ULTIMATE DINOSAURS

MEET A NEW BREED OF BEAST

Science Museum of Minnesota®

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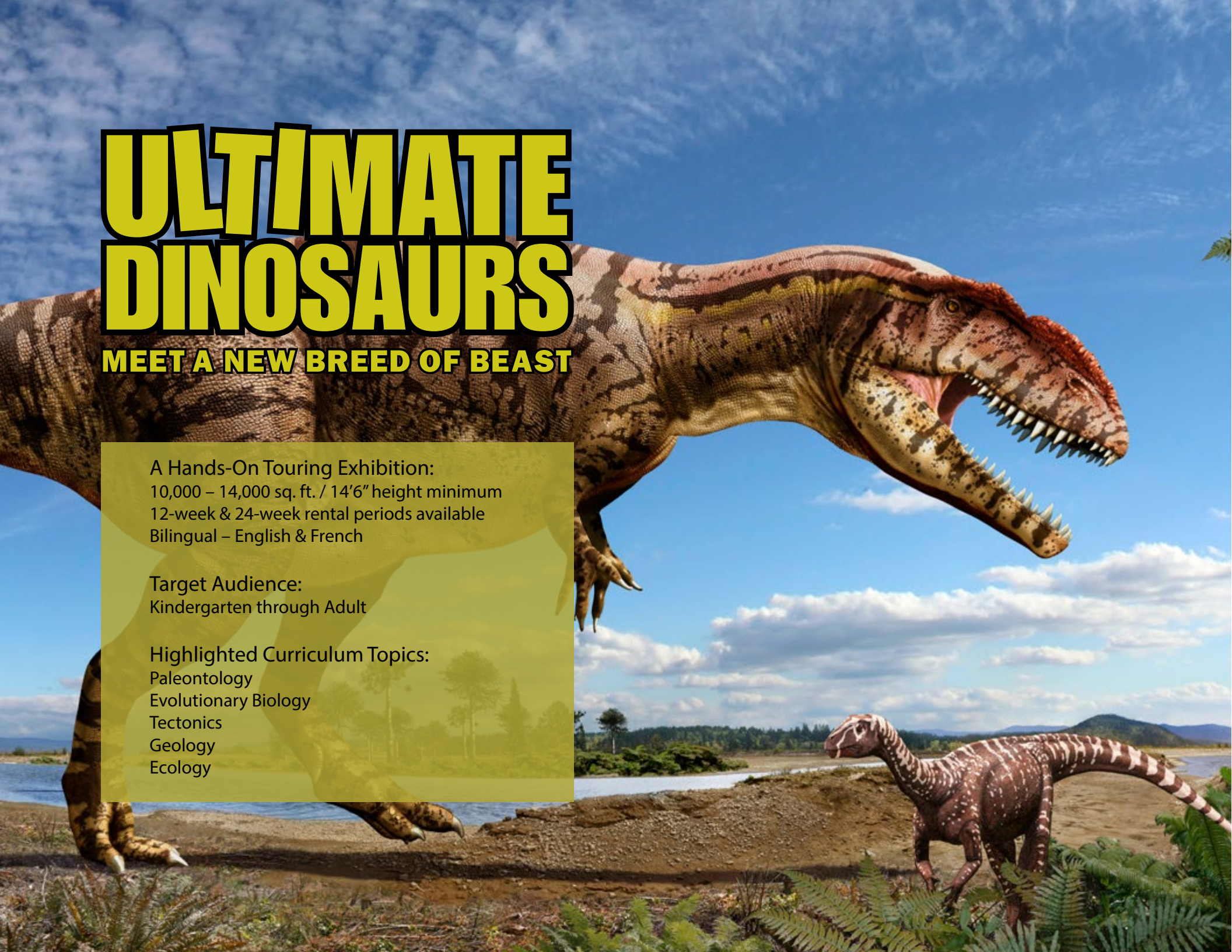
EXHIBITION OVERVIEW

Ultimate Dinosaurs showcases some of the most spectacular dinosaur discoveries and highlights cutting-edge scientific research from the Southern Hemisphere over the last two decades.

Why were southern dinosaurs so unique, bizarre, and different from their better known North American counterparts?

Focusing on the dinosaurs of the Southern Hemisphere, including South America, Africa, and Madagascar, this exhibition shows how continental drift altered the landscape of the ancient world and set the stage for the evolution of these bizarre creatures.



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MEET A NEW BREED OF BEAST

A Hands-On Touring Exhibition:
10,000 – 14,000 sq. ft. / 14'6" height minimum
12-week & 24-week rental periods available
Bilingual – English & French

Target Audience:
Kindergarten through Adult

Highlighted Curriculum Topics:
Paleontology
Evolutionary Biology
Tectonics
Geology
Ecology

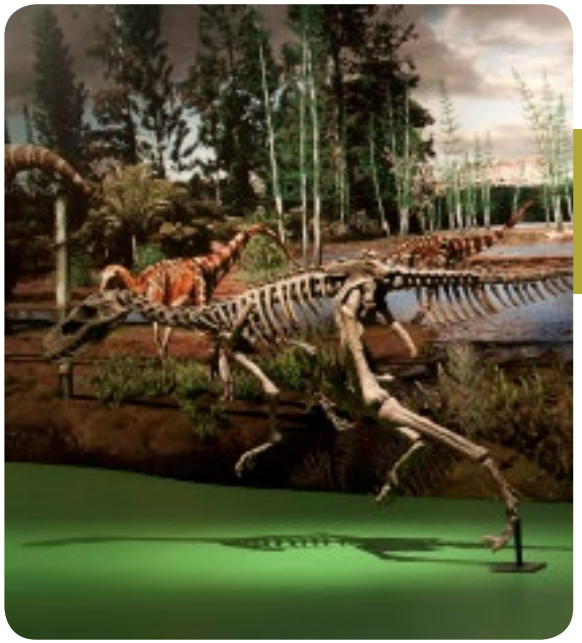
Section 1: Introduction
The Supercontinent of Pangaea and the Origin of Dinosaurs

250 Million Years Ago... There was Pangaea

Dinosaurs first appeared during the Triassic Period, when all the land masses of the Earth were concentrated in a supercontinent called Pangaea. These early dinosaurs were generally similar to one another, and there were no major ocean barriers to stop them moving from one place to another. Through dinosaur discoveries in Argentina, paleontologists have used the fossil record to tell the story of the origin of dinosaurs.

Pangaea

Although dinosaurs emerged in the Triassic, they were not the dominant land animals at that time. A number of large and non-dinosaur reptile groups, such as the cynodonts, rhynchosaurs, and crurotarsans, were much larger and more numerous, and may have preyed upon some of these early dinosaurs. This section features fossils of some of these earliest known dinosaurs, including the carnivores Eoraptor and Herrerasaurus, and the herbivore Pisanosaurus. Visitors will marvel at the relatively small size of these early dinosaurs.



Principles of Plate Tectonics and Evolution in Isolation

Principles of plate tectonics and evolution are outlined and defined through multimedia and kinetic demonstrations. Fossils are used to reinforce what spurred the revolutionary ideas of continental drift and natural selection. Visitors will gain an understanding of how these two forces drastically influenced the development of dinosaurs.

Section 1: Introduction
The Supercontinent of Pangaea and the Origin of Dinosaurs

Topics Covered:

Genetic Separation
Charles Darwin & Natural Selection
Alfred Wegener & Continental Drift Theory
Dinosaur Extinction
Fossil Formation
Dinosaur Evolution in the Triassic Period

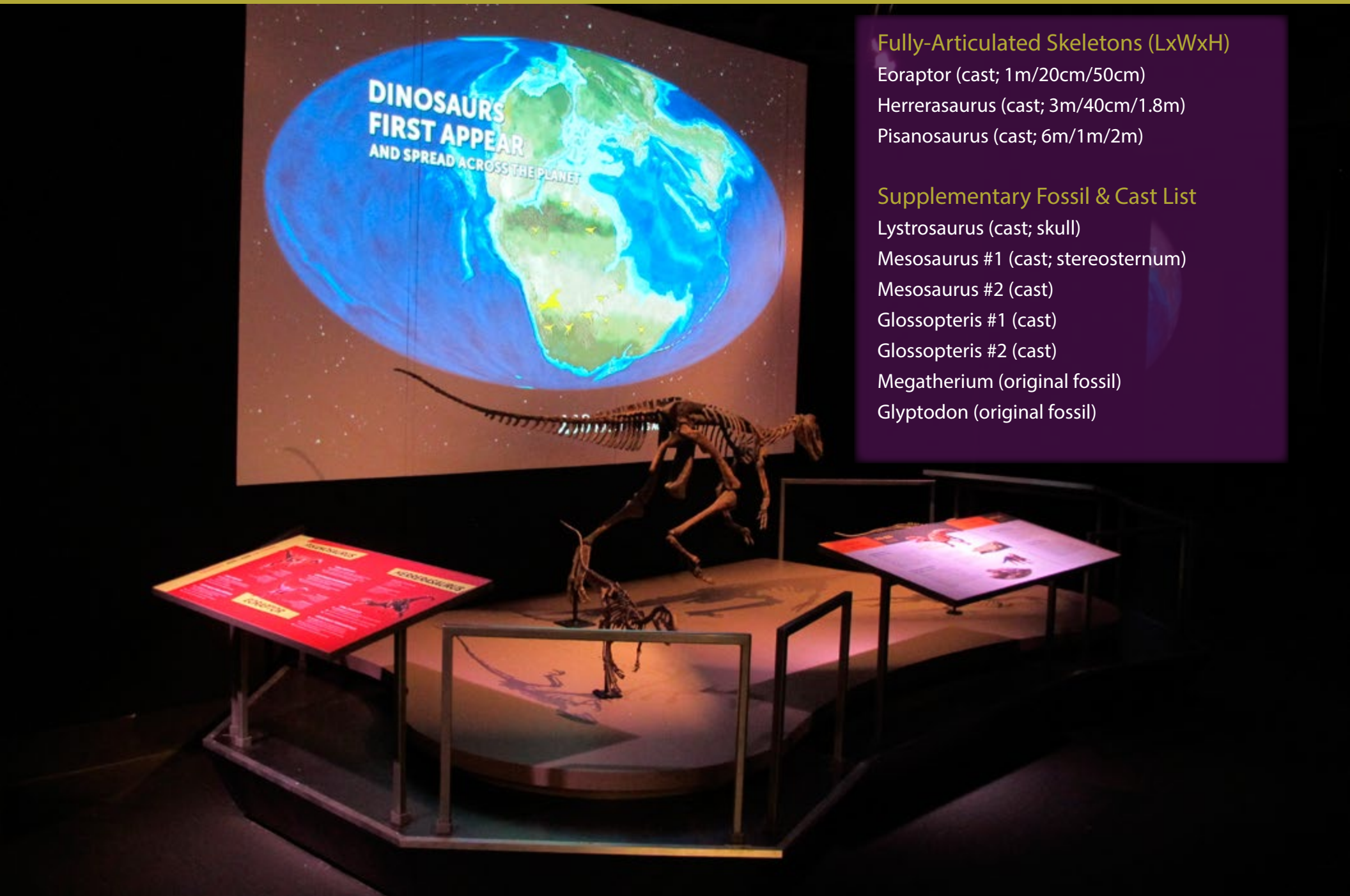
Section 1: Introduction
The Supercontinent of Pangaea and the Origin of Dinosaurs

Plate Tectonic Animation
Looping animation shows how the slow-moving currents in Earth's mantle affect the continents.

Not Your Average "Bones" Show

Ultimate Dinosaurs juxtaposes fully-articulated dinosaur casts with authentic fossils and multisensory interactives, creating a truly unique environmental and educational experience. Let us introduce you to a new breed of dinosaurs.

Section 1: Introduction
The Supercontinent of Pangaea and the Origin of Dinosaurs



Fully-Articulated Skeletons (LxWxH)

Eoraptor (cast; 1m/20cm/50cm)
Herrerasaurus (cast; 3m/40cm/1.8m)
Pisanosaurus (cast; 6m/1m/2m)

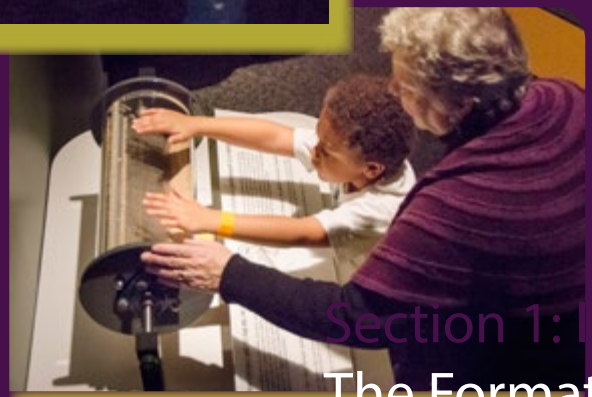
Supplementary Fossil & Cast List

Lystrosaurus (cast; skull)
Mesosaurus #1 (cast; stereosternum)
Mesosaurus #2 (cast)
Glossopteris #1 (cast)
Glossopteris #2 (cast)
Megatherium (original fossil)
Glyptodon (original fossil)

Section 1: Introduction
The Supercontinent of Pangaea and the Origin of Dinosaurs

Genetic Separation Sculpture
Demonstrating genetic separation through this kinetic sculpture, balls whirl and zip down metal tracks.

Interactive & Multimedia Experiences
Pterosaur Fly-over Video
Continental Drift Introduction Video
Continental Drift Spin Browser
Interactive Touch Graphics
Plate Tectonics Animation

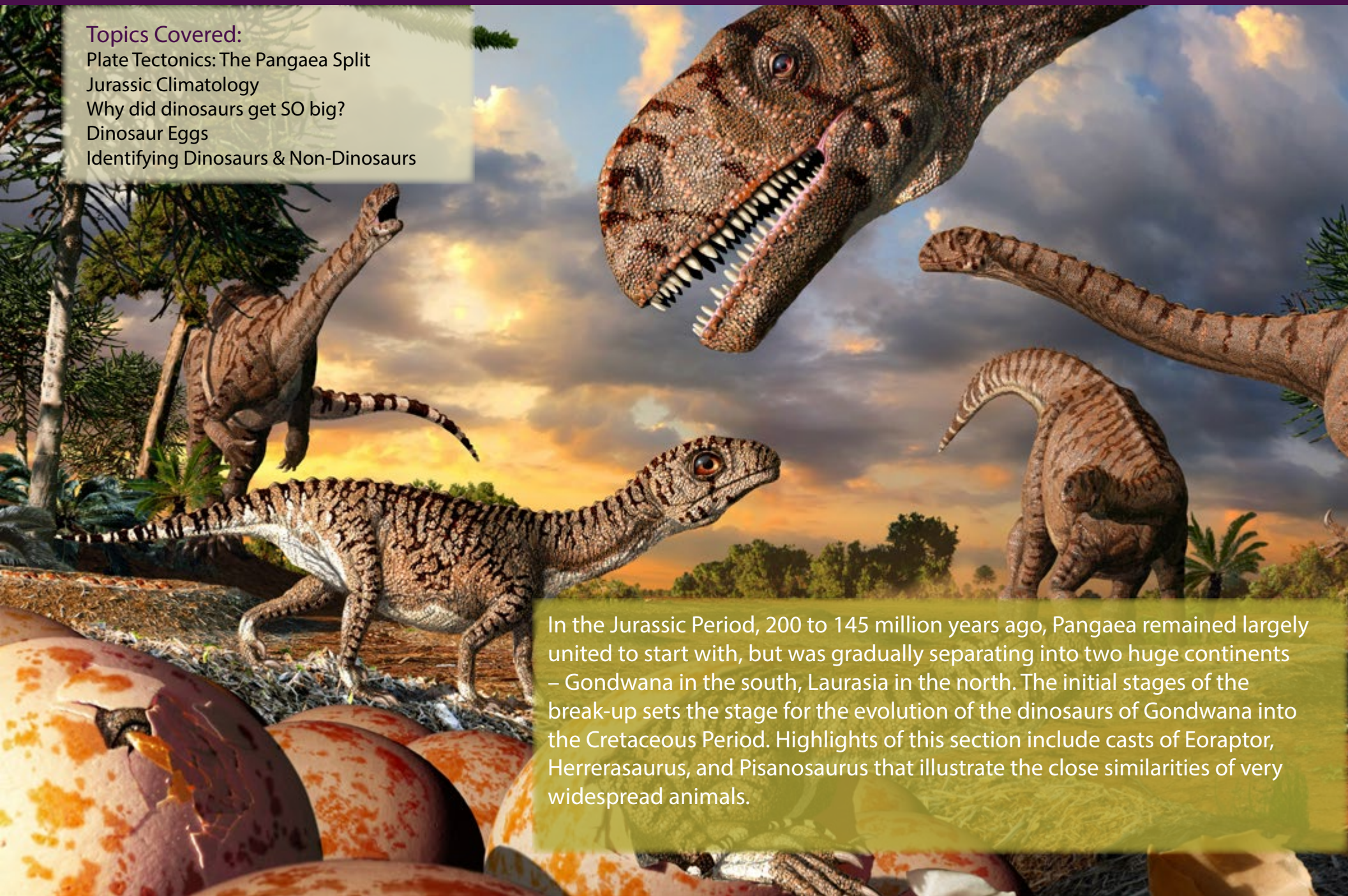


Microfossil Sifter
Visitors are able to sift through sand to see how archaeologists work with and search for fossils.

Section 1: Introduction
The Formation of Laurasia and Gondwana

Interactive Touch Graphics
Throughout the exhibition, liveaction and animated graphics via multi-user interactive screens, provide additional paleobiological information and fun facts.

Section 1: Introduction
The Formation of Laurasia and Gondwana



Topics Covered:
Plate Tectonics: The Pangaea Split
Jurassic Climatology
Why did dinosaurs get SO big?
Dinosaur Eggs
Identifying Dinosaurs & Non-Dinosaurs

In the Jurassic Period, 200 to 145 million years ago, Pangaea remained largely united to start with, but was gradually separating into two huge continents – Gondwana in the south, Laurasia in the north. The initial stages of the break-up sets the stage for the evolution of the dinosaurs of Gondwana into the Cretaceous Period. Highlights of this section include casts of Eoraptor, Herrerasaurus, and Pisanosaurus that illustrate the close similarities of very widespread animals.

Section 2: The Great Gondwana Dinosaurs
Introduction

By the beginning of the Cretaceous Period, 145 million years ago, Gondwana had emerged as a separate supercontinent. It then gradually broke up into the southern continents known today. The great Gondwana dinosaurs flourished, adrift on these separate new land masses. This splendid isolation resulted in some of the most bizarre-looking and gigantic dinosaurs that we know of today. Additionally, the south-north divide profoundly affected the evolution of dinosaur ecosystems.

This section of the exhibition focuses on the fragmentation of Gondwana. Organized along geographic lines into three major subsections — Africa, Madagascar, and South America — each area profiles southern dinosaurs during the Cretaceous Period.

Section 2: The Great Gondwana Dinosaurs
The Dinosaurs of Africa

Topics Covered:
Biodiversity in Gondwana
African Fossil Sites
The Great Gondwana Dinosaurs
Great Fish of the Cretaceous
Crocodiles of Gondwana

During the Cretaceous Period, 145 to 65 million years ago — when Gondwana gradually fragmented into the southern continents we know today — Africa was the first continent to break away and become isolated from the rest of Gondwana. Most dinosaurs of Cretaceous Africa come from what is now the Sahara desert. Among them, Ouranosaurus, Malawisaurus, and Nigerasaurus were found in an area of Niger called Gadoufaoua.

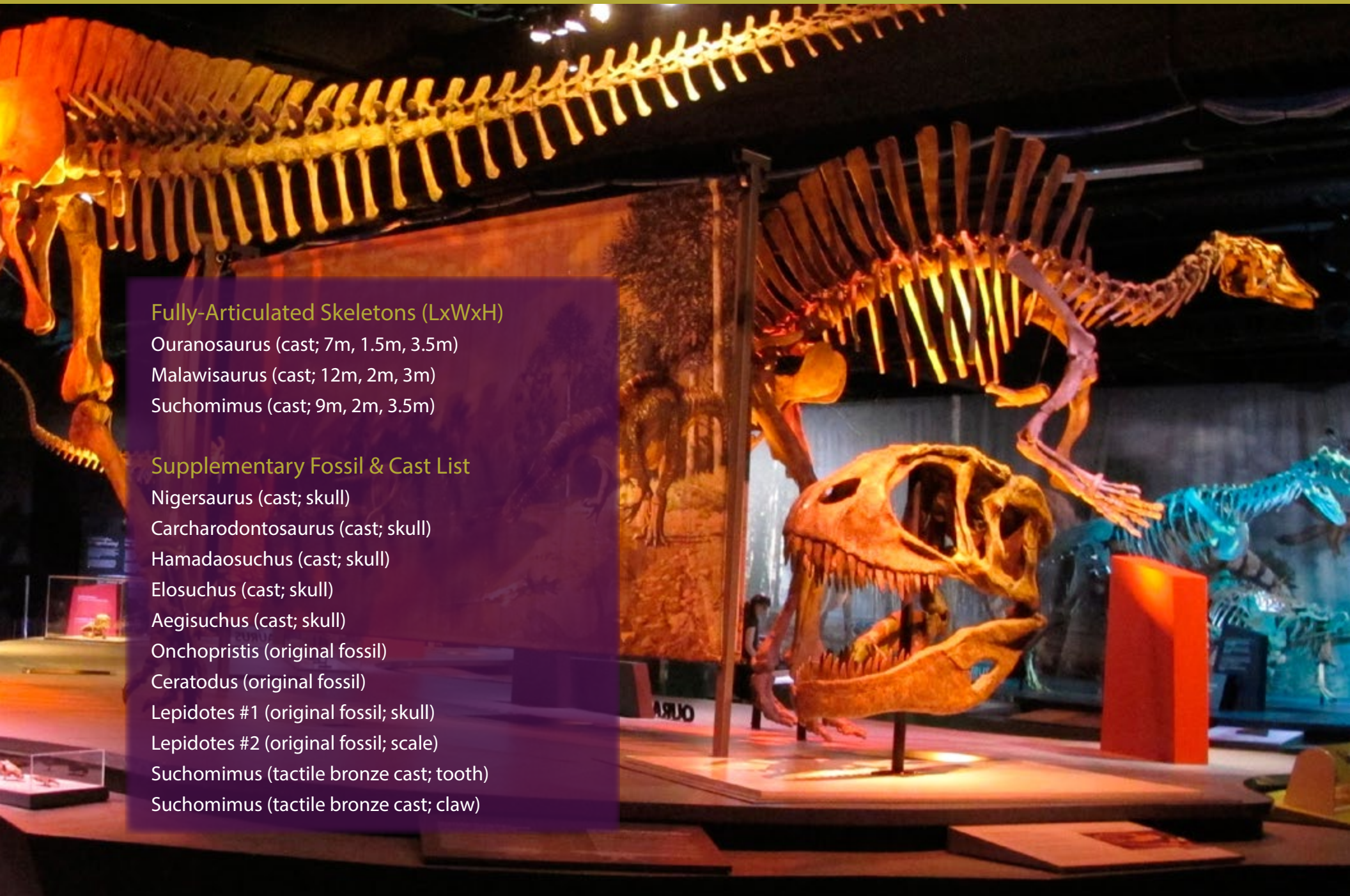
Section 2: The Great Gondwana Dinosaurs
The Dinosaurs of Africa

Scaled Diorama Play Station
Through play, these scaled play stations allow young visitors to explore the dinosaurs displayed in each section. These models also allow an opportunity for adults and facilitators to engage these visitors about various topics. How did these giants move? Do you think they were fast? What did they eat?

Tactile Bronze Casts
Tactile bronze casts put key specimens in the hands of each visitor. Specimens include comparison pieces and evolutionary examples.

Continental Drift Game
Explore the concepts of evolution, tectonic plates and continental drift through this single or multi-user experience. The puzzle (single or multi-user experience) allows a group of visitors to work together to reassemble Gondwana. Once the pieces are correctly connected, an animation of the fossil record is presented along with brief didactic content. The timeline (single user activity) focuses on geological stories with a timeline that populates the continents as they drift through time. Visitors can select hot-spots on the continents and learn additional fun facts.

Section 2: The Great Gondwana Dinosaurs
The Dinosaurs of Africa



Fully-Articulated Skeletons (LxWxH)

Ouranosaurus (cast; 7m, 1.5m, 3.5m)
Malawisaurus (cast; 12m, 2m, 3m)
Suchomimus (cast; 9m, 2m, 3.5m)

Supplementary Fossil & Cast List

Nigersaurus (cast; skull)
Carcharodontosaurus (cast; skull)
Hamadaosuchus (cast; skull)
Elosuchus (cast; skull)
Aegisuchus (cast; skull)
Onchopristis (original fossil)
Ceratodus (original fossil)
Lepidotes #1 (original fossil; skull)
Lepidotes #2 (original fossil; scale)
Suchomimus (tactile bronze cast; tooth)
Suchomimus (tactile bronze cast; claw)

Section 2: The Great Gondwana Dinosaurs

Madagascar: Late Cretaceous Island of Wonder

Since Madagascar separated from Gondwana, it has remained isolated to the present day. The strange lemur-dominated fauna of Madagascar today evolved under the same evolutionary conditions of biotic isolation as the strange dinosaurs millions of years before. This section includes wonderful specimens from the Late Cretaceous, including fully-articulated casts of Majungasaurus, Masiakasaurus, and Rapetosaurus. The amazing plant-eating crocodilian, Simosuchus, is also featured..

Section 2: The Great Gondwana Dinosaurs

Madagascar: Late Cretaceous Island of Wonder

Topics Covered:

The Unique Ecosystem of Madagascar
Diversity in Isolation
Flora & Fauna of Madagascar
Dig Sites in Madagascar

Section 2: The Great Gondwana Dinosaurs

Madagascar: Late Cretaceous Island of Wonder

Fossil Touch Table

Three stations allow visitors to explore:

- The casting process and why paleontologists use it
- How to identify fossils and microfossils with an interactive projection microscope
- Authentic (and touchable)

Interactive and Multimedia Experiences

- Interactive Touch Graphics
- Tactive Bronze Casts
- Fossil Touch Table

Section 2: The Great Gondwana Dinosaurs
Madagascar: Late Cretaceous Island of Wonder

Fully-Articulated Skeletons (LxWxH)

Majungasaurus (cast; 7m,1.5m, 2.5m)
Masiakasaurus (cast; 2m, 30cm, 1m)
Rapetosaurus (cast; 8m, 1.25m, 2.5m)
Simosuchus (cast; 1.5m, 0.5m, 0.5m)
Rahonavis (cast; 1m, 0.5m, 0.5m)

Supplementary Fossil & Cast List

Majungasaurus (tactile bronze cast; bones)
Majungasaurus (tactile bronze cast; teeth)
Spinosaur (original fossil; tooth)
Sauropod (original fossil; tooth)
Crocodilian (original fossil; osteoderm)
Carcharodontodaurus (original fossil; tooth)
Sauropod (tactile original fossil; vertebra large)
Sauropod (tactile original fossil; vertebra small)
Theropod (tactile original fossil; partial tibia)
Theropod (tactile original fossil; femur)

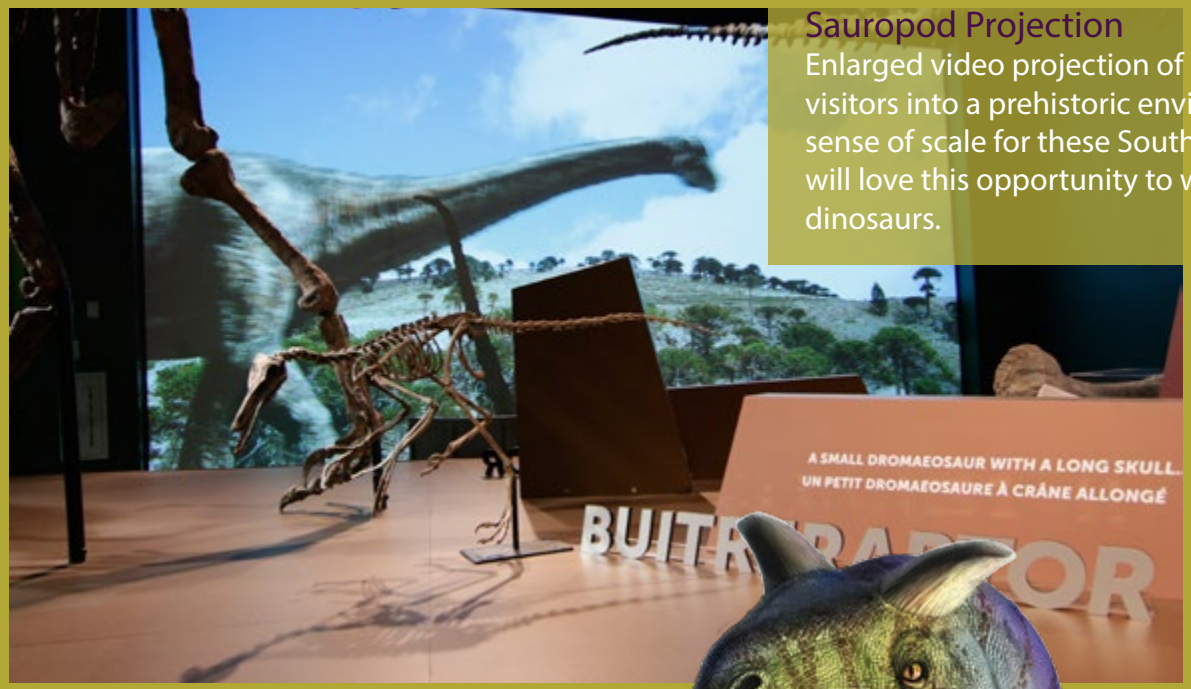
Section 2: The Great Gondwana Dinosaurs
The Giants of South America

The Cretaceous rocks of South America have produced some of the most spectacular dinosaur fossils ever found. If fact, South America has yielded the vast majority of dinosaur remains in Gondwana. While dinosaur fossils have been found in Argentina over the past 100 years, only in the last 25 years have Argentinian paleontologists revealed the amazing diversity of this continent. Highlights in this section include the ferocious and life-like Carnotaurus and specimen casts of an Argentinosaurus vertebrae and a Futalognkosaurus leg against which visitors can measure themselves.

Section 2: The Great Gondwana Dinosaurs
The Giants of South America

Topics Covered:
Paleoclimatology
Paleoecology
Appearance & Skin Impressions
Dinosaur Growth & Development
South American Dig Sites

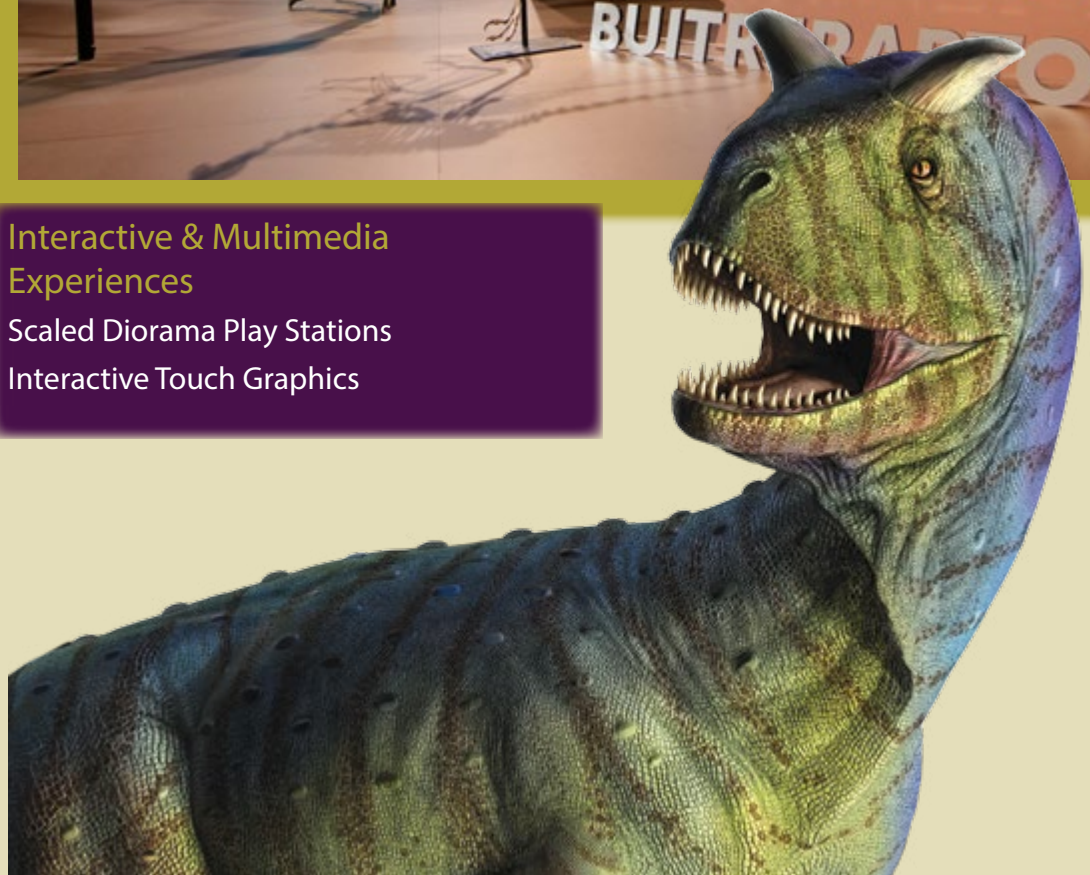
Section 2: The Great Gondwana Dinosaurs
The Giants of South America



Sauropod Projection
Enlarged video projection of sauropods will immerse visitors into a prehistoric environment and provide a sense of scale for these Southern giants. Your visitors will love this opportunity to walk (and run!) alongside dinosaurs.

Interactive & Multimedia Experiences
Scaled Diorama Play Stations

Interactive Touch Graphics



Augmented Reality Skin Viewer
What did dinosaurs really look like? Using augmented reality (AR) interactive viewers, visitors can look at a dinosaur cast and watch as the chosen area comes alive before their eyes. This experience focuses on the detailed examination of Carnotaurus' skin and body, revealing the relevant evolutionary traits this dinosaur possessed. This is an exciting experience that delivers bites of interpretive content.

Section 2: The Great Gondwana Dinosaurs
The Giants of South America

Fully Articulated Skeletons (LxWxH)

Amargasaurus (cast; 9m, 1.5m, 3m)
Buitreraptor (cast; 1m, 0.5m, 0.5m)
Carnotaurus (cast; 7m, 1m, 2.5m)
Austraraptor (cast; 5m, 75cm, 1.75m)

Supplementary Fossil & Cast List

Argentinosaurus (cast; vertebrae)
Futalognkosaurus (cast; leg)
Amargasaurus (model; embryo)
Amargasaurus (original fossil; femur)

Section 3: Reprise
Dinosaurs and Drifting Continents

By the Late Cretaceous, Gondwana had been isolated from Laurasia for tens of millions of years. This isolation created distinctive ecosystems in Gondwana, dominated by plants and animals almost unknown in Laurasia. Here visitors determineif Giganotosaurus was truly the biggest carnivorous dinosaur of all time. During the Late Cretaceous, the familiar tyrannosaurs were the dominant carnivores in North America, while the plant-eating hadrosaurs (duck-bills) and ceratopsians (horned dinosaurs) were the dominant herbivores. This contrasts with the Gondwana fauna, where the dominant carnivores were Giganotosaurus and its relatives and the sauropods were the dominant plant-eaters.

This final section links the two narrative threads of continental drift and evolution that run through the exhibition. A fully-articulated Giganotosaurus commands the attention of each visitor in this section.

Section 3: Reprise
Dinosaurs and Drifting Continents

Topics Covered:
Diversity in the Late Cretaceous Period
Gondwana vs. Laurasia
Dinosaur Extinction
Mammal Takeover

Fully Articulated Skeletons (LxWxH)
Giganotosaurus (12m, 1.5m, 4m)

Supplementary Fossil & Cast List
Giganotosaurus (tactile bonze cast, tooth)
Tyrannasaurus rex (tactile bronze cast, tooth)

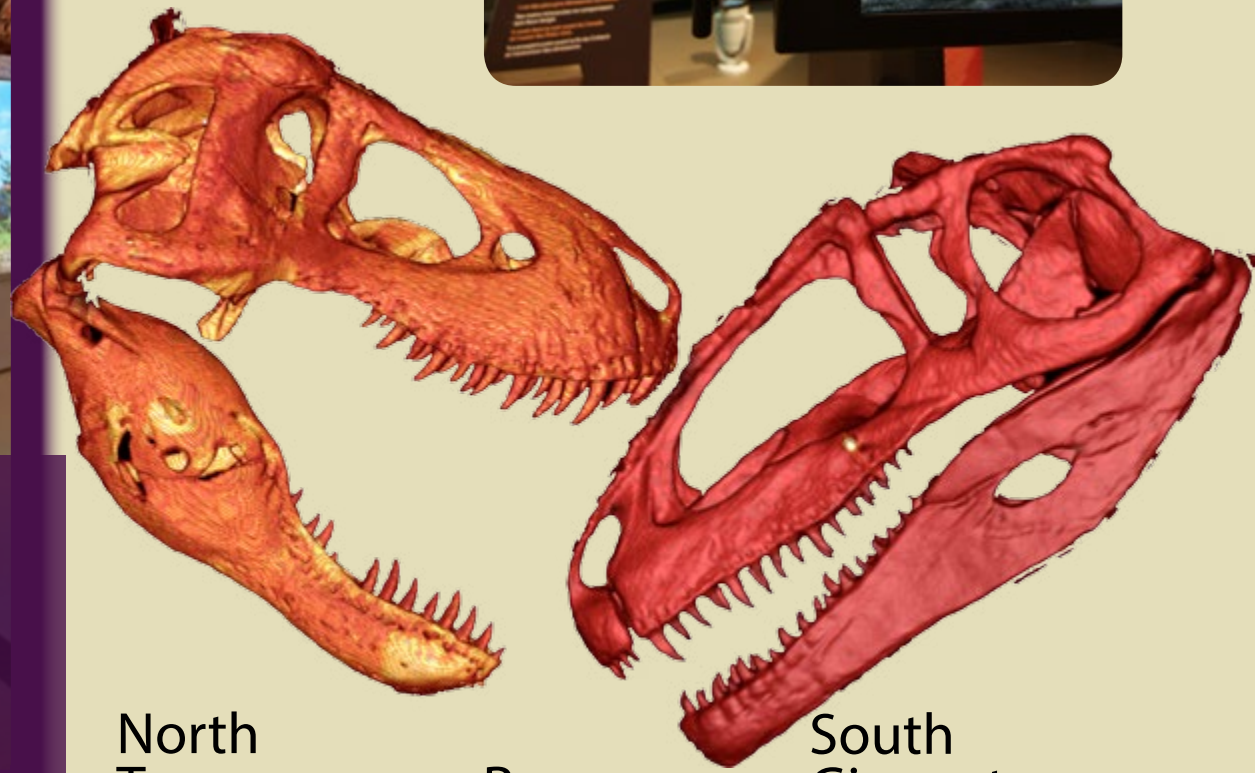
Section 3: Reprise
Dinosaurs and Drifting Continents

Interactive & Multimedia Experiences

Paleontology Video
Contemporary World Projected Globe
Augmented Reality Skin Viewers
Reactive Walls
Tactile Bronze Casts

Reactive Walls

A large-scale reactive experience interacts with each visitor that walks by. The scenes react subtly to the visitors' motion, inviting them to stop and explore. Depending on their proximity to the screen, visitors can activate the environment, initiate animated flora and fauna, or prompt didactic content.



North
Tyrannasaurus Rex

South
Giganotosaurus

Education and Facilitation Guides

Education & Facilitation Guides

Tied to national standards, a full education guide is provided with Ultimate Dinosaurs to support teachers before, during and after a visit to the exhibition.

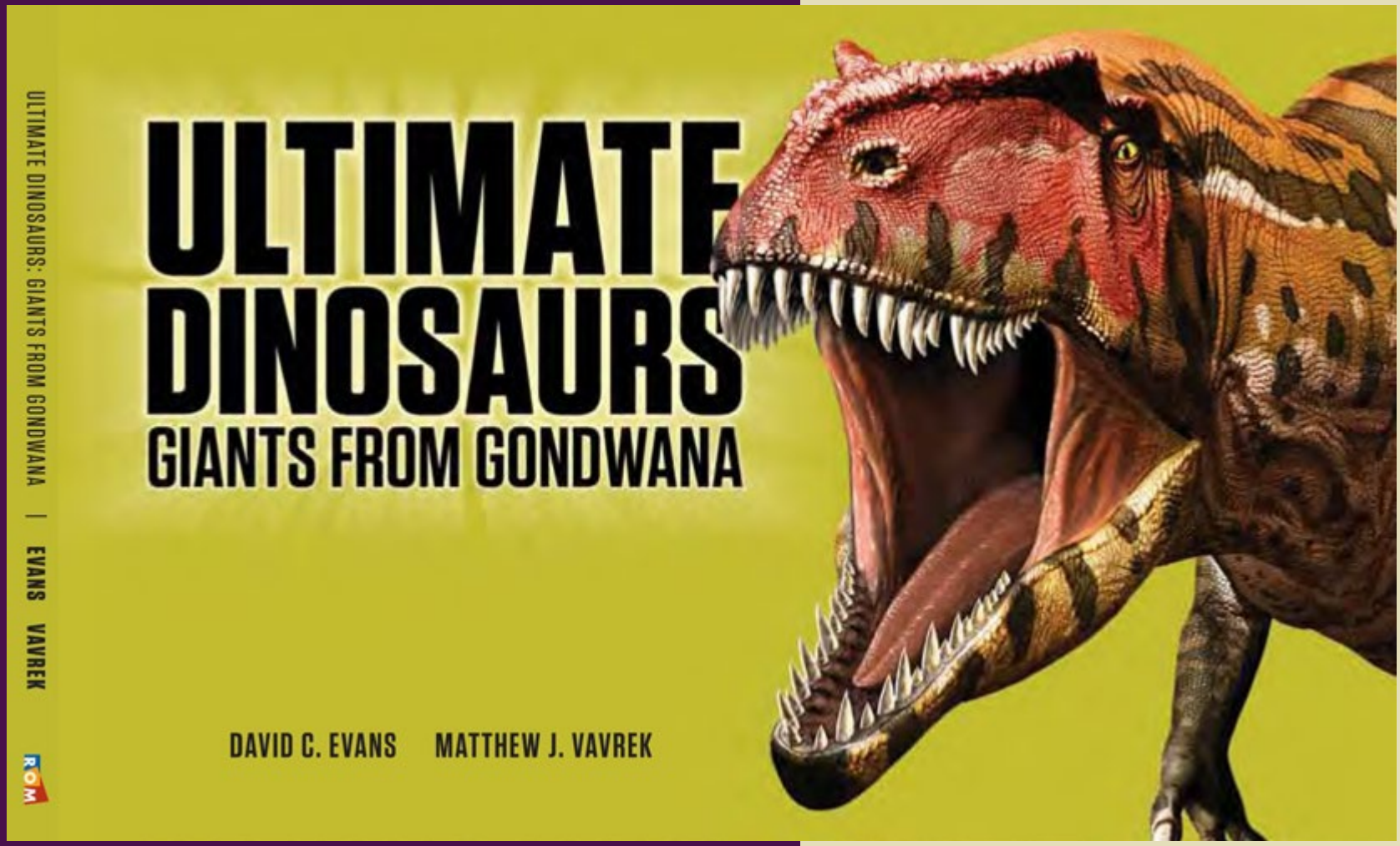
Activity ideas for educational facilitation carts are also included with the exhibition. Popular activities include: pterosaur gliders, dinosaur stop-motion videos, and touchable fossils.

Family Activity Guide

A Family Activity Guide was developed to facilitate conversations and stops within Ultimate Dinosaurs. Visitors are encouraged to complete tasks and collect stamps to become an official Junior Paleontologist.

Accompanying Guidebook

Highlights from the Ultimate Dinosaurs exhibition are captured in a full-color guidebook. The guidebook is 80 pages in length and includes photographs of the most iconic objects, along with extended label copy about the exhibition and introductory text. Dimensions of guidebook 5″x8″. Customization of booklet to include information on host venue is possible.



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Exhibition Includes:

- 15 dinosaur casts with armatures posed specifically for the exhibition
- Authentic dinosaur fossils
- Platforms for the dinosaur casts. Some platforms include embedded vitrines for fossils and monitors for multimedia presentations
- All exhibition copy graphics, including Braille incorporated into graphics supporting tactile elements and raised drawings
- Fully bilingual (English and French) text panels
- Banners of illustrated prehistoric environments
- All lighting embedded in platforms and theatrical/special effect lighting (i.e. custom gobos)
- All A/V and media components needed for interactives and projections
- A hard drive that includes: installation manual, A/V files, graphic files
- Family Activity Guide and accompanying six learning stations, each with tactile interactive
- Turn-key education package to support field trips
- Educational facilitation package, including scripts, customizable printables and some supplies
- All developed marketing materials and graphic standards

Science Museum of Minnesota®

Ultimate Dinosaurs was created and produced by
The Royal Ontario Museum, Toronto