

SCUTELLOSAURUS

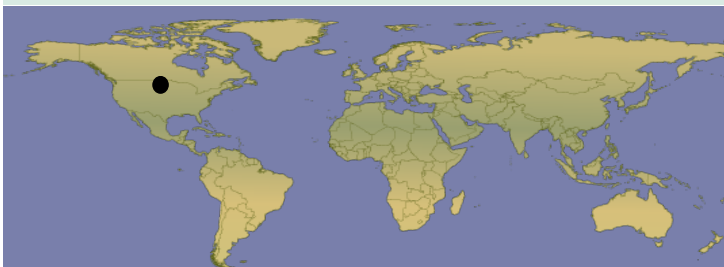
(skoo-TELL-oh-SAWR-us) “Small-Shield Lizard”

CLASSIFICATION

Kingdom.....	Animalia
Phylum.....	Chordata
Class.....	Sauropsida
Suborder.....	Dinosauria
Order.....	Ornithischia
Suborder.....	Thyreophora
Family.....	Basal
Genus.....	<i>Scutellosaurus</i>
Species.....	<i>lawleri</i>

FOSSIL LOCATION

North America



SIZE

Length 1-4 m (3-13 ft)
Height 50 cm (20 in)

WEIGHT

10 kg
(22 lbs)

DIET

Herbivore or Omnivore

LIFESPAN

Approximately
8-10 years

TIME PERIOD

Scutellosaurus
Early Jurassic
199.6-196.5 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

Scutellosaurus was a small, herbivorous dinosaur that lived in Early Jurassic North America. A **basal** ornithischian, *Scutellosaurus* was one of the earliest representatives of a large group of primitive dinosaurs that dominated during the Jurassic period (201.6–145.5 million years ago) and produced a variety of large dinosaur species.

In the Triassic period, the continents of the earth were united in a single land mass known as **Pangaea**. The dinosaurs evolved during this period and spread across the globe. North America was divided from South America and Africa by an inland sea known as the Tethys Seaway, largely dividing the fauna of the world into southern and northern components. In the Jurassic and Cretaceous periods, Pangaea split completely into two hemispheres, permitting the southern and northern dinosaur groups to further diverge.

Scutellosaurus evolved in the Triassic and represented one of the major dinosaur groups in the northern half of Pangaea. Ancestors of *Scutellosaurus* are found in the northern and southern continents, indicating that the ancestral species arrived in the area before the supercontinents split from Pangaea.

CLASSIFICATION

Scientists use two systems to organize animals into groups. Linnaean taxonomy, or “systematics,” groups organisms according to overall physical similarity, while an alternate system called “cladistics” creates groups called “clades” in an effort to reconstruct the evolutionary relationships between species.

Systematic analysis places *Scutellosaurus* into the order ornithischia based on the “bird-like” orientation of its pelvis. From there, the species is classified in the suborder thyreophora, which represents “armored” dinosaurs such as the stegosauria (which includes *Stegosaurus*) and the ankylosaurids, a large group of herbivorous dinosaurs characterized by bony dermal

Scutellosaurus

(skoo-TELL-oh-SAWR-us)
“Small-Shield Lizard”



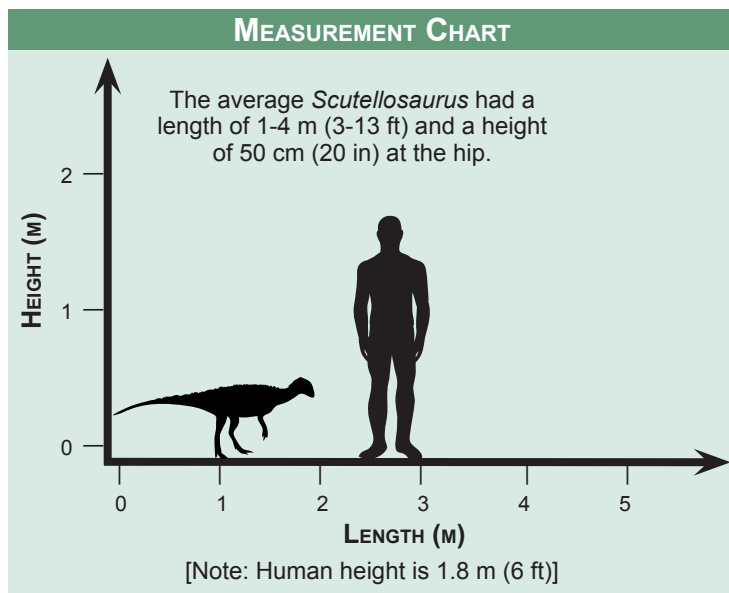
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plates, wide bodies, and angular skulls. The dinosaur is often considered the oldest known armored dinosaur, or earliest thyreophoran.

Further classification of *Scutellosaurus* is still open for debate. For example, *Scutellosaurus* is sometimes placed into the family fabrosauridae, a group of primitive ornithischian dinosaurs defined largely by their small size and features of the skull. (There are sometimes considered the basal-most group, or family, of ornithischian dinosaurs.) However, taxonomic analysis indicates that the fabrosauridae may not be a natural group and may be abandoned in future analyses. Also, the dinosaur's infraorder can be classified as incertae sedis, which is Latin for “of uncertain placement,” and a term used

to describe a taxonomic group whose broader relationships cannot be defined.

Cladistic analysis places *Scutellosaurus* in the clade thyreophora, which is divided from the ornithischia by the presence of bony formations in the skin called **osteoderms**. *Scutellosaurus* divided from the thyreophora early in the formation of the group and had primitive characteristics. Later representatives of the thyreophora had more substantial armor plating and became far larger in the Jurassic and Cretaceous. *Scutellosaurus* is also debatably classified as a more advanced member of the scelidosauridae clade, a sister group to the ankylosauria and stegosauria the members of which were less well-developed.



ANATOMY

Scutellosaurus was a small dinosaur, measuring approximately 1.2 meters (3.9 ft) long and reaching about 50 centimeters (20 inches) at the hip. Paleontologists estimate that the dinosaur weighed about 10 kilograms (22 lbs). *Scutellosaurus* is unusual for the thyreophora because it was partially **bipedal**, while later members of the group were generally obligate quadrupeds. *Scutellosaurus* had relatively strong front legs, which might have occasionally been used for walking.

Scutellosaurus had a relatively small, triangular-shaped head and unusual dentition. The animal had short cutting teeth in the front of its jaws, with sharper, pointed teeth on the sides, helping to slice through vegetation. The animal had a muscular tail that might have been useful for balance when *Scutellosaurus* reared onto its hind legs.

Scutellosaurus was covered in a rudimentary bony armor formed from numerous osteoderms, called **scutes**, especially thick along the animal's dorsal surface and around the skull. Along the animal's back were taller, triangular scutes that paleontologists have interpreted as an evolutionary stage towards the evolution of the large crests on Jurassic dinosaurs like *Stegosaurus*.

INTELLIGENCE

Paleontologist James A. Hopson used the ratio of brain to body mass, called the **encephalization quotient (EQ)**, to estimate the intelligence of several groups of dinosaurs. Hopson found that most dinosaurs fell within the range of 0.1 to 2.0 on a

scale with an upper limit set at 8.0, the value calculated for the human brain.

Hopson's research indicates that most dinosaurs were less intelligent than modern mammals living similar lifestyles. While *Scutellosaurus* was similar in size to a small dog, it was likely far less intelligent. Members of the thyreophora that evolved in the Jurassic and Cretaceous had low EQ values, less than 1.0, and were considered among the least intelligent dinosaurs.

REPRODUCTION & POPULATION

Paleontologists have not yet discovered eggs or juvenile specimens from *Scutellosaurus*, and the reproductive lifestyle of the animal remains largely a mystery. Eggs have been discovered for some later members of the thyreophora and paleontologists believe that dinosaurs like *Scutellosaurus* were also egg-laying animals.

Scutellosaurus is known from only two partial specimens and paleontologists are therefore unable to estimate population size and density. It is also uncertain whether males and females of the species were identical or whether they displayed variation in size or appearance.

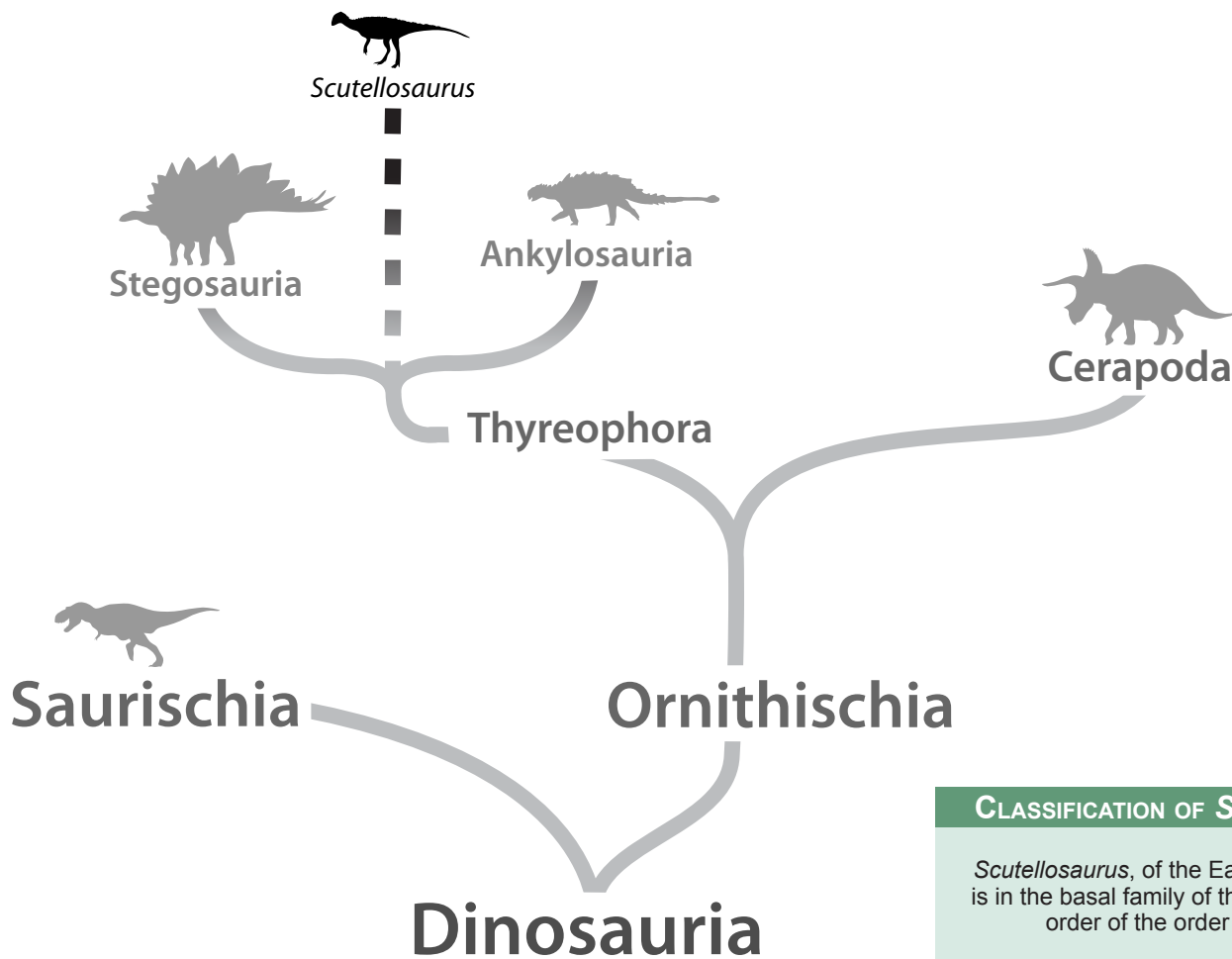
DIET

The dentition of *Scutellosaurus* establishes the species as an herbivore, with short cutting teeth similar to those found in modern herbivorous reptiles such as iguanas and tegu lizards. Vegetation in the Triassic included dozens of species of "pteridophytes," or ferns, which grew close to the ground and would have made appropriate food for the relatively small *Scutellosaurus*.

There were also primitive members of the **gymnosperm** group, including a variety of simple conifers and members of the Ginkgo group. Another major group of gymnosperms, the cycads, also began to spread during this period, many growing low to the ground and within the reach of smaller herbivores.

BEHAVIOR

The scutes of *Scutellosaurus* probably helped deter predators, but might have evolved primarily to protect the animal's skin from rough vegetation as the small dinosaur foraged in the undergrowth. *Scutellosaurus* would have been vulnerable to a variety of predatory reptiles and dinosaurs. There is no evidence to suggest social behavior in *Scutellosaurus*; many later members of the thyreophora are thought to have lived as solitary herbivores or in small family groups.



CLASSIFICATION OF SCUTELLOSAURUS

Scutellosaurus, of the Early Jurassic period, is in the basal family of the thyreophora sub-order of the order ornithischia.

HABITAT & OTHER LIFE FORMS

Late Triassic North America saw the rise of the **mesophyta**, as the climate across the Northern Hemisphere became more temperate. A variety of ferns, conifers, cycads, and ginkgos combined to create lush forests, rich tropical zones, and dry upland scrub plains. There were also a number of dicynodonts, a group of prehistoric reptiles representing the **therapsids**, which preceded the dinosaurs and formed the major segment of the terrestrial fauna until the end of the Triassic.

The pterosaurs emerged at this time and became the dominant flying reptiles throughout the Mesozoic Era. Species like *Carniadactylus* and *Peteinosaurus* were early representatives of the group in the Northern Hemisphere. Herbivorous dinosaurs in the Late Triassic included relatives of the later sauropods, like *Massospondylus*, which were the largest terrestrial animals in the Late Triassic. The early sauropods

were especially common and prolific animals, evolving into the most successful herbivores during the Jurassic.

Predatory species that may have threatened *Scutellosaurus* included early theropods like *Coelophysis* and primitive crested predators like *Dilophosaurus*. Other predators present included some of the earliest crocodile relatives, like *Protosuchus*. Another early crocodile relative, *Saltoposuchus*, was a bipedal predator representing a branch of the crocodile family that evolved similar predatory behavior to the bipedal theropod dinosaurs.

RESEARCH

The type specimen of *Scutellosaurus* was discovered in the Kayenta Formation of Arizona and later described by paleontologist Edwin Colbert in 1981. An additional specimen was uncovered in Arizona in 1970. Research into thyreophoran

cladistics was most recently undertaken by paleontologist Richard Butler, who published a review of the basal ornithischians, including species like *Scutellosaurus*, in 2007.

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VOCABULARY

Basal: The base or earliest identifiable state in a clade or lineage of organisms.

Bipedal: Characteristic of an organism that utilizes two limbs for terrestrial movement.

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.

Gymnosperms: Plants that reproduce by producing uncovered seeds, represented by the coniferous plants and the cycads.

Mesophyta: Group of plants adapted to mid-range climate and moisture levels, as opposed to groups of plants specialized to living in wet, humid, or dry climate zones.

Osteoderms: Bony deposits forming scales on the outer surface of several groups of reptiles.

Pangaea: A supercontinent that existed 250 million years ago and contained all of the earth's modern continents in a single land mass.

Scutes: The shield-like bony plates or scales that ran lengthwise along the neck, back, and tails of armor-plated dinosaurs.

Therapsids: A reptilian group that thrived during the Permian period and includes the ancestors of modern mammals, sometimes called "mammal-like" reptiles.

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