

VL: Mass Measurement Assignment

This Virtual Lab has TWO PARTS:

1. Virtual Lab Google Form
2. Analysis Question

Part 1: Complete the VL: Mass Measurement Google Form:

https://docs.google.com/forms/d/e/1FAIpQLSeYzM0U39Ch7G8DzqtHcGWlzKwalPYmrPC7BiFzPJ-uxtpHA/viewform?usp=sf_link

DO NOT attempt the Analysis Question without doing the Virtual Lab!

DO NOT copy from the Internet

USE Good Writing Strategies!

Part 2: Analysis Question

Explain the FOUR step process of using a triple arm balance to measure mass.

(HINT: you only did ONE of the FOUR – the first three steps were completed for you in the lab's questions.)

ANSWER:

Capitalization

Punctuation

Complete Sentences

1. start all arms of the balance at zero
2. place the object on the balance
3. adjust each arm until the balance balances
4. add the numbers from each arm

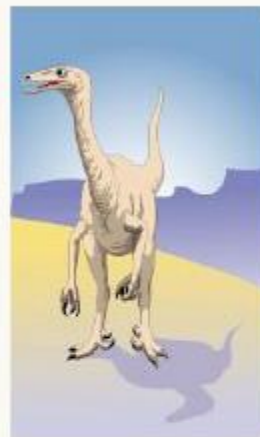
DINOSAUR GUIDE

Coelophysis

Coelophysis was one of the earliest-known dinosaurs and lived during the late Triassic period, about 210 million years ago. It lived in a seasonally dry, desert-like environment.

Coelophysis was a carnivore and may also have been a scavenger. It was a small dinosaur that walked on two legs and was about 3 m long. It had three clawed fingers on its hands, and a long neck. It had a pointed head with dozens of small, serrated teeth.

Fossil bonebeds of hundreds of *Coelophysis* have been found suggesting that the animals probably lived and hunted in packs.



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Coelophysis



Coelophysis is believed to have been a very fast, bipedal runner because of its slight, long-legged build and light, hollow bones. Speeds can be estimated using leg length measurements, estimated body mass, and fossilized tracks. *Coelophysis* most likely reproduced by laying eggs.



Diplodocus was a long-necked giant dinosaur, about 27 m long with an 8 m long neck, a 14 m long whip-like tail, and a row of spines running down its back. *Diplodocus* lived in the late Jurassic period, from 155 to 145 million years ago. The word "*Diplodocus*" is taken from the Greek meaning "double-beamed," and this dinosaur was so named because of its extra bony protrusions both forward and backward underneath the vertebrae.

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Diplodocus

Diplodocus had a horse-like head that was less than 60 centimeters long. The nostrils were at the top of the head. *Diplodocus* was an herbivore with peg-like blunt teeth in front of the jaws useful for stripping leaves of plants. It may have swallowed stones that remained in its stomach to help digest the leaves.



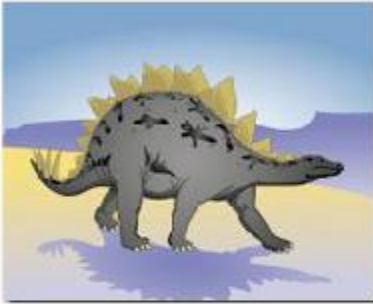
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Diplodocus had thin, fragile, ribs that helped support and protect the internal organs. These ribs were attached to the skin in the belly area. *Diplodocus*' intelligence as measured by its relative brain to body weight was among the lowest of the dinosaurs.

Fossilized tracks and other evidence indicate that *Diplodocus* walked slowly on four elephant-like legs with five-toed feet and a thumb claw on each foot. It is believed that it could hold its neck only about 5.4 m off the ground. These dinosaurs may have traveled in herds. They probably laid eggs and it is likely that they did not take care of their eggs.

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Stegosaurus



Stegosaurus lived during the late Jurassic period, about 156-140 million years ago. *Stegosaurus* was up to about 9 m long, about 3 m tall and weighed about 3100 kg. Its small brain weighed less than 100 grams, making its intelligence as measured by its brain to body weight relatively low among dinosaurs.

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Stegosaurus had triangular plates embedded in its back. They were made of bone and were probably filled with blood vessels. The function of these plates is not known, they may have been used to regulate the dinosaur's temperature. The largest of these plates was about 75 cm in diameter. For protection from predators *Stegosaurus* had spikes at the end of its flexible tail and an armor-like skin on the neck, and perhaps on some other parts of its body.

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Stegosaurus

The dinosaur's rear legs were much longer than its front legs. The front feet had five toes with hooves; the rear feet had three toes with hooves. Most likely it walked on four legs carrying its pointed and narrow head close to the ground. *Stegosaurus* was an herbivore with a toothless beak and small cheek teeth. It is still debated whether it may have been able to rear up on its hind legs to reach vegetation.

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Archaeopteryx is an animal with bird-like and dinosaur-like features. Paleontologists think that *Archaeopteryx* represents a dead-end in evolution and that another group of dinosaurs led to the modern birds. Some of *Archaeopteryx*'s dinosaur features included: teeth, lack of a horny bill, three claws on each wing, a flat breastbone, belly ribs, and a long, bony tail. Like today's birds, it had feathers, hollow bones, a wishbone and reduced fingers. Although it had feathers and could fly, it probably did not fly very well.

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Archaeopteryx

Archaeopteryx lived about 150 million years ago during the Jurassic period. It had a wingspan of about 50 cm and was about 30 cm long from beak to tail.



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Archaeopteryx

It probably weighed between 300 to 500 grams.

The first fossil found was a feather. A total of eight *Archaeopteryx* fossil specimens have been found near Solnhofen in Germany. This area was lagoon during the Jurassic Period with hardly any oxygen in the bottom water layer. This situation helped to preserve dead organisms, and increased the chance of fossil formation.

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Tyrannosaurus



Tyrannosaurus lived during the late Cretaceous period, about 85 million to 65 million years ago. It lived in a semi-tropical environment, probably in open forests. *Tyrannosaurus* was a predator and perhaps also a scavenger that walked on two powerful legs. Its prey was herbivorous dinosaurs.

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Tyrannosaurus

Tyrannosaurus was up to 12 m long, between 4 to 6 m tall and probably weighed between 5000 to 8000 kg. It had jaws with large, pointed, serrated teeth. Teeth of *T. rex* have been found that were up to 30 cm long. Adults had a variety of sizes of teeth in their jaws. As teeth were broken new ones grew in to replace them. When *T. rex* closed its mouth, the upper parts of the lower jaw's teeth fit inside the upper teeth.



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Tyrannosaurus

It had relatively small arms, each with two fingers. Each foot had three large toes, with claws. *T. rex* had a slim, stiff, pointed tail that provided balance and allowed quick turns while running. *T. rex*'s body was solidly built but its bones were hollow. Its brain dedicated relatively large area to the processing visual and olfactory (odor) information, an important ability for a predator.

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