

Geology 06/14F Midterm Exam Review Topics**Key Concepts - History and Paleontological Methods**

History of Dinosaur studies -

Cuvier - proves extinction, establishes long history of the Earth based on fossils

Buckland - describes first remains of a dinosaur - *Megalosaurus*

Mantell - describes first herbivorous dinosaurs - *Iguanodon*, *Hylaeosaurus*

Anning - finds and describes marine reptiles, first plesiosaur

Owen - coins the term “dinosaurian” to describe giant fossil reptiles

Leidy - describes and reconstruct *Hadrosaurus foulki*, confirms bipedalism in dinosaurs

Cope, Marsh - Late 1800’s dinosaur hunters - “bone wars” rivalry

Osborn, Andrews - AMNH Central Asiatic Expeditions - Gobi dinosaurs, first dinosaur eggs

Ostrom - describes *Deinonychus* - large raptor dinosaur, re-established bird-dinosaur link

Dinosaurs of the Gobi – Flaming Cliffs and Ukhaa Tolgod, major finds, circumstances of preservation –
review essay questions

Geologic Time - relative time, absolute (numerical) time, Hadean, Archean, Proterozoic, Phanerozoic Eons;
Paleozoic, Mesozoic, Cenozoic Eras; Triassic, Jurassic, Cretaceous Periods - using fossils to “date” rock
layers - assigning them to geologic systems - correlation of geologic systems using fossils- William
Smith.

Radiometric dating, half life, parent / daughter isotopes, uranium-lead, radiocarbon dating

Mesozoic Marine Life – oysters, ammonites, rudistid bivalves, ichthyosaurs, plesiosaurs, pliosaurs,
mosasaurs – importance of shelly fossils for correlation and relative dating

Sedimentary rocks - detrital (sandstone, shale), carbonate (limestone), evaporite, coal, depositional
(sedimentary) environments - fluvial, lacustrine, eolian, deltaic, marine, sedimentary structures (ripple
marks, mudcracks), environments likely to preserve dinosaurs / environments not likely to preserve them.
Tectonics and fossil preservation.

Fossils – fossilization – taphonomy (the study of fossilization) what is preserved and what is not; types of
dinosaur fossils:

body fossils - bones, teeth, brain endocasts, feather impressions, skin impressions

trace fossils - footprints, trackways, eggs, nests, coprolites

chemical fossils - proteins, DNA

Mesozoic plants: spore plants (ferns, tree ferns, horsetails, lycopsids), gymnosperms (ginkos, conifers,
cycads), angiosperms (flowering plants) – Paleophytic, Mesophytic, Cenophytic - changeover from
primitive spore plants to seed plants in the Triassic and evolution of flowering plants and their rise to
dominance in the Cretaceous.

Dinosaur Paleobiology - how do paleontologists reconstruct living dinosaurs?

Circumstantial inference:

Biomechanical analysis / biomechanical models - what behaviors / functions are possible or plausible
given dinosaur anatomy.

Living analogues - find animals that have similar anatomy to dinosaurs and see how they behave /
function (e.g. Komodo dragons as models for feeding in *T. rex*).

Direct inference:

Trace fossils - direct “proof” of behavior because trace fossils are made during living behavior - walking,
running, feeding, etc. Coprolites provide direct evidence of diet by showing remains of meals.

Feeding traces directly link predators to prey. Distribution of feeding traces on fossils of prey
dinosaurs (different species, young vs. older adults) provides evidence for selection of prey and direct
predation vs. scavenging.