
- Animals' habitats, environments, and diets
- Information about their extinction
- Information about where they lived around the world
- Basic information about their biology and biomechanics



THE FIELD MUSEUM Chicago, Illinois, USA

Since its inception in 1893, The Field Museum has dedicated itself to exploring the Earth and its peoples, building on the strength of its world-renowned collections and scientific research to engage visitors of all ages. Through innovative exhibitions and education programs, cutting-edge environmental conservation projects, and pioneering fieldwork undertaken on every continent, over 500 full-time Field Museum staff members share their knowledge about important scientific, cultural, and environmental issues with an average of 1.5 million guests each year.



The Field Museum is an international leader in evolutionary biology, paleontology, archaeology, and ethnography. The Museum's approximately 300 curatorial and scientific staff in the four departments of Anthropology, Botany, Geology, and Zoology conduct research in more than 90 countries around the world. These scientists also study and preserve the 24 million artifacts and specimens within The Field Museum's collections and collaborate with the departments of Education and Exhibitions to create exciting and informative public programs.

Field Museum traveling exhibitions combine cutting-edge research with award-winning design. From the world's most famous dinosaur to the natural and cultural history of chocolate, from natural disasters to landmark scientific discoveries, The Field Museum's exhibitions explore intriguing topics that encompass natural history, contemporary science, ethnology, community participation, and popular culture. Clients as varied as natural history museums, science centers, art museums, children's museums, and local history centers have enjoyed The Field Museum's engaging exhibitions and exceptional service and support.

CONTACTS

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