**Myth vs. Fact Essay:**

**The Adult Handbook to Dinosaurs**

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What would you do if a forty-foot, 6-ton T. rex was hunting you? Stand extremely still? Not move a muscle? Everyone knows they can't see you when you aren't moving, right? Wrong.

The T. rex actually had excellent eyesight, better than most modern birds of prey. This is one of the many myths surrounding dinosaurs, most of which stem from the hit film *Jurassic Park* by Steven Spielberg, who crafted an awesome, but totally fake, tale about these prehistoric creatures. These widespread myths include the very name "dinosaur," their strictly lizard-like appearances, and their solely tropical habitats. Additionally, there is the idea that every dinosaur lived at the same time, their mass extinction, and the belief that every creature got wiped out 66 million years ago. This essay debunks common dinosaur myths and explores the scientific truths behind these fascinating creatures.

You might find it surprising when you realize that the term "dinosaur" doesn't just mean every creature in the Mesozoic Era. The term "dinosaur" comes from a paleontologist named Richard Owen, who in 1824 proposed "Dinosauria," or in Latin, "The Terrible Lizard" ("Dinosaur, N. Meanings, Etymology and More," 2023). But dinosaurs are not actually the lizards we know now. They are a specific type of prehistoric reptile. the dinosaur is classified as a subgroup within a larger group of reptiles called archosaurs (Rae & Hendry, n.d.). What makes dinosaurs distinct within this group is their hip structure and the modification of their lower vertebrates into a structure called the sacrum, to help with joint connection (Davis, 2019b). The archosaur group also includes many other prehistoric reptiles that people commonly get confused with dinosaurs. For example, the plesiosaur is a commonly misnamed marine reptile who is also within that larger group (The Editors of *Encyclopedia Britannica*, 2015). There are even reptiles that get misnamed but are not within the archosaur group, the most common being Dimetrodon—a carnivorous creature that is a genus of the Sphenacodontid synapsid tetrapod. Looking at the photo below, you can tell why people confuse it with a dinosaur. The Dimetrodon had a similar scaly skin texture and a long protruding spine

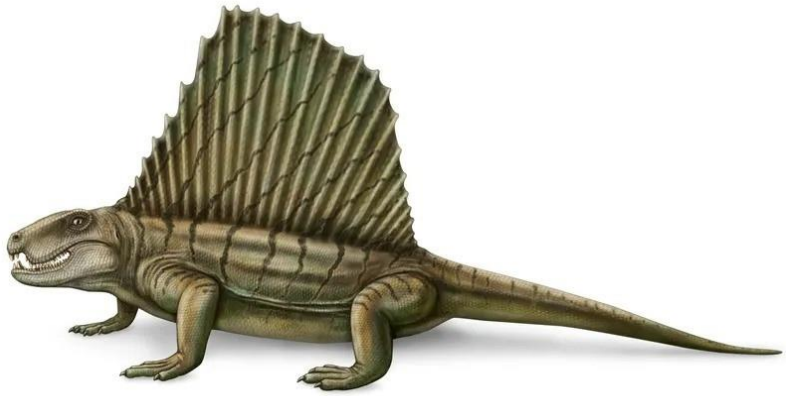

Figure 1- Dimetrodon

Nonetheless, the aspect of this creature that solidifies its standing as a Dimetrodon and not a dinosaur is its hip and bone structure. The Dimetrodon had a sprawling stance, like a crocodile, while dinosaurs had an upright stance to support their body weight (Hendry, n.d.). As you can tell, there is so much information and difference between these creatures, it honestly wouldn't be fair to call them all dinosaurs. That would be like calling a fish a dolphin or calling a bee a hornet.

As if sorting out which creatures were truly dinosaurs isn't tricky enough, the appearance of dinosaurs is another area where myths take over. When people think of dinosaurs, they usually think of the stereotypical *Jurassic Park* dinosaur: giant, bloodthirsty, scaly, big teeth, and horns. While that is true with a lot of the more well-known species, paleontology shows that there were a variety of different appearances throughout the Mesozoic Era. To put this into modern terms, dinosaurs were kind of like mammals. There are a variety of different appearances; spanning from humans to whales. Dinosaurs came in every shape and size; big, small, towering, tiny, feathered, and scaly. Different dinosaurs had different diets, which means different anatomy. The T. rex, for instance, is a carnivore, so by definition it needs sharp and long teeth to rip up meat.

On the contrary, the hadrosaurs—duck-billed dinosaurs—had almost a wall of teeth, with four sections that were used to grind up tough plants (Dinosaur Dentistry, Part 3: Steak Knives and Dental Batteries, 2018). Teeth weren't the only thing different throughout the millions of species. Skin texture and size were different as well. According to the Natural History Museum (n.d.) the Giraffatitan was a giant herbivore with scaly skin. It was around 23.0 meters long and had a neck around 8.5 meters. The Microraptor, on the other hand, was the smallest dinosaur recorded. The Microraptor was around a foot tall and about two pounds on average. This creature also had something that contradicts many people's narrative of dinosaurs—feathers. This small dinosaur had feathers on both its front limbs and back limbs for gliding through the air. These feathers are believed to be iridescent, much like a peacock (Hilfrank, 2014).

Figure 2- Microraptor

Though it is true that some dinosaurs looked like the ones you see on the big screen with a love for blood and bone, there was a lot more variety than some people realize.

Another common misconception is that all dinosaur species coexisted. In reality, many were separated by millions of years and lived in distinct geographic regions. There are three time periods in which the dinosaurs were alive: the Triassic Period, which in the early years consisted of “mammal-like reptiles" and an abundance of plants (Davis, 2019). This period is also unique because it is the time in which Pangea thrived. This means that instead of the seven continents we know now, it was one big supercontinent. It wasn't until the late Triassic Period that the dominance shifted from the “mammal-like reptiles” to the archosaurs. The dinosaurs in this time would have been smaller than the ones we think of today. For example, one of the biggest dinosaurs in the late Triassic Period was the Riojasaurus, and it was only an average of 5.2 meters in length (Riojasaurus | Natural History Museum, n.d.).

The Jurassic Period was when Pangea started to split in two, and the climate shifted into a more tropical feeling. This period is when you start to see some of the big well-known dinosaurs. Within this period, you can find the Stegosaurus with huge spikes on its spine and tail, or the Brachiosaurus, who stands up to 16 meters with a giraffe-like neck (Jurassic Period, 2015). In this period the ocean was also becoming more diverse. And finally, the Cretaceous Period. This is when the continents were just about where they are today, and the presence of dinosaurs was thriving. In early Cretaceous, the types of dinosaurs included species like ceratopsids and iguanodontians, which “were some of the first dinosaurs to evolve complex chewing mechanisms rather than just gulping down food like other reptiles” (Osterloff, n.d.).

The Late Cretaceous Period was where the most famous dinosaur species came into play—dinosaurs like the T. rex or the Velociraptor. This whole span of time is called the

Mesozoic Era, and it holds some of the greatest creatures to ever walk on the Earth. To me, it is crazy to think that some of these famous and well-known species of dinosaurs never even knew each other. For example, Brachiosaurus and the T. rex had 83 million years between them. To put that in perspective, humans have been alive for 0.0036% of that difference (Osterloff, n.d.). Below you can find a visual representation of life on earth as we know it. This visual is called the Geological Time Spiral.

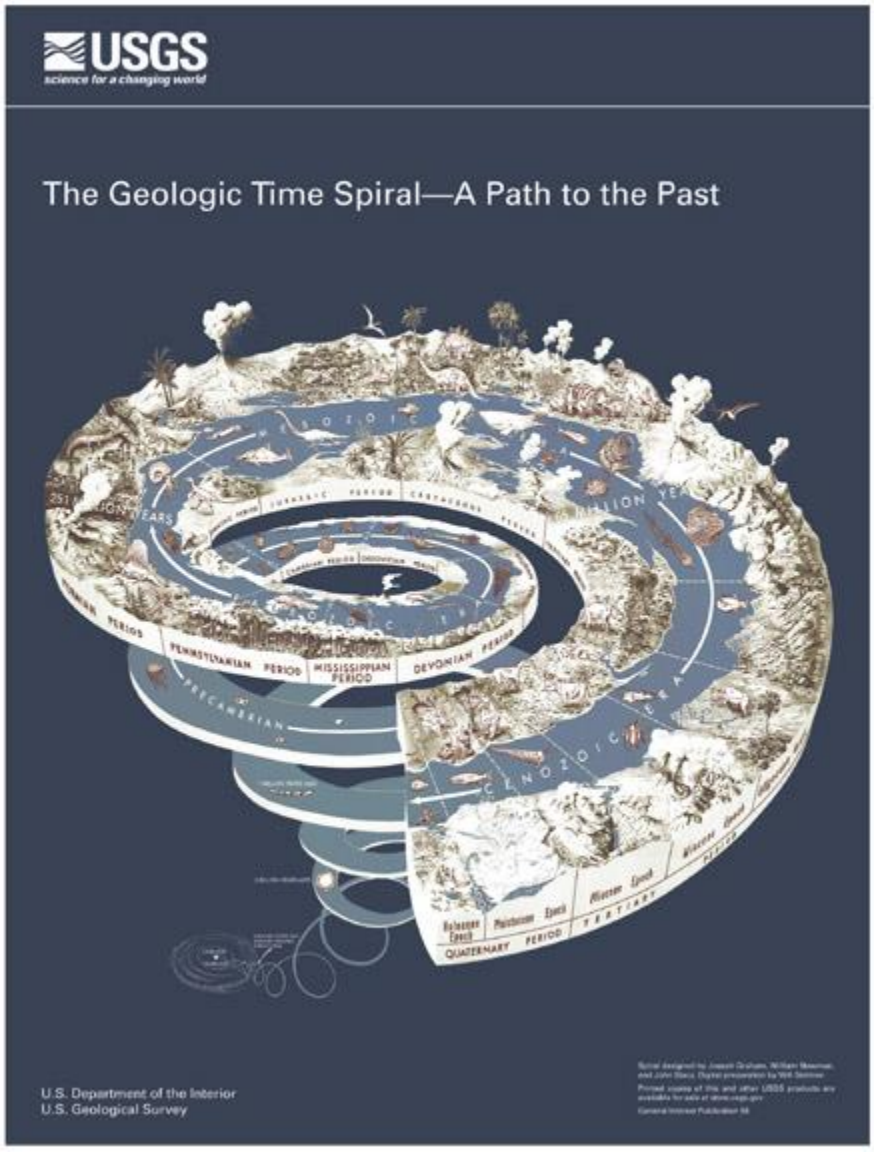


Figure 3- Geological Time Spiral

Okay, so people are correct to think that the final extinction event that destroyed dinosaurs was an asteroid, but there is still so much mystery intertwined in this wipe of species. Technically, it is called a meteorite because it made it through Earth's atmosphere; however, that is not significant to the point of this paragraph. This meteorite mass extinction is a theory that is widely accepted by scientists. This theory consists of the fact that within the Chicxulub crater, there was a discovery of iridium metal, which occurs in meteorites (Osterloff, 2020). When this meteorite hit the Earth, the surrounding area was destroyed, including the flora and fauna. The impact of the hit also caused an immense amount of soot to shoot up into the atmosphere, causing a near total block of the sun. This negatively affected plant growth, which in turn negatively affected the entire ecosystem. Another point to this crash would have been the change in living conditions. In addition to the soot in the air, the meteorite also sent a heatwave, which affected the climate species are adapted to. This is relatively all the information scientists have about this abrupt extinction. They believe there might be more that went into this tragic event, but it is an ongoing mystery (Osterloff, 2020).

Though most dinosaurs went extinct, there are still relatives of these great creatures. These relatives are birds. For years, scientists have been looking at the similarity of birds to dinosaurs. For example, in the 1960s they were making big strides: "Soon scientists were gathering other intriguing physical evidence, finding that fused clavicles were common in dinosaurs after all. Deinonychus and Velociraptor bones had air pockets and flexible wrist joints. Dinosaur traits were looking more birdlike all the time" (Stone, 2010). But at this time, they weren't finding a big similarity—feathers. However, with the discovery of feathers from a small fossil found in China, this all changed. This fossil was of a species called *Sinosauropteryx*, and it was present around 120 million years ago (Stone, 2010).

Figure 4- Sinosauropteryx fossil

This cemented the idea that birds are descendants of dinosaurs. However, there were many feathered dinosaur groups that died off. The group that modern birds evolved from is called theropods. In fact, the first theropod species that is considered the “first bird” is the *Archaeopteryx* (Pavid, 2016). The evolution into the small birds we know today took millions of years, but it is remarkable. But birds aren’t the only modern animals with dinosaur ancestry. Crocodilians, like crocodiles and alligators, also trace back to the archosaur family, making them close relatives of dinosaurs. (Unravelling the Surprisingly Complex History of Crocodiles, n.d.)

So, the next time you see a pigeon, a hawk, or even a crocodile, you're looking at creatures that share deep evolutionary ties with “The Terrible Lizard” of the past.

It is extremely easy to believe these myths: dinosaurs all went extinct, they all were terrifying and bloodthirsty, they all knew each other, we know everything about how they died, and everything in the past was called a dinosaur. I mean, why wouldn't you? They paint a cool picture, but that picture is wrong, and it is important to know the truth about history. However, in no way are people lesser if they knew of these myths or if they did not. Honestly, I learned half of this information while drafting this essay. So, I hope that you have learned some awesome and nerdy knowledge about what most people think is a kid's subject—dinosaurs. They are a critical part of understanding earth's evolutionary history and the environmental changes that shaped life as we know it. And, I hope, very dearly, that you never have to face that 40-foot, 6-ton T. rex that is staring straight at you.

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