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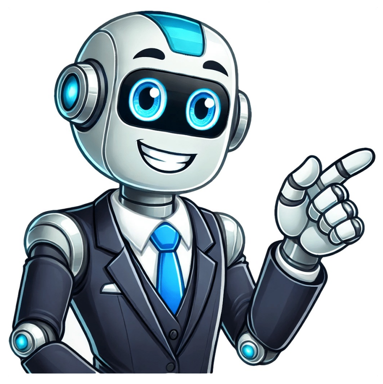

MARK GARLICK / Getty Images The vast majority of dinosaurs are diagnosed by paleontologists based not on complete skeletons, or even near-complete skeletons, but scattered, disconnected bones like skulls, vertebrae, and femurs. On the following slides, you'll discover a list of the most important dinosaur bones, and what they can tell us about the dinosaurs of which they were once a part. Oklahoma Museum of Natural History The overall shape of a dinosaur's head, as well as the size, shape and arrangement of its teeth, can tell paleontologists a lot about its diet (for example, tyrannosaurs possessed long, sharp, backward-curving teeth, the better to hang onto still-wriggling prey). Herbivorous dinosaurs also boasted bizarre skull ornamentation - the horns and frills of ceratopsians, the crests and duck-like bills of hadrosaurs, the thick crania of pachycephalosaurs--which yield valuable clues about their owners' everyday behavior. Oddly enough, the biggest dinosaurs of all--sauropods and titanosaurs--are often represented by headless fossils, since their relatively tiny noggins were easily detached from the rest of their skeletons after death. tobyfraley / Getty Images As we all know from the popular song, the head bone's connected to the neck bone--which ordinarily wouldn't cause much excitement among fossil hunters, except when the neck in question belonged to a 50-ton sauropod. The 20- or 30-foot-long necks of behemoths like Diplodocus and Mamenchisaurus were made up of a series of huge, but relatively lightweight, vertebrae, interspersed with various air pockets to lighten the load on these dinosaurs' hearts. Of course, sauropods weren't the only dinosaurs to have necks, but their disproportionate length--about on a par with the caudal vertebrae (see below) constituting these creatures' tails--put them, well, head and shoulders above others of their breed. Ivan / Getty Images About 400 million years ago, nature settled on the five-fingered, five-toed body plan for all terrestrial vertebrates (though the hands and feet of many animals, such as horses, bear only vestigial remnants of all but one or two digits). As a general rule, dinosaurs possessed anywhere from three to five functional fingers and toes at the end of each limb, an important number to keep in mind when analyzing preserved footprints and track marks. Unlike the case with human beings, these digits weren't necessarily long, flexible, or even visible: you'd have a hard time making out the five toes at the end of the average sauropod's elephant-like feet, but rest assured they were really there. In all tetrapods, the ilium, ischium, and pubis make up a structure called the pelvic girdle, the crucial part of an animal's body where its legs connect to its trunk (slightly less impressive is the pectoral girdle, or shoulder blades, which does the same for the arms). In dinosaurs, the pelvic bones are especially important because their orientation allows paleontologists to distinguish between saurischian ("lizard-hipped") and ornithischian ("bird-hipped") dinosaurs. The pubis bones of ornithischian dinosaurs point down and toward the tail, while the same bones in saurischian dinosaurs are oriented more horizontally oddly enough, it was a family of "lizard-hipped" dinosaurs, the small, feathered theropods, that wound up evolving into birds! The enormous hands of Deinocheirus (Wikimedia Commons). In most ways, the skeletons of dinosaurs aren't all that different from the skeletons of human beings (or of just about any tetrapod, for that matter). Just as people possess a single, solid upper arm bone (the humerus) and a pair of bones comprising the lower arm (the radius and ulna), the arms of dinosaurs followed the same basic plan, though of course with some major differences in scale. Because theropods had a bipedal posture, their arms were more differentiated from their legs, and thus are studied more often than the arms of herbivorous dinosaurs. For example, no one knows for sure why Tyrannosaurus Rex and Carnotaurus had such small, puny arms, though there's no shortage of theories. A typical dinosaur vertebra. Between a dinosaur's cervical vertebrae (i.e., its neck) and its caudal vertebrae (i.e., its tail) lay its dorsal vertebrae--what most people refer to as its backbone. Because they were so numerous, so big, and so resistant to "disarticulation" (i.e., falling apart after their owner died), the vertebrae comprising dinosaurs' spinal columns are among the most common bones in the fossil record, and also some of the most impressive from an aficionado's point of view. Even more tellingly, the vertebrae of some dinosaurs were topped by strange "processes" (to use the anatomical term), a good example being the vertically oriented neural spines that supported the distinctive sail of Spinosaurus. A hadrosaur femur in the field. As was the case with their arms (see slide #6), the legs of dinosaurs had the same basic structure as the legs of all vertebrates: a long, solid upper bone (the femur) connected to a pair of bones comprising the lower leg (the tibia and fibula). The twist is that dinosaur femurs are among the biggest bones excavated by paleontologists, and among the biggest bones in the history of life on earth: the specimens from some species of sauropods are about as tall as a full-grown human being. This foot-thick, five- or six-foot-long femurs imply a head-to-tail length for their owners of well over a hundred feet and weights in the range of 50 to 100 tons (and the preserved fossils themselves tip the scales at hundreds of pounds!) Ankylosaurus scutes (Getty Images). The herbivorous dinosaurs of the Mesozoic Era required some form of protection against the ravenous theropods that preyed on them. Ornithopods and hadrosaurs relied on their speed, smarts and (possibly) the protection of the herd, but stegosaurs, ankylosaurs and titanosaurs evolved often-elaborate armor plating made up out of bony plates known as osteoderms (or, synonymously, scutes). As you can imagine, these structures tend to be well-preserved in the fossil record, but they're often found beside, rather than attached to, the dinosaur in question--which is one reason we still don't know exactly how the triangular plates of Stegosaurus were arranged along its back! The furcula (wishbone) of T. Rex (Field Museum of Natural History). Not all dinosaurs possessed a full set of sterna (breastbones) and clavicles (collar bones); sauropods, for example, seem to have lacked breastbones, relying on a combination of clavicles and free-floating rib bones called "gastralia" to support their upper trunks. In any event, these bones are only rarely preserved in the fossil record, and thus aren't nearly as diagnostic as vertebrae, femurs and osteoderms. Crucially, it's believed that the clavicles of early, less advanced theropods evolved into the furculae (wishbones) of the "dino-birds," raptors and tyrannosaurs of the late Cretaceous period, an important piece of evidence confirming the descent of modern birds from dinosaurs. The tail of Stegosaurus (Wikimedia Commons). All dinosaurs possessed caudal vertebrae (i.e., tails), but as you can see by comparing an Apatosaurus to a Corythosaurus to an Ankylosaurus, there were major differences in tail length, shape, ornamentation and flexibility. Like cervical (neck) and dorsal (back) vertebrae, caudal vertebrae are well represented in the fossil record, though often it's their associated structures that say the most about the dinosaur in question. For example, the tails of many hadrosaurs and ornithomimids were stiffened by tough ligaments--an adaptation that helped to maintain their owners' balance--while the flexible, swinging tails of ankylosaurs and stegosaurs were often capped by club-like or mace-like structures.The fossil record shows that for the first 175 million years of their existence, dinosaurs took on a huge variety of forms as the environment changed and new species evolved that were suited to these new conditions. Dinosaurs that failed to adapt went extinct.But then 66 million years ago, over a relatively short time, dinosaurs disappeared completely (except for birds). Many other animals also died out, including pterosaurs, large marine reptiles, and ammonites.Although the number of dinosaur species was already declining, this suggests a sudden catastrophic event sealed their fate - something that caused unfavourable changes to the environment to occur more quickly than dinosaurs and other creatures could adapt.What caused the Cretaceous extinction?The exact nature of this catastrophic event is still open to scientific debate. Evidence suggests an asteroid impact was the main culprit. Volcanic eruptions that caused large-scale climate change may also have been involved, together with more gradual changes to Earth's climate that happened over millions of years.Whatever the causes, the huge extinction that ended the age of the dinosaur left gaps in ecosystems around the world. These were subsequently filled by the only dinosaurs to survive - birds - and mammals, both of which went on to evolve rapidly.Discover more about what caused the extinction of the dinosaurs >In this 30-minute video, Prof Paul Barrett discusses dinosaur discoveries from around the world.Join him as he shows us some of the fascinating dinosaur fossils kept behind the scenes in the Museum's collection, including a fossil skull of Proceratosaurus. This dinosaur is the earliest known member of the group that gave rise to Tyrannosaurus rex and the Museum specimen is the only known example.Baryonyx, Megalosaurus, Edmontosaurus, Giraffatitan and Stegosaurus are some of the other major species mentioned in the show, which was broadcast live on 22 June 2017.The following essay is reprinted with permission fromThe Conversation, an online publication covering the latest research.Credit for discovering the first dinosaur bones usually goes to British gentlemen for their finds between the 17th and 19th centuries in England.Robert Plot, an English natural history scholar, was the first of these todescribea dinosaur bone, in his 1676 book The Natural History of Oxfordshire. Over the next two centuries dinosaur palaeontology would be dominated by numerous British natural scientists.On supporting science journalismIf you're enjoying this article, consider supporting our award-winning journalism by subscribing. By purchasing a subscription you are helping to ensure the future of impactful stories about the discoveries and ideas shaping our world today.Butour studyshows that the history of palaeontology can be traced back much further into the past. We present evidence that the first dinosaur bone may have been discovered in Africa as early as 500 years before Plots.Were a team of scientists who study fossils in South Africa. Peering through the published and unpublished archaeological, historical and palaeontological literature, we discovered that there has been interest in fossils in Africa for as long as there have been people on the continent.This is not a surprise. Humankind originated in Africa:Homo sapienshas existed for at least300,000 years. And the continent has a great diversity of rock outcrops, such as the Kem Kem beds in Morocco, the Fayum depression in Egypt, the Rift Valley ineast Africaand the Karoo in southern Africa, containing fossils that have always been accessible to our ancestors.So it wasnt just likely that African people discovered fossils first. It was inevitable.More often than not, the first dinosaur fossils supposedly discovered by scientists were actually brought to their attention by local guides. Examples are the discovery of the gigantic dinosaursJobariaby the Tuaregs in Niger andGiraffatitanby the Mwera in Tanzania.Our paper reviews whats known about African indigenous knowledge of fossils. We list fossils that appear to have long been known at various African sites, and discuss how they might have been used and interpreted by African communities before the science of palaeontology came to be.Bolahla rock shelter in LesothoOne of the highlights of our paper is the archaeological site of Bolahla, a Later Stone Age rock shelter in Lesotho. Various dating techniques indicate that the site was occupied by the Khoesan and Basotho people from the 12th to 18th centuries (1100 to 1700 AD). The shelter itself is surrounded by hills made of consolidated sediments that were deposited under a harsh Sahara-like desert some 180 million to 200 million years ago, when the first dinosaurs roamed the Earth.This part of Lesotho is particularly well known for delivering the speciesMassospondylus carinatus, a 4 to 6 metre, long-necked and small-headed dinosaur. Fossilised bones ofMassospondylusare abundant in the area and were already so when the site was occupied by people in the Middle Ages.In 1990,archaeologistsworking at Bolahla discovered that a finger bone ofMassospondylus, a fossil phalanx, had been transported to the cave. There are no fossil skeletons sticking out the walls of the cave, so the only chance that this phalanx ended up there was that someone in the distant past picked it up and carried it to the cave. Perhaps this person did so out of simple curiosity, or to turn it into a pendant or toy, or to use it for traditional healing rituals.After heavy rains, it is not unusual that the people in the area discover the bones of extinct species that have been washed out of their mother-rock. They usually identify them as belonging to a dragon-like monster that devours people or even whole houses. In Lesotho, the Basotho call the monster Kholumolumo, while in South Africas bordering Eastern Cape province, the Xhosa refer to it as Amagongqongqo.The exact date when the phalanx was collected and transported is unfortunately lost to time. Given the current knowledge, it could have been at any time of occupation of the shelter from the 12th to 18th centuries. This leaves open the possibility that this dinosaur bone could have been collected up to 500 years prior to Robert Plots find.Early knowledge of extinct creaturesMost people knew about fossils well before the scientific era, for as far back as collective societal memories can go. In Algeria, for example, people referred to some dinosaur footprints as belonging to the legendary Roc bird. In North America, cave paintings depicting dinosaur footprints were painted by theAnasazi peoplebetween AD 1000 and 1200. Indigenous Australians identified dinosaur footprints as belonging to a legendary Emu-man. To the south, the notorious conquistador Hernan Cortes was given the fossil femur of a Mastodon by theAztecsin 1519. In Asia, Hindu people refer to ammonites (coiled fossil-sea-shells) as Shaligrams and have been worshipping them for more than 2,000 years.The fact that people in Africa have long known about fossils is evident from folklore and the archaeological record, but we still have much to learn about it. For instance, unlike the people in Europe, the Americas and Asia, indigenous African palaeontologists seem to have seldom used fossils for traditional medicine. We are still unsure whether this is a genuinely unique cultural trait shared by most African cultures or if it is due to our admittedly still incomplete knowledge.Also, some rather prominent fossil sites, such as the Moroccan Kem Kem beds and South African UnescoCradle of Humankindcaves, have still not provided robust evidence for indigenous knowledge. This is unfortunate, as fossil-related traditions could help bridge the gap between local communities and palaeontologists, which in turn could contributepreservingimportant heritage sites.By exploring indigenous palaeontology in Africa, our team is putting together pieces of a forgotten past that gives credit back to local communities. We hope it will inspire a new generation of local palaeoscientists to walk in the footsteps of these first African fossil hunters.This article was originally published on The Conversation. Read the original article.Karuika asks: Who was the first person to figure out what dinosaur bones were?From around 250 to 66 million years ago various dinosaurs roamed the Earth. Today the only dinosaurs left are birds, which are coelurosauria theropods funny enough the same sub-group Tyrannosauruses belong to. (Think about that the next time you're enjoying a McDinosaur sandwich or scrambling up some dinosaur eggs for breakfast.)Beyond their avian progeny, all that mostly remains of these once dominate creatures are fossilized bones, footprints, and poop. While many dinosaurs were actually quite small, some were comparatively massive, bringing us to the question of the hour what did people first think when they pulled huge dinosaur bones out of the earth?To begin with, it is generally thought humans have been discovering dinosaur bones about as long as we've been humaning. And it appears that at least some of the giant creatures of ancient legend likely stemmed from the discovery of dinosaur bones and fossils, and the subsequent attempts of ancient peoples to explain what they were.For example, 4th century BC Chinese historian Chang Qu reported the discovery of massive "dragon bones" in the region of Wuchen. At the time and indeed for many centuries after (including some still today), the Chinese felt that these bones had potent healing powers, resulting in many of them being ground down to be drunk in a special elixirs.As for the exact medicinal purposes, in the 2nd century AD Shennong Bencaojing, it states,Dragon bone mainly treats heart and abdominal demonic influx, spiritual miasma, and old ghosts; it also treats cough and counterflow of qi, diarrhea and dysentery with pus and blood, vaginal discharge, hardness and binding in the abdomen, and fright epilepsy in children. Dragon teeth mainly treats epilepsy, madness, manic running about, binding qi below the heart, inability to catch one's breath, and various kinds of spasms. It kills spiritual disrupters. Protracted taking may make the body light, enable one to communicate with the spirit light, and lengthen one's life span.While fossilized bones may not actually make such an effective cure-all, all things considered, the classic depictions of dragons and our modern understanding of what certain dinosaurs looked like are actually in the ballpark of accurate.Moving over to the ancient Greeks, they are also believed to have stumbled across massive dinosaur bones and similarly assumed they came from long-dead giant creatures, in some cases seeming to think they came from giant human-like creatures.Moving up to that better documented history, in the 16th through 19th centuries, the idea that the Earth was only about six thousand years old was firmly entrenched in the Western world, leading to these fossils creating a major puzzle for the scientists studying them. Even Meriwether Lewis of the famed Lewis and Clark expedition found a dinosaur bone in Billings Montana, but in his case, he decided it must have come from a massive fish, which was a common way they were explained away given that no creatures that then walked the earth seemed to match up.The various ideas thrown around around during these centuries were described by Robert Plot in his 1677Natural History of Oxfordshire:[are] the Stones we find in the Forms of Shell-fish, be Lapides sui generis [fossils], naturally produced by some extraordinary plastic virtue, latent in the Earth or Quarries where they are found? Or, [do] they rather owe their Form and Figuration to the Shells of the Fishes they represent, brought to the places where they are now found by a Deluge, Earth-quake, or some other such means, and there being filled with Mud, Clay, and petrifying Juices, have in tract of time been turned into Stones, as we now find them, still retaining the same Shape in the whole, with the same Lineations, Sutures, Eminencies, Cavities, Orifices, Points, that they had whilst they were Shells?Plot goes on to explain the idea behind the "plastic virtue" hypothesis was that the fossils were some form of salt crystals that had by some unknown process formed and grown in the ground and just happened to resemble bones.However, Plot argues against this then popular notion stating,Come we next to such [stones] as concern the Members of the Body: Amongst which, I have one that has exactly the Figure of the lowermost part of the Thigh-Bone of a Man or at least of some other Animala little above the Sinus, where it seems to have been broken off, shewing the marrow within of a shining Spar-like Substance of its true Colour and Figure, in the hollow of the BoneAfter comparing the bone to an elephant's, he decided it could not have come from one of them. He instead concluded,It remains, that (notwithstanding their extravagant Magnitude) they must have been the bones of Men or Women: Nor doth any thing hinder but they may have been so, provided it be clearly made out, that there have been Men and Women of proportionable Stature in all Ages of the World, down even to our own DaysThus, much like is thought to have happened with certain ancient peoples, he decided some of these bones must have come from giant humans of the past. During Plot's era, the Bible's mention of such giants was often put put forth as evidence, such as inNumberswhere it states,The land that we have gone through as spies is a land that devours its inhabitants; and all the people that we saw in it are of great size. There we saw the Nephilim and to ourselves we seemed like grasshoppers, and so we seemed to them.Though the bone Plot was describing has since been lost to history, he left detailed drawings, from which it's thought to have come from the lower part of the femur of a Megalosaurus (literally, Great Lizard).But before it was called the Megalosaurus, it had a rather more humorous name. You see, in 1763 a physician called Richard Brookes studying Plot's drawings dubbed it "Scrotum Humanum" because he thought it looked like a set of petrified testicles. (To be clear, Brookes knew it wasn't a fossil of a giant scrotum, but nevertheless decided to name it thus because apparently men of all eras of human history can't help but make genital jokes at every opportunity.)While hilarious, in the 20th century, this posed a problem for the International Commission for Zoological Nomenclature when it eventually came time to formally classify the Megalosaurus as such. The problem was, of course, that Brookes had named it first.Eventually the ICZN decided that since nobody after Brookes had called it Scrotum Humanum, even though he was the first to name it, that name could safely be deemed invalid. Thus Megalosaurus won out, which is unfortunate because discussion of the rather large Scrotum Humanum would have provided great companion jokes to ones about Uranus in science classes the world over.Moving swiftly on, humanity continued to have little clear idea of what dinosaurs were until William Buckland's work on the aforementioned Megalosaurus in 1824.As for the word "dinosaur" itself, this wouldn't be coined until 1842 when British scientist Sir Richard Owen noted that the few dinosaur fossils that had been scientifically studied at that point all shared several characteristics. For the curious, those species were the Megalosaurus, Hylaeosaurus and Iguanodon. He further concluded that the fossils could not have come from any creature that currently roamed the Earth and thus came up with a new name dinosaur, meaning "terrible/powerful/wondrous lizards".Of course, it should be noted that despite being knighted for his life's work in 1883, Owen was renowned for stealing other people's ideas and calling them his own, in at least one case even after having previously ridiculed the person he stole the ideas from paleontologist Gideon Mantell. In several instances, Owen would attempt to take credit for some of Mantell's pioneering work on the Iguanodon, while downplaying Mantell's contributions in the process.To add insult to injury, it is speculated that the much more distinguished Owen actively worked to stop some of Mantell's work and papers from getting published.To further illustrate Owen's character and rivalry with Mantell, after near financial ruin in 1838, his wife leaving him in 1839, and his daughter dying in 1840, Mantell would become crippled after a fall from a carriage on October 11, 1841. Previous to the accident, he had frequently suffered from leg and back pain, but the source of it was dismissed as likely due to the long hours of work he put in and the like. Things got worse when a coach he was on crashed, shortly before which Mantell leapt from it. In the aftermath, his former pain became extreme and he ceased to be able to use his legs properly. As he writes, "I cannot stoop, or use any exertion without producing loss of sensation and power in the limbs and could I choose my destiny, I would gladly leave this weary pilgrimage." He later laments in his journal, "my long probation of suffering will be terminated by a painful and lingering death."What does any of that have to do with Owen? To add insult to injury, after Mantell died from an opium overdose taken to help relieve some of his constant and extreme pain, several obituaries were published of Mantell, all glowing except oneThis one was anonymously written, though analyses of the writing style and general tone left few among the local scientific community with any doubt of who had written it.In it, Owen starts off praising Mantell, stating, "On Wednesday evening last, at the age of about 63 or 64, died the renowned geologist, Gideon Algernon Mantell" It goes on to note how Mantell's memoir on the Iguanodon saw him the recipient of the prestigious Royal Medal. Of course, later in the article, Owen claims Mantell's work for which he won that medal was actually stolen from others, including himself:The history of the fossil reptile for the discovery of which Dr. Mantell's name will be longest recollected in science, is a remarkable instance of this. Few who have become acquainted with the Iguanodon, by the perusal of the Medals of Creation would suspect that to Covier we owe the first recognition of its reptilian character, to Clift the first perception of the resemblance of its teeth to those of the Iguano, to Conybear its name, and to Owen its true affinities among reptiles, and the correction of the error respecting its build and alleged hornThe article then goes on to outline Dr. Mantell's supposed various failings as a scientist such as his "reluctance to the revelation of a truth when it dispossessed him of a pretty illustration", as well as accusing him of once again stealing people's work:To touch lightly on other weaknesses of this enthusiastic diffuser of geological knowledge we must also notice that a consciousness of the intrinsic want of exact scientific, and especially anatomical, knowledge, which compelled him privately to have recourse to those possessing it produced extreme susceptibility of any doubt expressed of the accuracy or originality of that which he advanced; and in his popular summaries of geological facts, he was too apt to forget the sources of information which he had acknowledge in his original memoirs.It finally concludes as it started on a compliment, "Dr. Mantell has, however, done much after his kind for the advancement of geology, and certainly more than any man living to bring it into attractive popular notice."It's commonly stated from here that, out of spite, Owen also had a piece of Mantell's deformed spine pickled and put on a shelf in the Hunterian Museum in London where Owen was the curator. However, while this was done, the examination and study of his spine was done at the behest of Mantell himself.Thus, an autopsy was performed and an examination of Mantell's spine showed he had a rather severe and, at least at the time, peculiar case of scoliosis. As to what was so interesting about this case, one of the physicians involved, Dr. William Adams, states, it was discovered "that the severest degree of deformity of the spine may exist internally, without the usual indications in respect of the deviation of the spinous processes externally."In other words, in other such cases, it was clear the spine was not straight from visual observation of the person's back where a curve could be observed. Mantell's spine, however, exhibited severe scoliosis, but in such a way that upon external examination methods of the day where the person was lying down or standing up, it otherwise appeared straight.To Adam's knowledge, such a thing had never been observed before, but if Mantell had this particular brand of scoliosis, surely many others did as well. But how to detect it. Mulling over the problem inspired Dr. Adams to come up with a method to make such a deformity visible with external examination, thus giving the world the Adam's forward bend test which many a school student even today has no doubt recollections of being subjected to periodically.Going back to Owen, as to why he seems to have hated Mantell so much, this isn't fully clear, though it may have simply been Mantell's work sometimes resulted in showing Owen's to be incorrect in various assumptions, jealousy of a scientist he deemed inferior to himself, or it could just be that Owen was a bit of a dick. As noted by famed biologist Thomas Henry Huxley, "[I]t is astonishing with what an intense feeling of hatred Owen is regarded by the majority of his contemporaries, with Mantell as arch-hater. The truth is, [Owen] is the superior of most, and does not conceal that he knows it, and it must be confessed that he does some very ill-natured tricks now and then."Of course, if you steal other people's work long enough, eventually you'll get caught, especially when you're one of the world's leading scientists in your field. Owen's misstep occurred when he was awarded the prestigious Royal Medal from the Royal Society for his supposedly pioneering discovery and analyses of belemnites, which he called the Belemnites owenii, after himself and gave no credit to anyone else for the ideas in the paper. It turns out, however, four years previous he'd attended a Geological Society get together in which an amateur scientist by the name of Chaning Pearce gave a lecture and published a paper on that very same creatureWhile Owen was allowed to keep his medal even after it was revealed he'd stolen the work of Pearce, the rumors that he'd similarly "borrowed" other ideas without credit and this subsequent proof resulted in the loss of much of his former academic prestige. Things didn't improve over the following years and Owen was eventually given the boot from the Royal Society in 1862 despite his long and rather distinguished career.While he would never again do any scientific work of significance, his post plagiarist career did prove to be a huge boon for those who enjoy museums. You see, up until this point, museums were not places readily open to the public, and to get access, you usually needed to be an academic. They were places for research, not for random plebeians to gawk at things.After losing any shred of respect from his peers, he eventually devoted his energies into his role as the superintendent of the natural history department of the British Museum. Among other things, as superintendent, he pushed for and helped develop London's now famed Natural History Museum, London. He also instituted a number of changes such as encouraging the general public to come visit the museum at their leisure, devoted the majority of the displays for public use, had labels and descriptions added below each display explaining what each was of so anybody, not just the educated, could understand what they were looking at, etc. Many among the scientific community fought against these changes, but he did it anyway, giving us the modern idea of a museum in the process.In any event, after Owen, Mantell's, and their contemporaries' work finally revealed these long extinct creatures for what they were, interest in dinosaurs exploded resulting in what has come to be known as the "Bone Wars" between rival paleontologists in the 1890s which got so heated, some paleontologists literally resorted to dynamiting mines to beat their rivals in discoveries.The most famous such rivals were Othniel Marsh of the Peabody Museum of Natural History at Yale and Edward Cope of the Academy of Natural Sciences of Philadelphia.While the pair started out friendly, even choosing to name species after one another, they eventually became bitter enemies, and when they weren't doing everything in their power to find dinosaur bones as fast as possible, they were writing and giving talks insulting one another's work, attempting to get each other's funding canceled, stealing discoveries from one another or, when not possible, trying to destroy the other's work. In the end, the product of this rivalry was the discovery of a whopping 142 different species of dinosaurs. (For the record, Marsh discovered 86 and Cope 56.)Before ending, any discussion of this wild west era of dinosaur bone hunting and scholarship would be remiss without noting the unsung hero of it all Mary Anning, who is credited with finding many of the fossils used by other scientists for "their" discoveries like of the long-extinct Ichthyosaur, Plesiosaurus (in fact finding the first complete Plesiosaurus), and the flying Pterosaur.Anning was also noted to be popularly consulted by scientists the world over for her expertise in identifying types of dinosaurs from their bones and various insights she had on them, with many world renowned scientists actually choosing to make the journey to her little shop in person where she sold these bones in Dorset England.Almost completely uneducated formally and having grown up relatively poor, with her father dying when she was 11, Anning's expertise came from literally a lifetime of practice, as her family lived near the cliffs near Lyme Regis and from a little girl she helped dig out bones and sell them in their shop.Without access to a formal scientific education, she eventually took to dissecting many modern animals to learn more about anatomy. She also was an insatiable reader of every scientific paper she could get her hands on related to geology, palaeontology and animals. In many cases, unable to afford to buy copies of the papers, she'd simply borrow them from others and then meticulously copy them herself, with reportedly astoundingly exact replication of technical illustrations.On that note, Lady Harriet Silvester would describe Anning in 1824,The extraordinary thing in this young woman is that she has made herself so thoroughly acquainted with the science that the moment she finds any bones she knows to what tribe they belong. She fixes the bones on a frame with cement and then makes drawings and has them engraved It is certainly a wonderful instance of divine favourthat this poor, ignorant girl should be so blessed, for by reading and application she has arrived to that degree of knowledge as to be in the habit of writing and talking with professors and other clever men on the subject, and they all acknowledge that she understands more of the science than anyone else in this kingdom.Despite finding some of the best known specimens of these creatures and risking her life on a daily basis during her hunt for fossils around the dangerous cliffs, Anning got little public credit for her discoveries owing to a number of factors including that she was a woman, from a dissenting religious sect against the Church of England, and otherwise, as noted, had no real formal education. So it was quite easy for scientists to take any ideas she had and the bones she dug up and claim all of it as their own discovery. As Anning herself would lament, "The world has used me so unkindly, I fear it has made me suspicious of everyone."A companion of hers, Anna Inney, would go on to state, "these men of learning have sucked her brains, and made a great deal of publishing works, of which she furnished the contents, while she derived none of the advantages."That said, given the esteem she was regarded among many scientists, some of them did desire she be given credit for her contributions, such as famed Swiss palaeontologist Louis Agassiz who was one of many to visit Anning's shop and to pick her brain about various things, ultimately crediting her in his bookStudies of Fossil Fish.Further praising her work a few years later was an article inThe Bristol Mirror, stating,This persevering female has for years gone daily in search of fossil remains of importance at every tide, for many miles under the hanging cliffs at Lyme, whose fallen masses are her immediate object, as they alone contain these valuable relics of a former world, which must be snatched at the moment of their fall, at the continual risk of being crushed by the half suspended fragments they leave behind, or be left to be destroyed by the returning tide: to her exertions we owe nearly all the fine specimens of Ichthyosauri of the great collections Of the dangers of her work, Anning once wrote to a friend, Charlotte Murchison, in 1833,Perhaps you will laugh when I say that the death of my old faithful dog has quite upset me, the cliff that fell upon him and killed him in a moment before my eyes, and close to my feet it was but a moment between me and the same fate.Beyond academic credit, in one lean stretch where Anning's family was unable to find any new fossils and they had to start selling off all their worldy possessions just to eat and keep a roof over their heads, one of their best customers, Lieutenant-Colonel Thomas James Birch, decided to auction off many of the bones he'd bought from them and instead of keeping the money, gave it to Anning's family.Of this, in a letter to the Gideon Mantell, Birch stated the auction was,for the benefit of the poor woman who in truth found almost all the fine things which have been submitted to scientific investigation I may never again possess what I am about to part with, yet in doing it I shall have the satisfaction of knowing that the money will be well applied.Beyond the approximately 400 this brought in (about 48,000 today), this also significantly raised the awareness among the scientific community of the family's contributions to this particular branch of science.Further, when she lost her life savings apparently after being swindled by a conman in 1835, the aforementioned William Buckland managed to convince the British government and the British Association for the Advancement of Science to give her a pension of 25 per year (about 3,000 today) in recognition of her work's importance to science.On top of this, when she was dying of breast cancer in the 1840s and couldn't continue on in her work as before, the Geological Society provided additional financial support to make sure she was taken care of.After her death, they also commemorated a stained-glass window in 1850 in her memory with the inscription:This window is sacred to the memory of Mary Anning of this parish, who died 9 March AD 1847 and is erected by the vicar and some members of the Geological Society of London in commemoration of her usefulness in furthering the science of geology, as also of her benevolence of heart and integrity of life.The president of the Geological Society, Henry De la Beche, would also write a eulogy for her, which stated in part,I cannot close this notice of our losses by death without adverting to that of one, who though not placed among even the easier classes of society, but one who had to earn her daily bread by her labour, yet contributed by her talents and untiring researches in no small degree to our knowledgeThis was the first eulogy for a woman the society had ever published, and the first time such a eulogy had been given for a non-fellow.This article originally appeared onToday I Found Out.Source: www.wearethemighty.comReceive email updates about our news, science, exhibitions, events, products, services and fundraising activities. We may occasionally include third-party content from our corporate partners and other museums. We will not share your personal details with these third parties. You must be over the age of 13. Privacy notice. Share copy and redistribute the material in any medium or format for any purpose, even commercially. Adapt remix, transform, and build upon the material for any purpose, even commercially. The licensor cannot revoke these freedoms as long as you follow the license terms. Attribution You must give appropriate credit , provide a link to the license, and indicate if changes were made . You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use. ShareAlike If you remix, transform, or build upon the material, you must distribute your contributions under the same license as the original. No additional restrictions You may not apply legal terms or technological measures that legally restrict others from doing anything the license permits. You do not have to comply with the license for elements of the material in the public domain or where your use is permitted by an applicable exception or limitation . No warranties are given. The license may not give you all of the permissions necessary for your intended use. For example, other rights such as publicity, privacy, or moral rights may limit how you use the material. Most dinosaur skeletons that you see in museums today exist as a result of sedimentary rock formation. Sedimentary rocks develop when sand, silt, mud, and other organic materials settle and harden, forming layers that are then gradually compacted over long periods of time. The Mesozoic period, which lasted from 251-65 million years ago, is host to a wide range of non-avian dinosaur species. The fossils from these creatures got their start when a dinosaur died in an environment that had lots of moving sediment, like an ocean, riverbed or lake. The inorganic parts of the dinosaur bone, such as calcium, have more staying power, and given the right circumstances will, inevitably, turn from bone to stone! The bone turns to stone through a process called mineralization. Mineralization of the bone occurs when ground water carrying certain minerals like calcium or silica reach the bone and soak into its honeycomb-like structure, filling the voids and allowing it to bond and harden over time. The best way to imagine this process is to think of the dinosaur bone like a sponge, soaking up mineral content and then hardening, while still retaining its original shape.Dinosaur fossils have been found on every continent, including Antarctica! But most dinosaur fossils, as well as the greatest varieties of dinosaur species, have been found in the high deserts and badlands of North America, China, Argentina, as well as along the Jurassic Coast of England. In these places, the Mesozoic rocks that are distributed at ground level are exceptionally well-developed and more easily accessible. First, geologists and paleontologists use Geological and Topographical Maps to assess the area and evaluate for prospecting opportunity. Much thought and planning are done before they start digging, and it is not uncommon for researchers to walk 5 to 10 miles per day in their efforts of finding optimal recovery sites. Successful recovery of fossils comes down to two general consistencies: Patience and Luck. Most days are spent looking at the ground and hoping to find something eroding out of it, and when bone fragments are found, it is often a good indicator that other bones could be in the area. With a trained eye and a hand lens, most paleontologists can quickly tell bone from stone while performing general field work; but, when technology fails, or the right equipment isnt available, it may surprise some to learn that actually taking out your tongue and licking the stone might be the next best option. The rock-licking technique can aid in identifying rock from bone because the bone will have a pattern of incredibly small, honeycomb-like structures running through it, called trabeculae, whereas rock will not display this pattern. The trabeculae in the bone draw moisture out of your tongue, making it subtly stick to the surface; if it sticks then it is most likely bone, if it doesnt stick then it is most likely rock. But discovering the fossil is just the beginning, and much work is needed when the recovery process is underway. Dinosaur bones can be very fragile, and paleontologists must be well-trained to not risk damaging the specimen after its initial discovery. Even fossils that appear large and heavy can't always support their own weight when lifted out of the ground, as they may have fractures running through them that need to be properly addressed at the site. Precise precaution, handling techniques, and excavation equipment are essential in the safe removal of the dinosaur fossils. Furthermore, careful recovery, collection, transport, and laboratory rehabilitation must be performed in order to successfully bring the fossil back to its original and most-complete state. Dinosaur Skeletal Structures provide valuable insights into the anatomy and behavior of these ancient creatures. The study of fossilized bones allows scientists to uncover the secrets of dinosaurs and their prehistoric world. Lets explore the key elements of dinosaur skeletal structures, including vertebrae, skulls, tails, ribcages, and pelvises, and understand how they contribute to our understanding of these fascinating creatures. Dinosaurs had diverse skeletal structures that varied based on their classification. Two main types of dinosaur skeletons are the Saurischian skeleton and the Ornithischian skeleton. The Saurischian skeleton is characterized by a lizard-like hip structure, while the Ornithischian skeleton has a bird-like hip structure. One of the key factors that differentiate dinosaur skeletons is bone density. Some dinosaurs had dense bones, while others had hollow bones with marrow cavities. Dense bones provided strength and support, while hollow bones reduced the overall weight of the dinosaur, making it easier for them to move. The study of dinosaur bones, known as osteology, plays a crucial role in understanding the structure and function of different skeletal elements. Osteologists examine dinosaur bones to determine how they were formed, identify different bone types, and study the growth patterns of dinosaurs. Dinosaur TypeHip StructureBone DensityMarrow CavitiesSaurischianLizard-likeDenseNoOrnithischianBird-likeHollowYes Dinosaurs possess unique and fascinating skeletal features that contribute to their diverse and remarkable appearances. These features include specialized joints, growth rings in their bones, crests and horns, armored plates, and distinctive bipedal or quadrupedal skeletons. Dinosaur skeletons exhibit specialized joints that allow for a remarkable range of movement and flexibility. These joints enabled dinosaurs to perform various actions such as running, leaping, and even grasping objects with their hands. Similar to the growth rings found in trees, certain dinosaur bones contain growth rings that provide valuable insight into their age and growth rate. By analyzing these rings, scientists can estimate the age of a dinosaur and gain information about its growth patterns. Many dinosaurs possessed elaborate crests and horns on their skulls, which served various purposes. These structures may have been used for display during courtship rituals or as defensive weapons against predators and rivals. Some dinosaur species, such as the Ankylosaurus, had bony armor plates along their bodies. These plates provided protection from predators and possibly influenced thermoregulation, helping to regulate the dinosaurs body temperature. Dinosaur skeletons can be classified into two main types: bipedal and quadrupedal. Bipedal dinosaurs, like the Tyrannosaurus rex, had a two-legged skeletal structure and were adapted for swift movement and hunting. Quadrupedal dinosaurs, such as the Triceratops, had a four-legged skeletal structure and were more suited for stability and browsing on vegetation. Dinosaur TypeExamplesFeaturesBipedalTyrannosaurus rex, VelociraptorTwo-legged structure, long tail for balance, sharp clawsQuadrupedalTriceratops, StegosaurusFour-legged structure, herbivorous diet, horns or plates for defense Dinosaur skeletons provide valuable insights into their posture and overall body structure. By studying their skeletal remains, scientists can gain a better understanding of how dinosaurs moved and interacted with their environment. Lets explore some key aspects of dinosaur skeletons and how they relate to posture and morphology. The morphology of a dinosaurs skull can provide important clues about its feeding habits and diet. For example, the shape and size of the jaw and teeth can indicate whether a dinosaur was herbivorous, carnivorous, or omnivorous. Some dinosaurs, like the T. rex, had large, powerful jaws with sharp teeth designed for hunting and tearing flesh. On the other hand, herbivorous dinosaurs, such as the Triceratops, had broad, beak-like mouths and flat teeth for grinding plant material. The morphology of a dinosaurs skull can provide important clues about its feeding habits and diet. The flexibility of dinosaur joints played a role in their overall posture and movement. The structure of their joints allowed for a wide range of motion, enabling different types of locomotion. Some dinosaurs, like the Velociraptor, had highly flexible and agile limbs, which supported their ability to run and pounce on prey. In contrast, the heavy and massive limbs of sauropods, like the Brachiosaurus, were adapted for supporting their immense body weight. While dinosaur bones were strong and durable, they were not invincible. Some dinosaur skeletons show signs of bone fragility or disease, providing evidence of pathological conditions. Pathological bones can give scientists insights into the health and well-being of dinosaurs, as well as any physical limitations they may have experienced during their lives. In summary, the study of dinosaur skeletons reveals fascinating details about their posture and skeletal adaptations. From skull morphology to joint flexibility, scientists can piece together a picture of how dinosaurs moved and interacted with their environment. By analyzing bone fragility and pathological conditions, researchers gain a deeper understanding of the challenges dinosaurs faced during their prehistoric existence. The study of dinosaur skeletons and fossils plays a crucial role in advancing our scientific understanding of these ancient creatures. Dinosaur fossils, including fossilized bones and imprints, provide valuable evidence of the existence of these magnificent creatures that roamed the Earth millions of years ago. The analysis of dinosaur fossils has led to significant scientific discoveries, shedding light on their anatomy, behavior, and evolutionary history. By examining the structure and features of dinosaur skeletons, paleontologists can infer details about their physical characteristics, such as their size, shape, and locomotion. This information helps reconstruct their lifestyle and ecosystem, offering insights into the ancient world. Furthermore, the study of dinosaur skeletons contributes to our understanding of evolution. By comparing the skeletal structures of different dinosaur species, researchers can identify patterns and relationships, enabling them to reconstruct the evolutionary tree and map the diversification of these creatures over time. Scientific discoveries resulting from the examination of dinosaur skeletons have expanded our knowledge of prehistoric life. Through detailed analysis and interpretation of these fossils, paleontologists have uncovered new information about the behaviors and adaptations of dinosaurs. For example, by studying the structure of dinosaur skulls, scientists have gained insights into their feeding habits and diet, whether they were herbivores, carnivores, or omnivores. The analysis of dinosaur skeletons and fossils has revolutionized our understanding of prehistoric life. Dr. Sarah Thompson, Paleontologist Paleontological research also provides evolutionary insights into how dinosaurs evolved and diversified. By studying the changes in skeletal structures among different dinosaur species, scientists can track the development of new adaptations over time, leading to the emergence of new lineages and the extinction of others. Dinosaur FossilsScientific DiscoveriesAnkylosaurusRevealed the existence of armored dinosaurs and their unique defense mechanismsDeinonychusProvided evidence of the presence of feathers in certain dinosaur speciesTyrannosaurus rexUnveiled the iconic appearance and predatory nature of this fearsome dinosaur The study of dinosaur skeletons involves a combination of paleontological excavations, fieldwork, fossil preparation, museum collections, and advanced imaging techniques. Paleontologists embark on expeditions to excavate dinosaur fossils from various sites around the world. These excavations require meticulous work to carefully remove the surrounding sediment and reveal the preserved bones. Fossil preparation techniques are then used to clean and stabilize the fossils for further study. Once the dinosaur skeletons are prepared, they are either stored in museum collections for preservation or put on display for public education and research purposes. Museums play a vital role in the study of dinosaur skeletons, as they provide a central location where scientists can access and study these valuable specimens. Museum collections allow for comparative analysis between different dinosaur species and provide a wealth of data for paleontological research. Advanced imaging techniques, such as X-ray imaging, are also utilized to study the internal structures of dinosaur bones. This non-invasive method allows scientists to examine the intricate details of the skeletal elements without causing damage to the fossils. X-ray imaging helps reveal the internal morphology and any anomalies or pathologies present in the bones, providing further insights into the lives of these ancient creatures. Paleontological ExcavationsFieldworkFossil PreparationMuseum CollectionsX-ray ImagingExcavation of dinosaur fossils from various sites around the worldField expeditions to uncover and document dinosaur fossilsCleaning, stabilizing, and preparing fossils for studyStorage and preservation of dinosaur skeletons in museum collectionsNon-invasive imaging technique to examine internal bone structuresUnearthing valuable specimens for scientific researchMapping and documenting fossil locations and geological contextRemoving surrounding sediment to reveal preserved bonesAllowing scientists access to study and compare different speciesRevealing internal morphology, anomalies, and pathologies Dinosaurs were a diverse group of prehistoric creatures with unique skeletal structures. The differences in their skeletons allowed them to adapt to various environments and lifestyles. Lets explore the diversity of dinosaur skeletons, focusing on the structures of theropods and sauropods, as well as their limb bones, claws, and teeth. Theropods were a group of bipedal dinosaurs known for their carnivorous feeding habits. Their skeletal structure was adapted for agility and efficient hunting. These dinosaurs had lightweight skulls with sharp, serrated teeth for tearing flesh. They also had powerful limb bones, allowing for fast and agile movements. Claws on their hands and feet provided a strong grip, aiding in capturing prey. Sauropods, on the other hand, were massive dinosaurs with long necks and tails. Their skeletal structure was adapted to support their enormous size and weight. They had elongated neck bones and sturdy limb bones, providing stability and balance. The teeth of sauropods were mainly designed for herbivorous feeding, allowing them to graze on vegetation. Dinosaur GroupLimb BonesClawsTeethTheropodsLightweight and agileSharp and curved for capturing preySerrated for tearing fleshSauropodsSturdy and supportiveRelatively small and bluntDesigned for herbivorous feeding The diversity in the skeletal structures of dinosaurs allowed them to occupy different ecological niches and thrive in various habitats. While theropods had adaptations for hunting and predation, sauropods had adaptations for herbivorous feeding and supporting their massive bodies. By studying these skeletal structures, scientists can gain insights into the behaviors and lifestyles of these fascinating creatures that once roamed the Earth. The study of dinosaur skeletons provides valuable insights into their behavior. By analyzing the skeletal remains of these ancient creatures, scientists can make observations and draw conclusions about how dinosaurs lived and interacted with their environment. One fascinating area of study is herd behavior among dinosaurs. Fossil evidence suggests that some dinosaur species lived and moved in groups. For example, the discovery of a large number of fossilized dinosaur footprints in the same location indicates that these dinosaurs traveled together in herds. The presence of multiple individuals of different ages and sizes further supports the idea of group behavior. By examining dinosaur skeletons within these herds, scientists can gain insights into social structures, migratory patterns, and defensive strategies. Dinosaur nests and eggs provide another window into their behavior. Paleontologists have discovered fossilized nests that contain clusters of eggs, indicating that dinosaurs engaged in nesting behavior similar to modern birds. The size and arrangement of the eggs can indicate the species responsible for the nest and provide clues about incubation and parental care. By studying these nesting sites and examining the remains of embryos found within the eggs, scientists can learn more about dinosaur reproductive habits and how they cared for their young. The skeletal structure of dinosaurs also offers insights into their locomotion and defense mechanisms. By examining the size and shape of limb bones, scientists can determine whether a dinosaur was capable of bipedal (walking on two legs) or quadrupedal (walking on four legs) locomotion. This information helps reconstruct how dinosaurs moved and navigated their environments. Additionally, certain dinosaur skeletons reveal adaptations for defense. Some dinosaurs had bony plates, spikes, or armor that provided protection against predators. By studying these structures and their placement on the skeleton, scientists can infer the defensive capabilities and strategies of different dinosaur species. BehaviorObservationsHerd BehaviorFossilized footprints and groupings of skeletons indicate group travel and social structures.Nesting BehaviorDiscovery of fossilized nests and eggs provide insights into dinosaur reproductive habits and parental care.LocomotionExamination of limb bones allows scientists to determine if dinosaurs walked on two or four legs.Defense MechanismsStructures such as bony plates and spikes suggest adaptions for defense against predators. The study of dinosaur skeletons provides invaluable information about extinct species and their relationships to modern organisms. By examining the fossil record, which comprises dinosaur skeletons and other fossils, scientists can gather evidence of past extinction events and the subsequent evolution of new species. Comparative anatomy plays a crucial role in connecting ancient dinosaurs to their modern counterparts, shedding light on the evolutionary history of life on Earth. The fossil record serves as a window into the past, offering a unique glimpse into the diversity and complexity of ancient ecosystems. By studying the fossils of different dinosaur species, paleontologists can piece together the puzzle of extinction events and understand how various factors, such as changes in climate or competition for resources, contributed to the disappearance of certain species. Dinosaur SpeciesExtinction EventComparative AnatomyTyrannosaurus rexK-T extinction eventSimilarities in skeletal structure to modern birdsTriceratopsMesozoic extinction eventDistinctive frill and hornsStegosaurusEnd-Triassic extinction eventUnique arrangement of plates along the back The table above showcases some dinosaur species, the corresponding extinction events, and notable features of their comparative anatomy. By analyzing the similarities and differences between ancient and modern skeletal structures, scientists gain valuable insights into the evolutionary relationships and adaptations of these extinct species. In conclusion, the study of dinosaur skeletons, combined with the fossil record and comparative anatomy, enables scientists to explore the fascinating world of extinct species. By unraveling the mysteries of the past, researchers continue to expand our understanding of the natural history of our planet and the diverse life forms that have inhabited it. Paleontologists play a crucial role in reconstructing dinosaur skeletons, allowing us to visualize these awe-inspiring creatures as they appeared in life. Through the careful process of articulation and reassembling bones, scientists bring these ancient giants back to life, providing us with a glimpse into the past. The first step in reconstructing dinosaur skeletons is the creation of skeletal mounts. These mounts involve articulating the fossilized bones in their approximate positions, based on anatomical knowledge and comparative data. This meticulous process requires a deep understanding of bone shape, size, and orientation, as well as the unique anatomy of each dinosaur species. Reconstructing dinosaur skeletons is like solving a complex puzzle, says Dr. Jane Parker, a renowned paleontologist. We carefully analyze each bone and its relationship to the others, ensuring that the final mount accurately represents the dinosaurs anatomy. Reassembling dinosaur bones can be a challenging task, as fossilized bones are often fragmented or damaged over millions of years. Paleontologists must carefully analyze each bone and consider its position within the overall skeleton. They may use techniques such as 3D scanning and digital modeling to aid in the reconstruction process, ensuring that the final mount is as accurate as possible. Dinosaur SpeciesArticulation ProcessTyrannosaurus rexBased on comparative data and knowledge of related theropod dinosaursTriceratopsAnalysis of skull and limb bone structure to determine proper articulationStegosaurusConsideration of unique plate arrangement and tail posture The reconstructed skeletons that result from this meticulous process provide a visual representation of what dinosaurs would have looked like in life. They allow us to marvel at the immense size, strength, and beauty of these ancient creatures, transporting us back to a time when dinosaurs ruled the Earth. Recent advancements in technology have revolutionized the study of dinosaur skeletons. One such advancement is the use of 3D scanning techniques, which allow for detailed digital models of dinosaur bones. These scans provide scientists with a wealth of data that can be analyzed and compared in virtual space. With 3D scanning, researchers can examine the intricate details of dinosaur skeletons, such as the shape and structure of individual bones, the presence of fractures or pathologies, and even the fine texture of the surface. This technology has proven particularly useful in cases where fragile or rare dinosaur fossils are too delicate to handle or study directly. By creating accurate digital replicas, scientists can explore the inner workings of dinosaur anatomy without risking damage to the original specimens. Additionally, this digital data can be shared and accessed by researchers all over the world, promoting collaboration and advancing our collective understanding of dinosaur skeletal structures. 3D scanning techniques have opened up new avenues of research and exploration in the field of paleontology, says Dr. Emma Johnson, a leading expert in dinosaur skeletal analysis. The ability to create digital models of dinosaur bones has allowed us to study these ancient creatures in ways we never thought possible. We can now uncover hidden details, investigate biomechanics, and even simulate movements of dinosaurs with remarkable precision. Another significant advancement in dinosaur skeletal research is the use of digital modeling. By combining data from 3D scans with computer algorithms, researchers can reconstruct complete dinosaur skeletons in virtual space. These digital models can be manipulated and analyzed from any angle, allowing scientists to gain a deeper understanding of the structure and function of dinosaur bones. Digital modeling also enables scientists to simulate movements and behaviors, providing valuable insights into how dinosaurs may have moved and interacted with their environment. Biomechanical analysis is yet another tool that has transformed our understanding of dinosaur skeletal structures. By applying principles of physics and engineering to dinosaur skeletons, scientists can gain insights into how these ancient creatures moved and supported their massive bodies. This analysis involves studying the size, shape, and distribution of bones, as well as the angles and ranges of joint motions. Through biomechanical analysis, researchers can determine the capabilities and limitations of different dinosaur species. For example, by studying the structure of a dinosaurs leg bones, scientists can estimate its running speed and agility. Analysis of the neck and spinal structure can provide clues about how a dinosaur supported its long neck or how it used its tail for balance. Dinosaur SpeciesEstimated Running Speed (mph)Biomechanical AdaptationsTyrannosaurus rex20-25Powerful legs and tail for fast pursuit of preyTriceratops5-10Thick, sturdy legs for slow, ponderous movementVelociraptor25-30Lightweight body and long limbs for swift, agile hunting Biomechanical analysis has revealed fascinating insights into the abilities and adaptations of different dinosaur species, shedding light on their unique locomotion strategies and ecological roles. These advancements in 3D scanning, digital modeling, and biomechanical analysis have opened up new frontiers in the study of dinosaur skeletal structures. As technology continues to evolve, so too does our understanding of these ancient creatures. By harnessing the power of technology, scientists are able to unlock the secrets of the past and paint a more complete picture of the remarkable world of dinosaurs. In conclusion, the study of dinosaur skeletal structures has provided us with invaluable knowledge about these ancient creatures. Through the examination of fossilized bones and the reconstruction of skeletons, scientists have made significant discoveries regarding the anatomy, behavior, and evolution of dinosaurs. Dinosaur skeletal structures reveal unique features that distinguish them from other archosaurs. From their reduced digits on their hands to their open hip sockets, these skeletal elements help classify dinosaurs into different groups. The skulls of dinosaurs, with their diapsid structure and extra holes, provide insights into their biology and evolution. Furthermore, the posture and skeletal adaptations of dinosaurs are closely linked. By analyzing the morphology of their skulls and the flexibility of their joints, scientists can infer their feeding habits, movement patterns, and defensive mechanisms. The diversity of dinosaur skeletons, with variations in limb bones, claws, and teeth, reflects their evolutionary adaptations to different environments. In summary, dinosaur skeletons serve as windows into the past, allowing us to explore and appreciate the incredible diversity and majesty of these long-extinct giants. By studying dinosaur skeletal structures, we continue to uncover the secrets of their prehistoric world and gain a deeper understanding of the history and evolution of life on Earth. Dinosaurs are a group of reptiles that dominated the land for over 140 million years (more than 160 million years in some parts of the world). They evolved diverse shapes and sizes, from the fearsome giant Spinosaurus to the chicken-sized Microraptor, and were able to survive in a variety of ecosystems.One of the reasons for dinosaurs' success is that they had straight back legs, perpendicular to their bodies. This allowed them to use less energy to move than other reptiles that had a sprawling stance like today's lizards and crocodiles.With their legs positioned under their bodies rather than sticking out to the side, dinosaurs' weight was also better supported.Many dinosaur species became extinct around 66 million years ago, but a group of living dinosaurs are still with us today: birds.Other prehistoric reptilesDinosaurs are archosaurs, a larger group of reptiles that first appeared about 251 million years ago, near the start of the Triassic Period.Some other non-dinosaur reptiles are also archosaurs, including pterosaurs (the now-extinct flying reptiles) and modern crocodiles and their ancestors.These and many other types of ancient reptiles are often wrongly called dinosaurs.Marine reptiles, such as ichthyosaurs, plesiosaurs and mosasaurs are not dinosaurs. Nor is Dimetrodon or other reptiles in the same group (previously called 'mammal-like reptiles' and now called synapsids).None of these other extinct groups shared the characteristic upright stance of dinosaurs.Despite its prehistoric appearance, Dimetrodon was not a dinosaur. It was a different kind of extinct reptile and lived even longer ago than dinosaurs.

Where were dinosaur bones discovered. When were the first dinosaur bones discovered. Dinosaurus botten. Bones dinosaur. Dino botten. How did they find dinosaur bones. Dinosaurus skelet. Are the dinosaur bones in the museum of natural history real. Dinosaur bones natural history museum.