Dinosaur/Sauropods
Order Saurischia, Suborder Sauropodomorpha, Family Diplodocidae
Sauropods are one of the largest creatures to ever roam the earth, thriving for 150 million years. Quintessential icons of the big and prehistoric, little is understood about this group of dinosaurs, including their ontogeny, functional morphology and sexual dimorphism.

Five diplodocid dinosaur fossils were discovered at the Dana Quarry, in Wyoming USA. This site has produced some of the most important dinosaur discoveries made in North America. After the discovery of the Dana Quarry site, the Dinosauria International, LLC team organised an excavation of documentation of the site in 2006. This revealed a Morrison locality, which preserved a large number of multi-species dinosaur death assemblages. The Morrison Formation is a sedimentary rock unit, commonly found in the Western States. The five diplodocid fossils found were almost complete.

The fossils found at the Dana Quarry are much older than most other Morrison localities, possibly dating to about 156 million years ago. The site holds both plant and animal fossils, which could help with the understanding of Morrison dinosaur paleoecology, biostratigraphy and paleobiology.

Three of these fossils were offered to be sold, where a phone call from Germany offered them to the Lee Kong Chian Natural History Museum in April 2011. They had heard about the museum as very few museums were being built. These three fossils, named Twinky, Prince and Apollonia, were at least 80% complete. This level of completeness and scale are very rare. They made an offer of $12 million for the three specimens, giving the museum two months to raise the funds.

Initially, the museum only managed to raise around $750,000, and did not ask for an extension as they did not want to commit. Dinosauria ended up offering the museum an additional two months. When asked why they wanted to sell the dinosaurs to the museum, as they could have easily sold them off to a private collector through the auction houses more quickly and for more profit, they claimed it was because it was the only new museum that is public and open to scientists studying these species. The principals of Dinosauria are paleontologists and valued research access.

This led to the start of the ‘dinosaur campaign’, after already recently raising $46 million for the museum. They did not make much headway initially, but they eventually raised over $9 million dollars to purchase, deliver and set up the dinosaurs and the associated displays in the gallery. Although not a part of Singapore’s natural history, dinosaurs lived over 65 million years ago, before the Singapore and Southeast Asia we know today existed. Land masses were configured differently, and maybe dinosaurs are everyone’s heritage.

The three diplodocid sauropods in the museum were found together. Apollonia and Prince were adults measuring 24 m and 27 m from head to tail respectively, while Twinky is likely a sub-adult, measuring 12 m from head to tail.

Apollonia is the first skeleton to be found with an intact skull preserved and articulated to a near complete series of cervical vertebrae. The skeleton is 80 to 90% complete.

Prince was discovered in 2010. The skeleton is complete with a well-preserved skull and lower jaws.

Twinky was discovered in 2009 and is noteworthy due to its small size. It is the first complete specimen belonging to an adolescent individual, and the only one possessing a nearly complete axial skeleton.

There have been many speculations on the life habits of sauropods, including as solitary aquatic reptiles or even herding animals with complex behaviour occupying open dry savannah environments. Diplodocids may be highly evolved animals well suited for extensive overland travel but preferring to live and feed in watery shore environments (similar to today's wading birds).

Microcephalomorphic condition of the skull is present, where their heads may have the proportionately the smallest known skulls. Their skulls may hold a brain that is about the size of a human's thumb.

These species do not chew their feed, having a reduced number of cheek teeth, and weak jaws. Rostral bill may be present, which may have functioned for filter feeding by dabbling.

Long necks present in sauropods are likely to provide the animal with better reach, such as for feeding from tall treetops, or lower down. They could look about freely at the end of their long rigid neck, similar to an ostrich.

Long whiplash tails of diplodocid sauropods are likely intended for extended reach as seen by the elongation of vertebral centra and the unique development of supernumerary caudal elements. This is used for counterbalance but may be used for other purposes as well. For instance, it may be used to strike and slash flesh with bone crushing power and the ability to hit a target with deadly accuracy.

Diplodocids had strongly constructed hips, hind legs and tail. Thus, they may have performed rearing, where they used their hind legs and tails as anchors for the body in a tripod position.

The presence of claws suggests that they may have used them for digging the ground for nesting.

Sexual dimorphism in dinosaurs is poorly understood. Hypertrophic condition of cervical ribs expands the width and depth of the neck skeleton. This could be used for courtship where individuals bear down on the back of the neck of females to subdue and hold them steady during copulation. This could have also been used for courtship displays and male rivalry.