

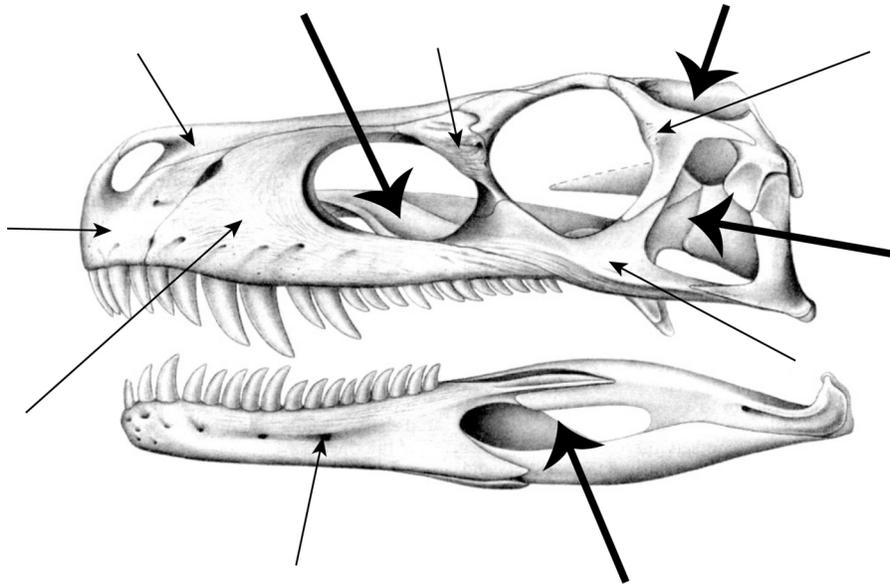
Name: _____

GEOL 104 Dinosaurs: A Natural History
Anatomy and Taxonomy Assignment

DUE: Fri. Sept. 29

Part I. Comparative Anatomy

Below is the skull of the early primitive meat-eating dinosaur *Herrerasaurus ischigualastensis*.



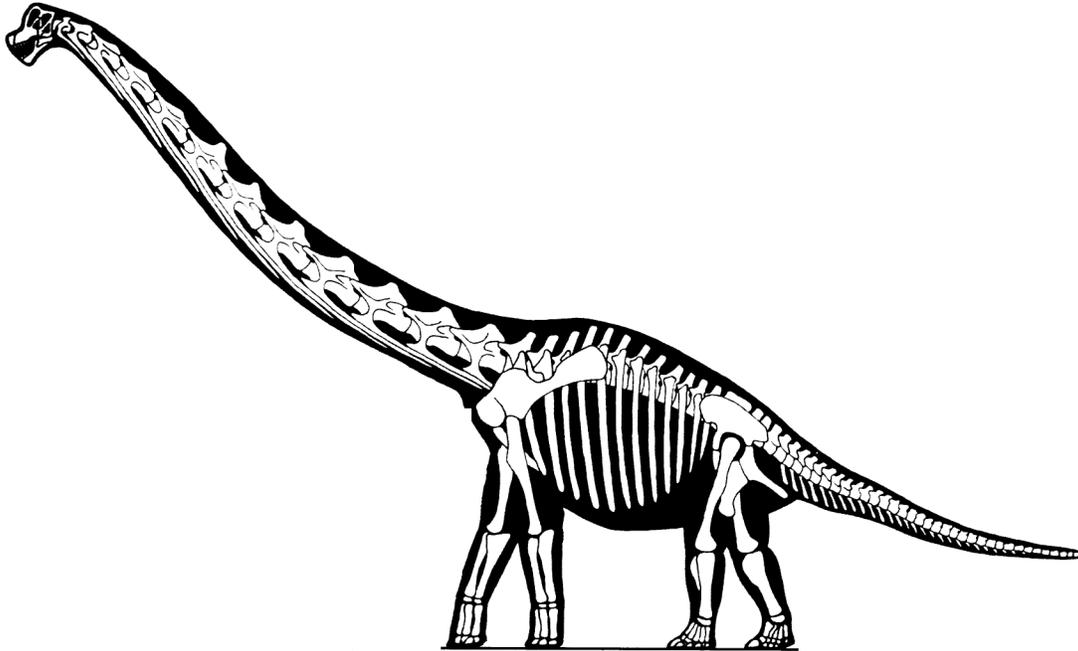
Herrerasaurus ischigualastensis

For 1-7: Using the handout from class and the website, label the bones indicated on the skull above by the **thin** arrows. There are 7 bones to label. Write the name of the bone at the end of the thin arrow.

For 8-11, you will identify the four openings in the skull indicated by the **thick bold** arrows. Use the information below to recognize the different openings:

- **Antorbital fenestra:** anterior to the orbit, posterior to the naris, surrounded by the maxilla, lacrimal, and nasal bones
- **Infratemporal fenestra:** posterior to the orbit, ventral to the supratemporal fenestra, surrounded by the jugal, quadratojugal, squamosal, and postorbital bones
- **Mandibular fenestra:** within the mandible (lower jaw), surrounded on the anterior end by the dentary and the posterior end by the surangular and angular bones
- **Supratemporal fenestra:** posterior to the orbit, dorsal to the infratemporal fenestra, surrounded by the squamosal, postorbital, frontal, and parietal bones

Name: _____



Sauroposeidon proteles

In the skeleton above, identify by name or number the following bones (the handouts will help with this):

- | | | | | | |
|--------------------------------|------------------------------|-----------------------------|----------------|-------------|----------|
| 12) A Cervical (neck) Vertebra | 13) A Dorsal (back) Vertebra | 14) A Sacral (hip) vertebra | | | |
| 15) A Caudal (tail) Vertebra | 16) A Rib | 17) Scapula | 18) Ilium | 19) Ischium | |
| 20) Pubis | 21) Humerus | 22) Femur | 23) Tibia | 24) Fibula | 25) Ulna |
| 26) A Metacarpal | 27) A Metatarsal | 28) Chevron | 29) Acetabulum | | |

Extra Credit) This dinosaur is in [dorsal | right lateral | left lateral | left medial] view.

Part II. Taxonomy

30) *Euoplocephalus tutus* was named in 1910; *Scolosaurus cutleri* was named in 1928. If later studies indicate that these are two different species within the **same** genus, what would be the name of these two species?

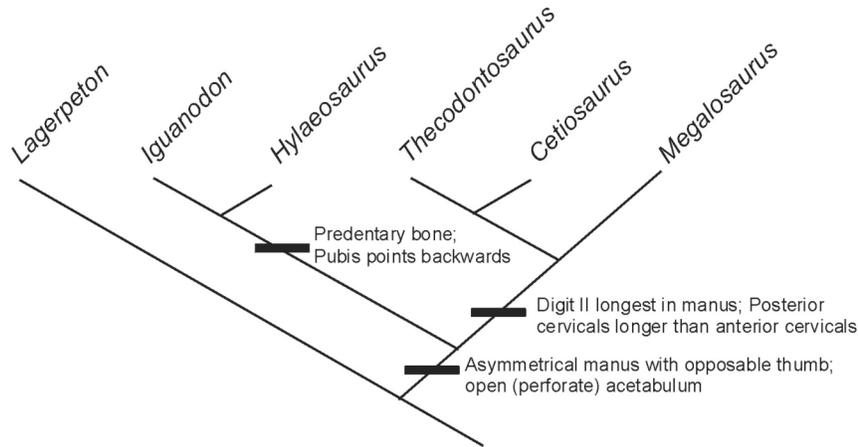
31) If, instead, *Euoplocephalus tutus* and *Scolosaurus cutleri* are discovered to be different specimens of the same **species**, what would be the complete name of this species?

Extra Credit) What is the **ONLY** proper abbreviation of *Tyrannosaurus rex*?

Name: _____

Part III. Systematics

Below is a cladogram showing the interrelationship of various dinosaurs and related forms. The positions of pairs of derived characters are indicated by the heavy bold horizontal lines.



32) What is the closest relative to *Hylaeosaurus* on this cladogram? _____

33) What is the closest relative to *Iguanodon* on this cladogram? _____

34) The clade **Ornithischia** is defined as *Iguanodon* and all taxa sharing a more recent common ancestor with *Iguanodon* than with *Megalosaurus*. List all the taxa on this cladogram which are members of Ornithischia.

35) Name one of the shared derived character of Ornithischia as listed on the cladogram, with extra credit for the second.

36) The clade **Saurischia** is defined as *Megalosaurus* and all taxa sharing a more recent common ancestor with *Megalosaurus* than with *Iguanodon*. List all the taxa on this cladogram which are members of Saurischia.

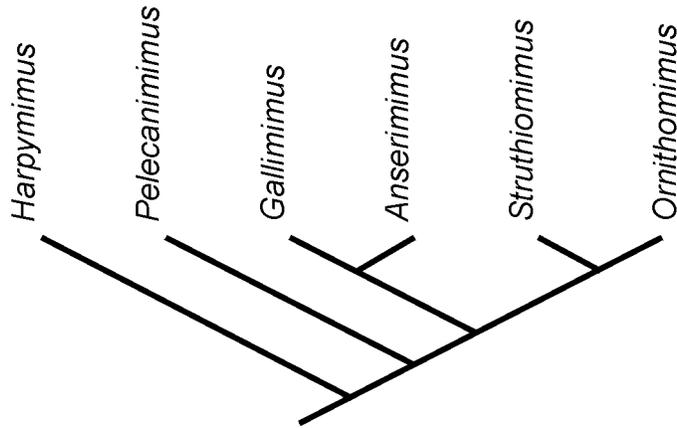
37) What is the closest relative to the clade comprised of *Iguanodon* + *Hylaeosaurus* on this cladogram?

38) **Dinosauria** is defined as the most recent common ancestor of *Iguanodon* and *Megalosaurus* and all of its descendants. According to the cladogram above, is *Lagerpeton* a dinosaur? [Yes | No]

Extra Credit) Is *Thecodontosaurus* a dinosaur? [Yes | No]

Below is a cladogram and data matrix of the ostrich dinosaurs (Ornithomimosauria). In the data matrix, a “0” indicates that the derived feature (mentioned on the left) is absent; “1” indicates that the derived feature is present; and “?” means that the feature cannot be evaluated (in these cases, that part of the body isn’t known for the genus). For example, *Ornithomimus* is **toothless**, has a **long metacarpal I**, and a **pinched metatarsal III**. *Harpymimus* shows the primitive (ancestral) condition: it has teeth, a short metacarpal I, and an unpinched metatarsal III.

Toothless?	0	0	1	?	1	1
Metacarpal I Long?	0	1	1	1	1	1
Pinched Metatarsal III?	0	?	1	1	1	1



- 39) Based on the cladogram above, which dinosaur is characterized by a toothed jaw and a long metacarpal I?
- 40) The skull of *Anserimimus* is not known at present. Based on the data available, do you predict that this dinosaur was **toothed** or **toothless**? Justify your answer.
- 41) Only the front end of *Pelecanimimus* is known at present. Based on the information above, which of the following best describes the simplest explanation for the metatarsal condition in *Pelecanimimus*?
- had a pinched metatarsal III
 - did not have a pinched metatarsal III
 - ambiguous as to whether it did or did not.

Extra Credit) Justify your answer to 41