Interpretive Guide for the Georgia Southern University Museum's Permanent Exhibits

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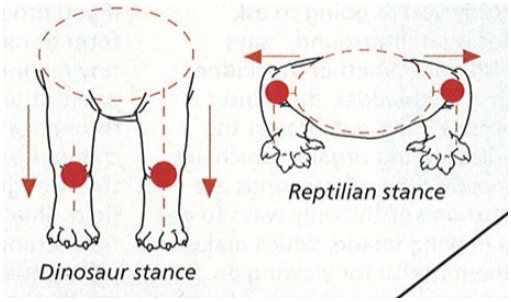
All information contained in the Hall of Natural History Interpretive Guide was checked for accuracy by Dr. Brent Tharp, Museum Director, and Dr. Kathlyn (Katie) Smith, Curator of Paleontology.

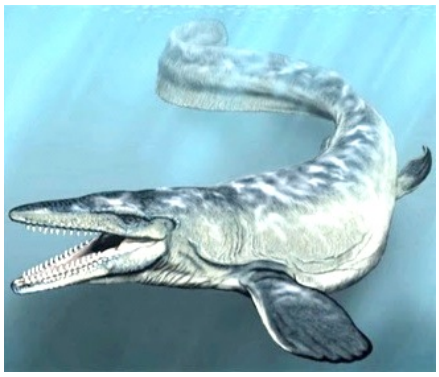
What is a Dinosaur?

The term *dinosaur* is widely misunderstood and generally misused. The word is actually a specific classification of animal with strict qualifications. To be considered a **dinosaur** the animal must**:**

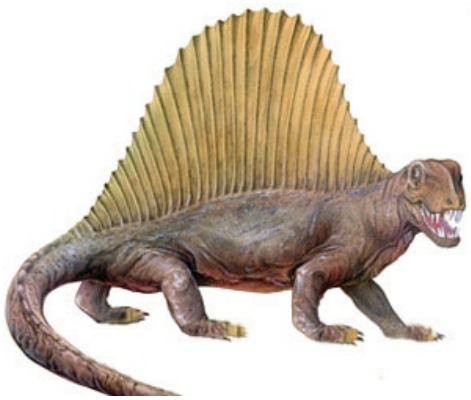
1. Be a reptile.
   - They could have feathers but never hair or fur like mammals.
2. Live on land.
   - If they lived in the sea they are called marine reptiles
   - If they flew they are called winged reptiles
3. Have legs directly underneath its body (as opposed to sprawled to the side).
   - This can be hard to distinguish. It helps to identify the position of the animal's knees in relation to its hipbones and feet when looking at the front or back view. If you can draw a (more or less) straight line through its hipbone, knees, and feet, then its legs are considered directly under its body. If the knees jut out from the hipbone, perpendicular to the body, and then down to the feet, its legs are considered sprawled to the side.



   - When an animal's legs are sprawled to the side, its body wiggles when it walks, like a modern lizard. When its legs are directly underneath, its body remains still when it walks, like a dog.
4. Live during the Mesozoic Era.
   - Many species of large reptiles lived both before and after the Mesozoic Era. Regardless of how much an animal looks like a dinosaur—even if it meets all other criteria—if it lived outside the Mesozoic Era, it is not a dinosaur.



This means many of the animals the public often calls dinosaurs are really not dinosaurs at all. For example, our **mosasaur** (left) lived during the Mesozoic Era and was a reptile. However, it did not live on land and did not have legs under its body (technically, it did not have legs at all, it had paddles). Therefore, the mosasaur is <u>not</u> a dinosaur even though it lived at the time of the dinosaurs. It is, instead, a **marine reptile**.



This ***Dimetrodon*** **(**right) certainly looks like a dinosaur and it lived on land. However, *Dimetrodons* lived way before the dinosaurs, during the Permian Period (part of the late Paleozoic Era). In addition, its legs are not directly under its body—they are sprawled to the side. It is also not a reptile (this is explained later). *Dimetrodons* are <u>not</u> dinosaurs. Reptiles that lived on land but fail to meet the other qualifications are referred to as **land**

reptiles.

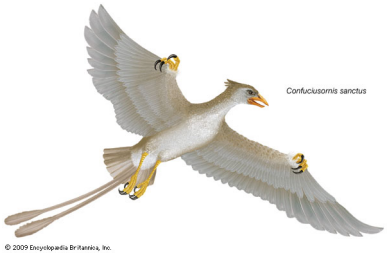
Pterosaurs (left, pronounced: ter-oh-sores), including *Pteranodon and Pterodactyl*, lived during the Mesozoic Era and were reptiles, but they flew. Therefore, pterosaurs are <u>not</u> dinosaurs. Rather, they are called **winged reptiles**.

We also need to keep in mind that all the dinosaurs did not exist at the same time. Dinosaurs walked the earth for 65 million years. In that time, new dinosaur species evolved while others went extinct. For example, it is common in movies to show a *Stegosaurus* and *Tyrannosaurus rex* roaming through the landscape at the same time. However, these two dinosaurs did not overlap. The *Stegosaurus* lived in the late Jurassic Period and went extinct before the Cretaceous started. The *Tyrannosaurus rex* did not live until the Cretaceous. This means the showdown to the right could not have happened.

Era	Period	Epoch
Cenozoic (65 mya to today)	**Quaternary** (1.8 mya to today)	**Holocene** (11,000 years to today
		Pleistocene (1.8 mya to 11,000 years)
	Tertiary (65 to 1.8 mya)	**Pliocene** (5 to 1.8 mya)
		Miocene (23 to 5 mya)
		Oligocene (38 to 23 mya)
		Eocene (54 to 37 mya)
		Paleocene (65 to 54 mya)
Mesozoic (245 to 65 mya)	**Cretaceous** (146 to 65 mya)	
	Jurassic (208 to 146 mya)	
	Triassic (245 to 208 mya)	
Paleozoic (544 to 245 mya)		

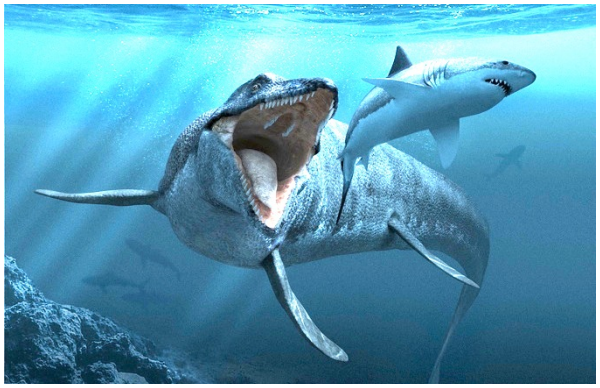
And so on to 4.5 bya

Others argue that *Pteranodons* caught fish more like a modern duck: from a sitting position on top of the water. *Pteranodons* had three clawed fingers on each "hand" and four clawed toes on each foot. Their fossils have been found in present day Kansas, Alabama, Nebraska, Wyoming, and South Dakota.



While pterosaurs dominated the skies, we also see the first modern birds in the Cretaceous (the earliest birds first emerged during the Jurassic Period). During this period, most birds were not bigger than a modern crow. They had claws on their wings and modern beaks. One of the earliest known birds from this period, *Confuciusornis* (left, pronounced: kon-FOO-see-OR-niss), was discovered in China.

By the late Cretaceous Period, mosasaurs were the dominant marine predator. The first mosasaur fossil was discovered in a limestone quarry in the Netherlands in 1764 (this is before the 1776 Declaration of Independence in America). The fossil only consisted of a portion of the skull. At first, early scientists believed it belonged to an ancient sperm whale or crocodile. Paleontology was just emerging as a credible scientific study in the mid-1700s. (Please note that while sharks did exist at the same time as mosasaurs, the modern Great White Shark, shown in the picture to the left, did not.)



Mosasaurs evolved from small, semi-aquatic lizards. There are two modern, living animals closely related to mosasaurs. The animal most closely related is a monitor lizard, such as a Komodo dragon. However, most school children do not know what a Komodo looks like. Almost all students will recognize the mosasaur's next closest modern relative: the snake. In our tours, we typically just talk about the snake.

Both snakes and mosasaurs have a similarly constructed mandible (lower jaw bone) and a set of unique teeth. If you touch your chin, you will feel that your mandible is a single, solid bone. A snake mandible is made of two bones that are not fused together in the front at the chin. Rather, the two pieces are connected by an elastic ligament that can expand and contract. Snakes are able to open their mouths down, like a human, and then separate the two sides of the lower jaw outward. This is illustrated in the picture to the right. By opening its jaw in two directions, a snake can eat prey many times larger than its head. Mosasaur fossils have a similar construction—the lower jaw is not fused at the front. This indicates that a mosasaur's jaw functioned in the same manner as the snake and it could also eat animals much bigger than its head.