

Name: _____

GEOL 104 Dinosaurs: A Natural History
Video Assignment

DUE: Fri. Nov. 3

For this assignment, you are asked to watch the documentary series *Walking With Dinosaurs (WWD)*. The version you will see on Dial Access (Basement of Hornbake Library) is the original BBC version: it is slightly different from the edited version shown on The Discovery Channel.

There are six episodes in the series, each about thirty minutes long. The conceit of *Walking With Dinosaurs* is that this is a “real” nature documentary: that is, that this is actual footage from the world of the dinosaurs, spliced together into TV shows just as might be done in the modern world with footage of the Serengeti or the Amazon rainforest.

This series has its faults, but the creators made an honest attempt to get a number of professional consultants to help out in its creation. You can judge the results for yourself.

While watching the show, consider the following:

- For any given feature or behavior of the extinct organisms shown, could that feature or behavior be verified in from the fossil record?
- Is it something that might leave direct evidence?
- Is it something that might be reasonably inferred from other evidence (phylogenetic, trace fossils, biomechanics, etc.)?
- Or is it pure speculation? **PLEASE NOTE: A LOT** of the stuff shown in this series is pure speculation!!

On the following pages are a few questions per episode. Watch the episodes as many times as you’d like. Enjoy!

Name: _____

Part I: New Blood

This episode, set in the Late Triassic Epoch of the American Southwest, represents the dawn of the dinosaurian world as known from the rocks and fossils of the Chinle Formation. (The Chinle is most famous for the Petrified Forest). The cast includes:

- The early carnivorous dinosaur *Coelophysis*
- The plant-eating prosauropod dinosaur *Plateosaurus* (shows up only at the end)
- The giant predatory pseudosuchian archosaur *Postosuchus*
- Two different synapsids, improperly called “reptiles” here even though they aren’t reptiles under the phylogenetic meaning of that term. These protomammals are:
 - The bulky ox-sized dicynodont *Placerias*
 - An unnamed cynodont species
- The early pterosaur (winged reptile) *Peteinosaurus*

1) *Coelophysis* and its kin were among the earliest successful groups of dinosaurs in a world dominated by pseudosuchians like *Postosuchus* and herbivorous synapsids like *Placerias*. Dinosaurs differed from other Triassic amniotes in a number of ways. Indicate below whether the statements are true or false, based on *WWD*:

- Coelophysis* was larger than *Postosuchus* and *Placerias*: _____
- Coelophysis* operated in groups, whereas both *Postosuchus* and *Placerias* only lived alone: _____
- Coelophysis* was a biped; *Postosuchus* and *Placerias* were both quadrupedal while walking: _____
- Coelophysis* was rather fast; both *Postosuchus* and *Placerias* were slower: _____
- Coelophysis* could kill its own food; *Postosuchus* was a strict scavenger: _____

Extra Credit) This episode shows two episodes of cannibalism. The first case shows the cynodonts eating their young. Why do they do this, according to the video?

2) The second case of cannibalism shows *Coelophysis* eating their own babies during the drought. This latter event was based on a misunderstanding of a site in which *Coelophysis* specimens which died from drought at a watering hole were found with what were thought to be baby *Coelophysis* bones in their bellies. (It turned out, as shown a study first published in 2006, that these were really bones of the fast running crocodile-relative *Hesperosuchus*). What evidence WOULD have been needed to show that *Coelophysis* engaged in cannibalism in these situations?

3) How does *Plateosaurus* compare in size to the other animals shown in this video?

Name: _____

Part II: The Time of the Titans

This episode is set in the Late Jurassic environment preserved as the Morrison Formation of the American West. It focuses on the birth, growth, and development of a young dinosaur. The cast includes:

- The giant long-necked sauropod dinosaur *Diplodocus* (size of 40 m based on the related genus *Seismosaurus*, thought at the time they made *WWD* to be a species of *Diplodocus*)
- The even LARGER long-necked sauropod *Brachiosaurus*
- The small carnivorous dinosaur *Ornitholestes*
- The large carnivorous dinosaur *Allosaurus*
- The plated dinosaur *Stegosaurus*
- The pterosaur (NOT a dinosaur!!) *Anurognathus*
- The small ornithopod dinosaur *Dryosaurus* (not mentioned by name)

1) At birth rhinos weigh 40 kg (88 lbs) and elephants about 100 kg (220 lbs). How do the baby *Diplodocus* compare?

[much smaller | about the same | much larger]

2) Adult rhinos weigh about 2 tons; adult elephants up to 8 tons. How do adult *Diplodocus* compare?

[much smaller | about the same | much larger]

3) *Walking with Dinosaurs* portrays *Stegosaurus* as able to flush blood into its plates, causing them to change color. However, this would work best if they were actually covered by thin skin. The actual fossil evidence suggests that those plates were covered by thicker keratin (horn). Based on this, is the “color flash” hypothesis reasonable?

4) The video suggests that one reason that *Diplodocus* grew so big was to aid in its digestion. Based on what the video says, how would larger body size help these herbivores digest?

Name: _____

Part III: A Cruel Sea

Shown somewhat out of sequence, the assemblage of marine reptiles (and a token dinosaur) here are from the Oxford Clay, which is actually a little older than the Morrison Formation shown in the previous episode (early Late Jurassic Epoch rather than middle Late Jurassic Epoch). This episode shows some of the different forms of marine life from the mid-Mesozoic. The cast includes:

- The dolphin-like ichthyosaur *Ophthalmosaurus*
- The gigantic predatory plesiosaur *Liopleurodon* (greatly exaggerated in size: these probably only got up to 15 m, NOT 25 m!!)
- The smaller long-necked plesiosaur *Cryptoclidus*
- The Mesozoic shark *Hybodus*
- The pterosaur *Rhamphorhynchus*
- Ammonites, coiled relatives of the modern pearly nautilus, squid, and octopus
- The carnivorous dinosaur *Eustreptospondylus*

1) The pterosaur *Rhamphorhynchus* fed on fish and other marine life. How does it get its prey while at sea? While on the beach?

2) *Ophthalmosaurus* and other ichthyosaurs are known to have given birth live, as shown in this episode. What sort of fossil specimen might be found that demonstrates that these animals gave live birth? (The clues are in this episode).

3) *Eustreptospondylus* (a theropod dinosaur) is known only from a single specimen found in marine rocks, even though it was a land-dwelling animal. How might its skeleton have wound up in the limestones of the marine Oxford Clay?

Extra Credit) *Cryptoclidus* is shown swallowing stones in order to counter its buoyancy problems. How might this behavior be known from the fossil record?

Name: _____

Part IV: Giant of the Skies

Like the last episode, this one focuses on some non-dinosaurs of the Mesozoic Era (specifically, pterodactyloid pterosaurs). The initial scenes take place in the Santana Group of Brazil, and later episodes in the Wealden Group (and related deposits) in Europe: both from the Early Cretaceous. The cast is:

- The crested pterosaur *Tapejara*
- The gigantic pterosaur *Ornithocheirus* (star of the show)
- The plant-eating dinosaur *Iguanodon*
- The armored dinosaur *Polacanthus*
- The dromaeosaurid (raptor) *Utahraptor*, largest known member of the Dromaeosauridae
- The early toothed bird *Iberomesornis*

1) In what social activities are the *Tapejara* in Brazil engaged?

2) *Iguanodon* is portrayed as living in herds. What sort of fossil evidence would support this hypothesis?

Extra Credit) According to *WWD*, what advantages do the feathered wings of birds have over the skin wings of pterosaurs?

3) What is the purpose of *Ornithocheirus*' long migration?

Name: _____

Part V: Spirits of the Ice Forest

This episode portrays the Early Cretaceous assemblage of dinosaurs and other vertebrates found at Dinosaur Cove in Queensland, Australia. During the Cretaceous this location (now on the southeastern coast of Australia) was inland and directly connected to Antarctica. The cast of this episode includes:

- The small ornithopod dinosaur *Leaellynasaura*
- The giant amphibian *Koolasuchus*
- The large plant-eating dinosaur *Muttaburrasaurus*
- An Australian “allosaur” (which may not actually be an allosaur but instead a more primitive meat-eater)
- An unnamed mammal (curiously played by the modern-day coatimundi, a relative of the raccoon!)
- A weta insect
- A tuatara (a lepidosaur, still alive today)

1) During the long winter night, different animals have different strategies for dealing with the cold and darkness.

Write which animal in the following list uses the strategy mention in the space provided:

Koolasuchus

Muttaburrasaurus

Leaellynasaura

Winter Habitat

Summer Habitat

Animal With This Strategy.

More northern land

Migrate to polar regions:

Pond in forest

Moves to lake:

Active in warmer part of forest

Active in forest:

(some suspended animation)

Extra credit) Of the three above, the polar allosaur’s strategy is most similar to

[*Koolasuchus* | *Muttaburrasaurus* | *Leaellynasaura*] (Circle)

2) *Muttaburrasaurus* has a large sac around its nose. In *Walking with Dinosaurs* what function did this sac perform?

3) The details of the social structure shown in *Leaellynasaura* are pure speculation. Indicate (by an “X”) which one of the following traits might be directly preservable in the fossil record:

Living in groups _____ Dominance by a breeding pair, otherwise identical to all others _____

The particular calls used _____ Sentry duty _____

Kicking back leaf litter to scare away a mammal _____

Name: _____

Part VI: Death of a Dynasty

The final episode depicts the Hell Creek Formation dinosaurs and other forms from the latest Late Cretaceous, a very well studied and interesting assemblage of animals from the very end of the Age of Dinosaurs. The cast is:

- The giant carnivorous dinosaur *Tyrannosaurus*
- The early marsupial-relative *Didelphodon* (which was among the largest of Cretaceous mammals)
- The duckbilled dinosaur *Anatotitan*
- The armored dinosaur *Ankylosaurus*
- The horned dinosaurs *Torosaurus* and *Triceratops*
- The giant crocodylian *Deinosuchus*
- The giant pterosaur *Quetzalcoatlus*
- Unnamed dromaeosaurid (raptor) and hypsilophodont (small bipedal plant-eating dinosaur) genera
- An early snake

1) *WWD* suggests that something in the climate was affecting the development of dinosaur eggs. What environmental factor do they suggest is the cause?

2) The idea that any individual *Tyrannosaurus rex* had to have a large home range is pretty strong on a theoretical basis. Why do you think that an individual giant predator might have to have such a large area all to itself?

3) *Torosaurus* is shown locking horns to fight, with catastrophic results for one individual. What sort of physical evidence do you think might be left to document this kind of behavior?

4) Which (if any) group of dinosaurs survived the extinction?