

VELOCIRAPTOR

(vel-OSS-i-RAP-tor) “Speedy Thief”

CLASSIFICATION

Kingdom.....	Animalia
Phylum.....	Chordata
Class.....	Sauropsida
Superorder.....	Dinosauria
Order.....	Saurischia
Suborder.....	Theropoda
Family.....	Dromaeosauridae
Genus.....	<i>Velociraptor</i>
Species.....	<i>mongoliensis</i>

FOSSIL LOCATION

Asia (Mongolia, China)



SIZE

Length 1.8 m (6 ft)

WEIGHT

16-18 kg
(35-40 lbs)

DIET

Carnivore

LIFESPAN

No reliable estimates

TIME PERIOD

Velociraptor
Late Cretaceous
85.8-83.5 million years ago

Triassic Period
250 - 201 million years ago

Jurassic Period
200 - 146 million years ago

Cretaceous Period
145 - 65 million years ago



INTRODUCTION

The first *Velociraptor* fossil was discovered in 1924 in Mongolia, but it would be nearly seventy years later, in 1993, before the dinosaur would capture the imagination—and inspire the dread—of audiences around the globe with the release of the Steven Spielberg film *Jurassic Park*. In the film, *Velociraptors* feature prominently as vicious hunters that terrorize the human characters, playing a pivotal role in the plot. Its depiction by Spielberg, however, is not based on actual scientific facts about the species. For example, the *Velociraptors* that appear in *Jurassic Park* are several times larger than those found as fossils, and run at significantly higher speeds than it is thought these animals actually moved at.

CLASSIFICATION

The Linnaean system of classification was developed in the mid 1700s and classified living things according to certain shared physical characteristics. In the Linnaean system, *Velociraptor* is placed in the class sauropsida, along with all other reptiles and birds. Its order is saurischia, meaning that (unlike dinosaurs in the order ornithischia), its pubis bone, one of three bones forming the pelvis, pointed forward instead of backward. *Velociraptor* is part of the suborder theropoda, which includes all non-avian dinosaurs that, like it, had feathers. At the level of the family, it is considered a member of dromaeosauridae, which also includes dinosaurs like *Stenonychosaurus*, *Deinonychus*, and *Saurornithoides*.

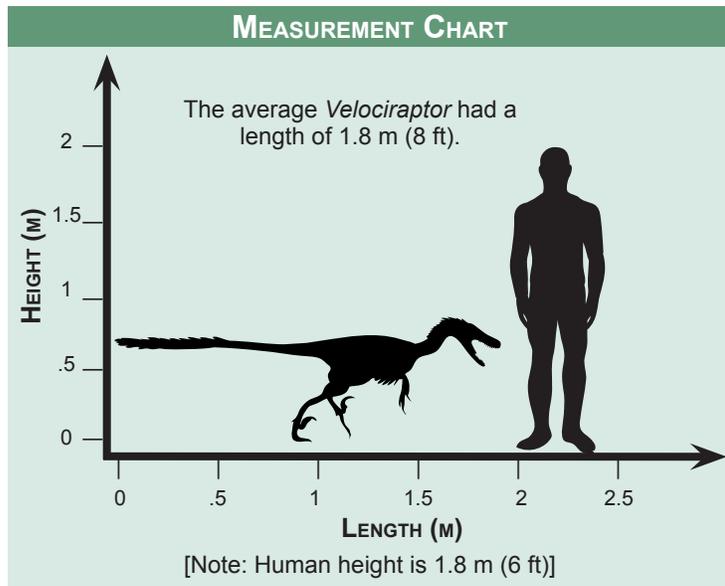
Scientists also use an alternate method of classifying species into groups, known as cladistics. In cladistics, species are classified according to the number of measurable physical characteristics they share, which determines whether or not they share a common ancestor. This helps scientists to determine whether or not to place them in the same “clade,” or group. Though cladistics analyses of *Velociraptor* may vary, it is most likely to be found grouped with such dinosaurs as

Velociraptor

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Microraptor and *Rahonavis* in a clade known as maniraptora, which comprises the Aves clade, under which birds are classified, and the dromaeosaurs clade, under which raptors are classified.

ANATOMY

Velociraptor was a relatively small, **bipedal** dinosaur that stood about the height of a small dog and may have been able to sprint after its prey at speeds reaching 44 km/h (27 mph) over short distances. Unlike many other dromaeosaurids, *Velociraptor*'s snout was long, rather than blunted, and its mouth was filled with sharp teeth—each roughly triangular in shape, with fine serrations along both edges. The dinosaur had relatively short forelimbs, stocky, muscular hind limbs, and a large, **hyperextensible**, sharp-tipped claw that curved out from the second digit of each hand and foot (a feature it shared with the other members of the family dromaeosauridae). *Velociraptor* also had a long tail stiffened by **ossified** tendons that enabled it to use its tail for balance.

The 2007 discovery of **quill knobs**, or places where feathers attach to bone, on the forearm of a *Velociraptor* indicated that the dinosaur had feathers on its forelimbs and may have had a sparse covering of feathers over its entire body. While *Velociraptor* was incapable of flight, its feathers may have helped it regulate temperature or attract mates. Prior to this discovery, scientists had believed that *Velociraptor*, like most other non-avian dinosaurs, was covered in scales of some kind.

INTELLIGENCE

Scientists use a measurement known as the **encephalization quotient (EQ)** to standardize the way they estimate and

compare the intelligence of living things. The EQ figure for an individual dinosaur species is calculated by comparing the relative size of its brain and body to similarly sized creatures, resulting in a value of up to 5.8 for dinosaurs (humans have an EQ of 7.44 and dolphins measure a 5.31). The higher the number, the bigger the brain in relation to the body, and the higher the level of intelligence.

Like other dromaeosaurids, *Velociraptor* had a relatively large brain case for its size, and was therefore probably among the most intelligent of dinosaurs. In fact, according to JA Hopson, a paleontologist from the University of Chicago who has researched the brain casts of many different extinct species, dromaeosaurids like *Velociraptor* had EQs of 5.8—the maximum figure Hopson calculated for any dinosaur. In comparison, Stegosaur and Ankylosaur, for instance, had EQs of less than 1.

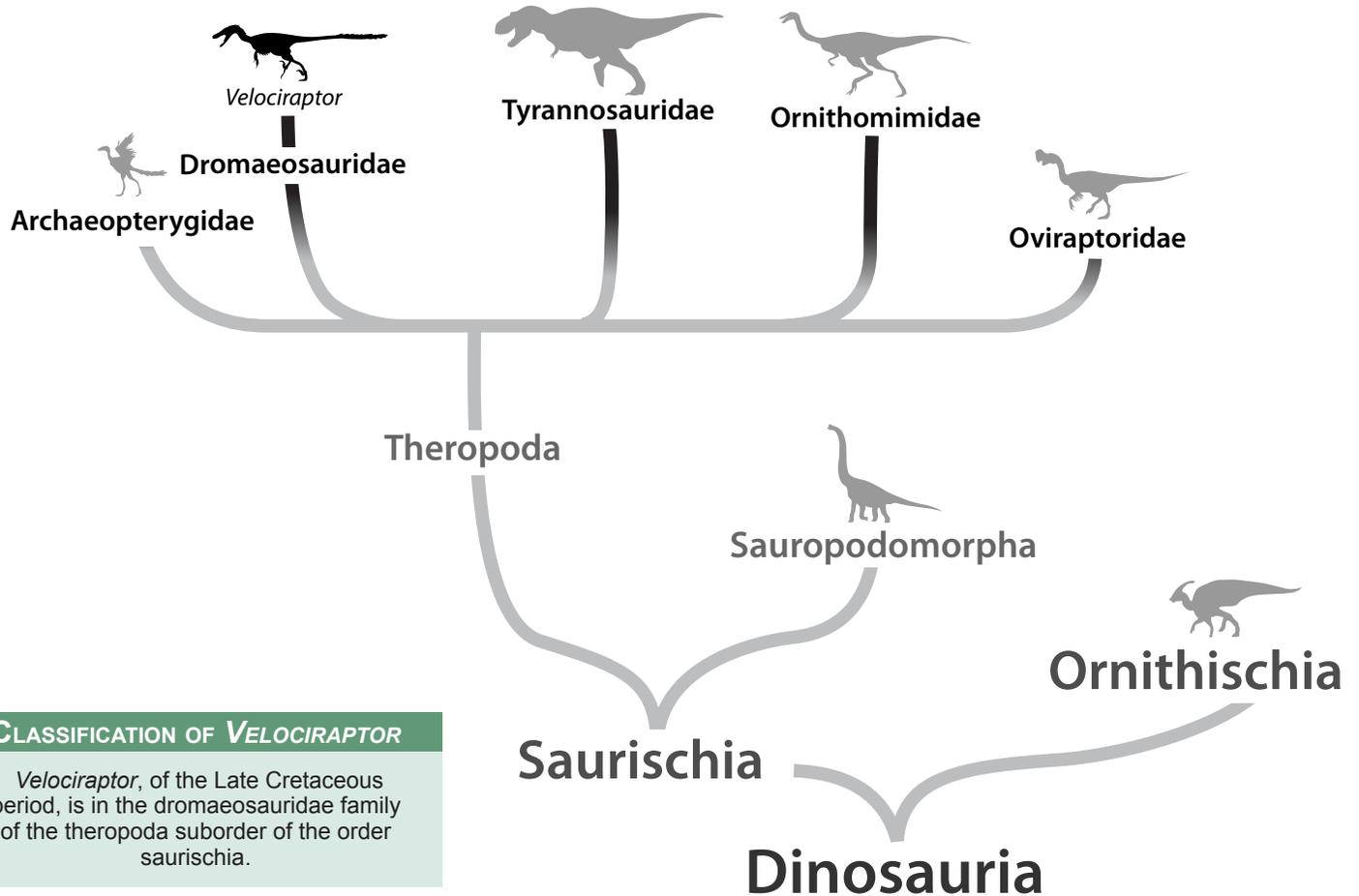
REPRODUCTION & POPULATION

Since scientists believe that *Velociraptor* shared a common ancestor with modern birds, it is not surprising that, like birds, these dinosaurs are thought to have laid their eggs in nests that remained open to the elements, then **brooded** (sat on) them to keep them warm and hatch them. Based on fossil evidence showing differences in the teeth of adult *Velociraptors* as compared to babies of the same species, paleontologists also believe that the dinosaur's diet changed over the course of its lifetime, something which may indicate the fact that young *Velociraptors*, like young birds today, relied on their parents for food.

One notable discovery has fascinated scientists for years. In a nest belonging to an *Oviraptor*, a **theropod** that lived during the same time as *Velociraptor*, researchers uncovered both *Oviraptor* eggs and the tiny skulls of two very young dinosaurs believed to be *Velociraptors*. There are several theoretical explanations for this finding, including the possibility that the young dinosaurs may have hatched from eggs that adult *Velociraptors* laid in the *Oviraptor* nest, taking advantage of the warmth and safety provided by the unknowing “surrogate parents.” (Organisms that do this are known as brood parasites, and the practice is seen in contemporary cuckoos.) The presence of the skulls could also indicate that the young *Velociraptors* had been eaten by *Oviraptors*, or vice versa.

DIET

Velociraptor was a carnivore that hunted other animals for food. Its prey is likely to have included terrestrial vertebrates, such as lizards and other small dinosaurs. One striking fossil



CLASSIFICATION OF *VELOCI RAPTOR*

Velociraptor, of the Late Cretaceous period, is in the dromaeosauridae family of the theropoda suborder of the order saurischia.

find is that of a *Velociraptor* and a *Protoceratops*, a small dinosaur that ran on four legs and had a bony frill on its neck, locked in what appears to be a deadly fight, with the *Velociraptor* grabbing the *Protoceratops* in its claws. This fossil evidence provides at least some information regarding this predator's preferred prey. In addition, fossil evidence, such as the discovery of the skulls of *Velociraptor* babies in an *Oviraptor* nest, may mean that the stolen eggs of other reptiles constituted a portion of its diet.

BEHAVIOR

In popular literature and art, *Velociraptor* is often depicted as hunting prey in small packs, as do modern wild dogs in Africa. To date, there has been no specific record of a *Velociraptor* trackway, or set of fossilized dinosaur footprints indicating group travel. But trackways made by related species, such as *Velociraptorichnus sichuanensis*, have been found, suggesting that *Velociraptor* may have also been a social dinosaur that behaved gregariously at least part of the time.

HABITAT & OTHER LIFE FORMS

Velociraptor lived in what is now Mongolia and China during the Late Cretaceous period. The globe as a whole was significantly warmer than it is now, with even the poles being mostly free of ice. The region where *Velociraptor* lived was largely arid and desert-like, covered with shifting sand dunes. Other dinosaurs that coexisted with *Velociraptor* in the same area included the small, stocky quadruped *Protoceratops*, the huge herbivore *Therizinosaurus*, which may have used its impressive claws to drag leaves closer to its mouth, and the hulking theropod *Tarbosaurus*, a smaller relative of *Tyrannosaurus Rex*. Many insects, including bees, grasshoppers, ants, and butterflies, had also appeared by this time.

RESEARCH

It was long assumed that the long, curved claws on the second digit of each of *Velociraptor*'s fore and hind limbs served



VOCABULARY

Bipedal: Able to walk upright on two legs, rather than four.

Brooded: A method of hatching eggs by sitting on them in a nest to warm them.

Encephalization Quotient (EQ): Method used to evaluate animal intelligence by comparing the ratio of an animal's brain mass to body mass to that of other organisms of similar size. The primary assumption is that higher brain/body mass ratios correlate positively with increased intelligence.

Hyperextensible: The ability to stretch or extend to a great degree from an original position.

Ossified: When a flexible substance has become rigid and inflexible, like stone.

Quill Knobs: Areas on which feathers were attached to an organism's bone with ligaments. In 2007, it was discovered that a *Velociraptor* specimen's forearm featured these knobs, which helped to resolve a long-standing dispute over whether or not the dinosaur had feathers.

Theropod: A bipedal, generally carnivorous group of dinosaurs that often have three-toed feet and air-filled bones.

as deadly tools for tearing apart its prey. But recent studies based on mechanical testing have suggested that these claws were actually ill suited for tearing and cutting, not being sharp enough to disembowel or rip thick hides. Instead, since its claws were more akin to grappling hooks, *Velociraptor* may have used them to first stab and then lock itself into its prey, preventing it from escaping. The claws may even have been strong enough to support its weight while climbing, a hypothesis that lends weight to the theory that the first birds evolved from dinosaur ancestors, such as *Microraptor* (an earlier relation of *Velociraptor*) that glided down from treetops.

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