DINOLABS & DINODIG

Dinosaurs captivate the imagination like little else. Artifacts, fossils and DNA are the elements scientists use to reconstruct what dinosaurs and the earth were like 200 million years ago. Inside DinoLabs you can explore that world again in ways you never imagined. From bone to stone, ancient fossils reveal how dinosaurs roamed and fought, how they lived and died. Fossils are the preserved remains of plants or animals more than 10,000 years old.

FOSSILS

There are two main types of fossils, body fossils and trace fossils. Body fossils are the preserved remains of a plant or animal's body. Trace fossils are what remains of the activity of an animal; trackways, footprints, fossilized egg shells and nests. Body fossils go through a process called permineralization to become stone. First, the body is buried. Second, ground water fills up all empty spaces – including cells. Third, the water slowly dissolves the organic material leaving minerals behind. After this process is complete, what was once bone is now rock in the shape of a bone!

CASTS AND MOLD FOSSILS

If an animal falls into mud or sand when it dies and is covered by another layer of mud or sand, over time the body will disintegrate. When this happens, the soil will harder into rock preserving an impression of the body. This space is called a mold fossil. Over time, it may fill with minerals and form what is called a cast fossil, becoming a model or a replica of the organism.

IMPRINTS

Imprints are the external molds of very thin organisms, including leaves and trilobites. They are often found in rocks such as sandstone, shale and volcanic ash.

Please remember fossils are very delicate. Most fossils in this exhibit should not be touched. Look for the hand symbol for fossils you may touch.

TRACE FOSSILS OR ICHNOFOSSILS

Trace fossils, also called Ichnofossils, are structures preserved in sedimentary rocks that record biological activity. These fossils are important because they represent both anatomy and behavior. Trace fossils include footprints, tracks and trail marks, burrows, borings, feeding marks and coprolites (fossilized droppings).

DINOSAURS

The Fort Worth Museum of Science and History paleontology collection consists of several notable holotypes all of which were discovered in Texas and date back to the Early Cretaceous Period. Among these are the State Dinosaur of Texas, the *Paluxysaurus jonesi*, and the *Tenontosaurus dossi*. There are no known Jurassic dinosaurs from Texas, but Jurrasic dinosaurs did live north and west of the Panhandle. These include the *Allosaurus* and *Camptosaurus*.

TENONTOSAURUS DOSSI

The discovery of a lifetime, this new species of dinosaur was uncovered in 1988 by a boy and his father on a walk in Parker County, near Weatherford. The ornithopod, a plant-eating dinosaur walked tip toed on its hind feet and lived 112 million years ago. The excavation of the *Tenontosaurus dossi* led to a chain of site excavations which eventually unearthed the *Paluxysaurus jonesi* 40 miles away.

PALUXYSAURUS JONESI

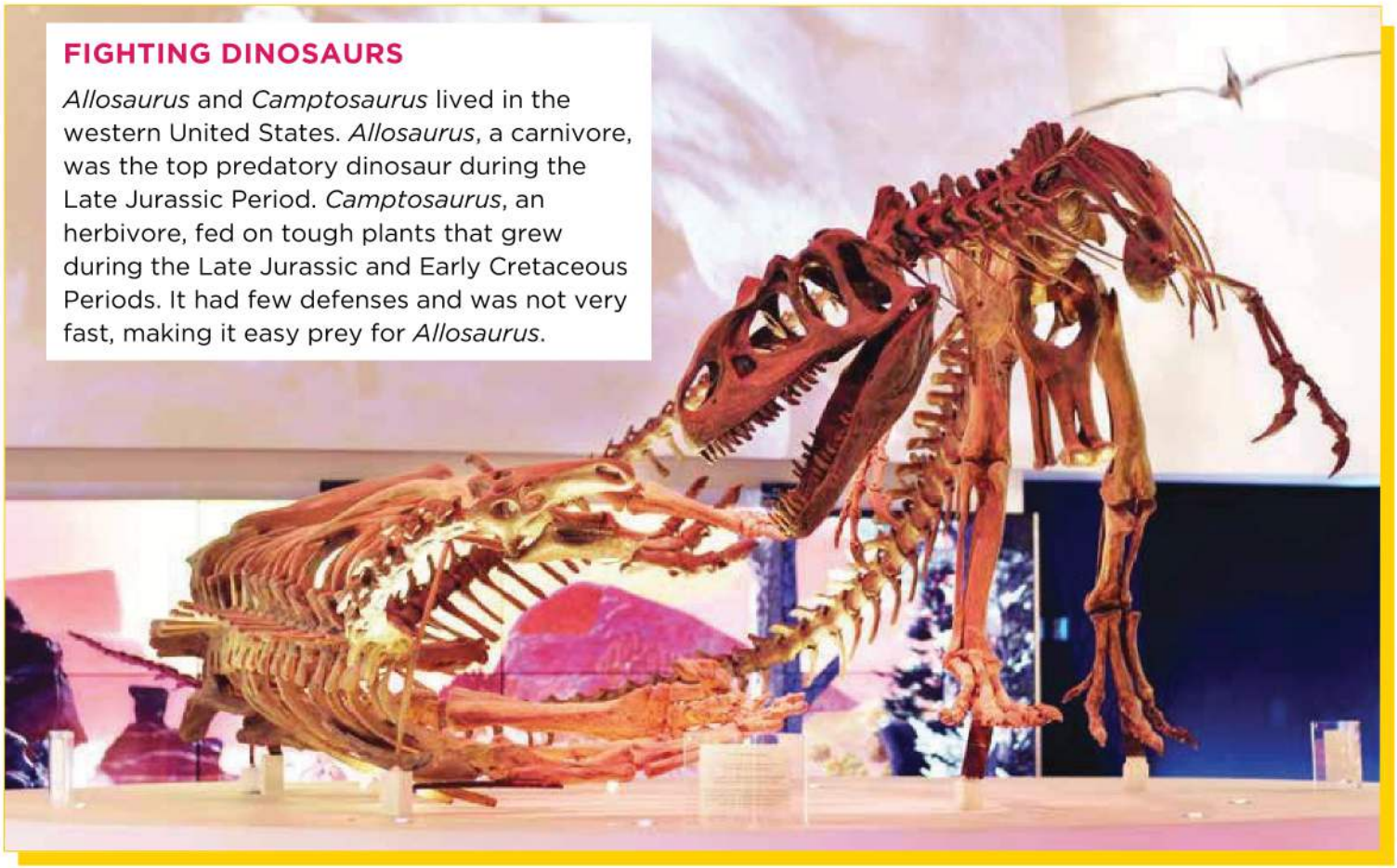
Paluxysaurus jonesi roamed the north and central parts of Texas some 112 million years ago during the Cretaceous Period. Paleontologists believe it was common to North Texas based on fossils from Hood County and dinosaur footprints near Glen Rose, Texas. DinoLabs features a pelvis of this large herbivore which weighed around 20 tons. Be sure to visit the State Dinosaur of Texas in the Museum's Atrium to study its entire skeleton more closely!

TYRANNOSAURUS REX

Tyrannosaurus Rex, a fearsome carnivore, lived in forested river valleys in North America during the Late Cretaceous Period. It became extinct 65 million years ago in the Cretaceous-Tertiary mass extinction.

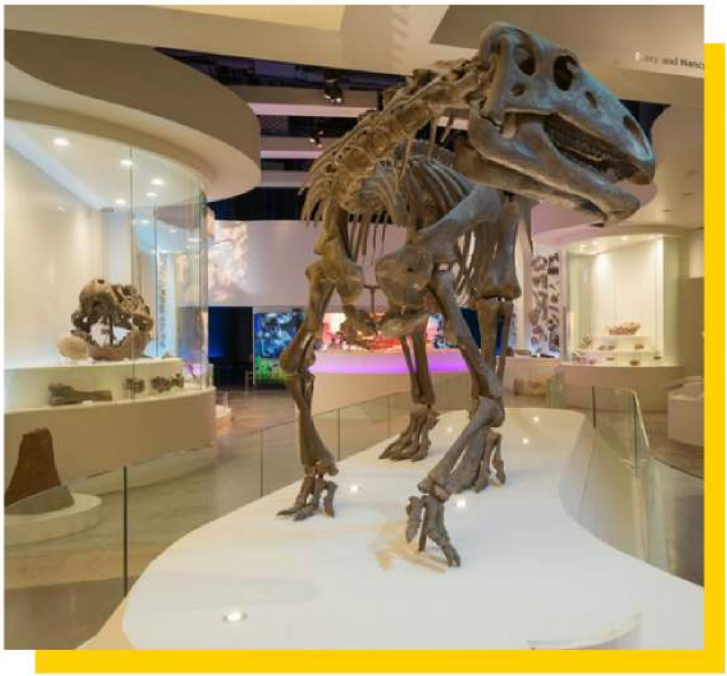
FIGHTING DINOSAURS

Allosaurus and *Camptosaurus* lived in the western United States. *Allosaurus*, a carnivore, was the top predatory dinosaur during the Late Jurassic Period. *Camptosaurus*, an herbivore, fed on tough plants that grew during the Late Jurassic and Early Cretaceous Periods. It had few defenses and was not very fast, making it easy prey for *Allosaurus*.



MINERALS

Minerals are naturally occurring substances formed by geological processes. They are usually solid and feature specific physical properties and chemical compositions. Physical properties include a crystal structure, hardness, lustre, color, streak, fracture, cleavage and density. Minerals can be made up of just one chemical element but more often it is a mixture of multiple elements.



TECHNOLOGY

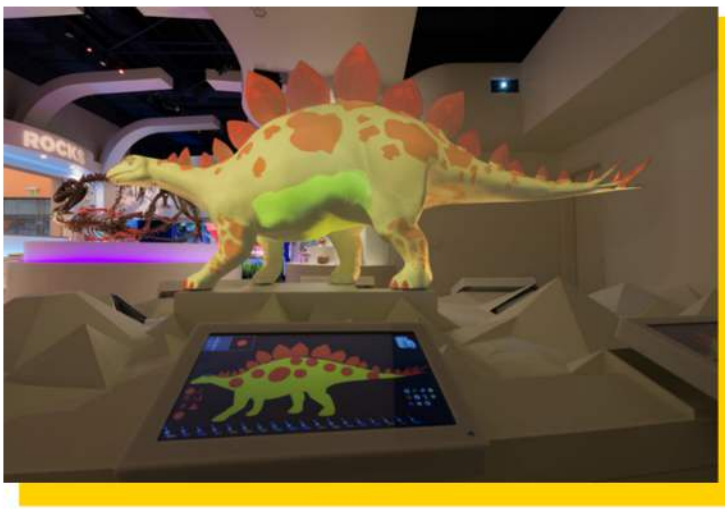
As much as DinoLabs allows you to dig into the past, this is also an interactive digital world where creativity is unleashed! Movement and technology create an immersive space where anything is possible! It is the seamless integration of fossils, dinosaurs and artifacts with cutting-edge technology.

DINOLAND

This is where dinosaurs come to life! Let your imagination run wild as you create a dino all your own... then scan it and watch it come to life! Personalized dinosaurs will populate the immense 19-foot curved screen, creating a landscape as unique as our guests! DinoLand is an opportunity to develop spatial intelligence, logical thinking and the power of expression.

DINOGLOW™

This Jurassic era Stegosaurus is the first ever interactive 3D mapping dinosaur, designed for collaborative engagement. Have you ever wondered what dinosaurs looked like? Did they have scaled skin in muted colors for just the right kind of camouflage? Did they have feathers? Were they brightly colored and vivid? DinoGlow™ is a one-of-a-kind experience that lets you explore the possibilities!



TEKS:

K: 2A,E, 3C, 4A,B
1ST: 2A,E, 3C, 4A,B
2ND: 2A,E,F, 3C, 4A,B
3RD: 2A, 3A, 4A
4TH: 2A, 3B,C, 4A
5TH: 3A,C,4A,7A
6TH: 3C

DINODIG

Paleontologists travel around the world to gather information about dinosaurs. We are fortunate that Texas has several sites that contain dinosaurs. This document is a guide to our DinoDig Field site. Besides the information provided, feel free to make your own measurements, observations, and discoveries!

Station 1: Deinonychus
Here is a complete skeleton of Deinonychus. This meat-eating dinosaur skeleton shows the effects of bleaching and weathering. It is in a relatively intact position, with the head and neck twisted backwards, suggesting it dried out enough for the tendons to shrink and contort the head and neck before it was covered and preserved from further damage.

Station 2: How Do We Know How Old Our Site Is?
Fossilized ammonites can be found in the marine limestone lying just above the Cretaceous strata in the quarry wall. They can be used as index fossils to determine that our site is around 112 million years old. An index fossil is a fossil that is known to have lived during a particular geologic time interval and is used to date the rock layer(s) in which it is found. Typically, good index fossils are from animals that lived for a very brief time period and were geographically widespread.

Station 3: Paluxysaurus Bones
The upper sandstone unit at our site contains both scattered and articulated remains of a large plant-eating dinosaur, Paluxysaurus. The bones aren't all connected to other skeletal elements like the Deinonychus at Station 1. This is the way paleontologists typically find dinosaur bones.

Gastroliths lie with the sauropod bones on the upper sandstone layer easily distinguished from other irregular rocks in the quarry by their polished surfaces. Gastroliths are small rocks that dinosaurs swallowed to grind food digestion.

Station 4: Field Jacket
Field jackets containing fossils from the site are transported to a laboratory for further preparation. Paleontologists carefully cut open the jacket, remove the fossils, and study them in greater detail.

Station 5: Crossbedding
A slow-moving river once ran through our site and made this pattern by depositing sand and mud. Cross-bedding occurs when sediment is deposited on rock as water moves across it from a single direction.

The sediment grains build up into piles until they reach an unstable height.

The grains then avalanche down and make thin layers. Since the layers are formed in this manner, they provide us information on the direction of flow of the prehistoric stream.

CLASSROOM CONNECTIONS

PRE-VISIT ACTIVITIES:

Pre-visit lessons are a great way to prepare students for their trip to a science museum about dinosaurs. These activities can help build background knowledge, generate interest, and enhance the overall learning experience. Here's a few ideas of pre-visit lesson ideas:

Dinosaur Classification: Introduce students to the different dinosaur groups, such as theropods, sauropods, and ornithischians. Discuss their unique characteristics and adaptations.

Dinosaur Habitats and Environments: Explore the different environments in which dinosaurs lived, from forests and plains to swamps and deserts. Discuss how these environments influenced their adaptations.

Fossil Formation: Explain how fossils are formed and the processes that lead to their preservation. This will help students understand why dinosaur fossils are found in certain areas.

Geological Time Scale: Introduce the concept of geological time and the different periods, such as Jurassic, Cretaceous, and Triassic. Relate these periods to the appearance and extinction of dinosaurs.

SPARK CURIOSITY!

Encouraging children to use **"I Notice, I Wonder, I Imagine"** questions during a field trip can help them engage actively with the exhibits, stimulate their curiosity, and foster their creativity and critical thinking skills. It also provides an opportunity for meaningful discussions and reflections on their experiences.

For Example: "I notice that the dinosaur skeleton is very big. I wonder what this dinosaur might have looked like when it was alive. I imagine it roaming through forests and roaring loudly."

TRY THIS BACK IN THE CLASSROOM!

Post-visit lessons are essential to reinforce and expand the learning experiences from the field trip to the dinosaur exhibit at the Museum. These activities can help students process the information they encountered during the visit and encourage further exploration. Here's a list of post-visit lesson ideas:

Comparing Animal Ancestors to Modern Animals: Have students make a T-Chart to compare animal ancestors to modern animals in terms of size, diet, and behavior based on what they learned at the Museum. This can help them relate to dinosaurs and better understand the scale and unique characteristics of these prehistoric creatures.

Design Your Own Dino: Encourage students to create dinosaur-themed artwork, sculptures, or models. Encourage students to include a name, physical features, habitat, and adaptations. They can draw or build models of their dinosaurs!

Dinosaur Storytelling: Encourage students to write an imaginative story featuring dinosaurs as characters, such as *Paluxysaurus Jonesi*, draw inspiration from what they learned at DinoLab. This can help them practice their writing skills while exploring their fascination with dinosaurs.

These post-visit lesson ideas will help students internalize and apply the knowledge gained from their FWMSH experience, fostering a deeper understanding and appreciation of prehistoric life!