

GEOL 104 Dinosaurs: A Natural History  
On-line Test II Review Sheet  
**EXAM 2 Must be Completed between: Oct. 14 & Oct. 18**

Major events in history of evolutionary biology, in particular the major contributions of:  
Carolus Linnaeus      Charles Darwin & Alfred Russel Wallace      Willi Hennig

Comparative Anatomy:

- Homology vs. Analogy
- Functions of the skeleton; how does the skeleton work and fit together?
- Anatomical directions
- Be familiar with major skull landmarks, skull bones, and postcranial bones

Taxonomy: know the basic rules, principles, and grammar of Linnaean taxonomy (esp. for genera and species); principle of priority; lumping vs. splitting

Species: What are species? What are some of the sources of variation that makes it difficult to distinguish species (sexual, ontogenetic, geographic, stratigraphic, individual)

Evolution = Descent with Modification

Initial evidence of evolution: homologies; adaptations; vestigial organs; the Linnean hierarchy; natural hybrids; transitional/intermediate fossils; embryology; fossil succession; biogeography

Fixed vs. Changing views of the world

Natural Selection = Differential Survival and Reproduction of Variants in a Population Resulting in Net Change in the Phenotype of the Descendant

Darwin & Wallace's contributions: Common Ancestry, Individual Variation, Natural Selection

Genetics and inheritance; mutations. The importance of geologic time, environmental change, and isolation for evolution.

What is "fitness" in the evolutionary sense?

Patterns of Evolution: Divergence, Correlated Progression, Adaptive Radiations, Niche Partitioning; Sexual Selection, Convergence, Co-evolution, Heterochrony (Paedomorphosis vs. Peramorphosis), Mass Extinctions

Systematics: **Be able to read a cladogram!**

- Why cladograms are more secure than trying to reconstruct direct ancestor-descendant trees

- How are cladograms constructed? How are they read?

- Be able to recognize shared derived, shared primitive, unique, convergence, and reversed character states: which are useful in phylogenetic analysis?

- Using cladograms to recognize membership in higher taxa, infer missing information, and determine minimum divergence times

Colonization of Land and Life on Land Before the Dinosaurs

Hazards of living on land relative to the water. Features exapted from marine animals for life on land: bony internal skeleton; limbs with wrists/ankles and digits to support weight; lungs to breath air; scales & mucous to prevent desiccation

New features: necks; claws; amniotic egg

Radiations of the **Amniota**:

Late Carboniferous – Early Permian:	<b>Basal synapsids</b>
Middle Permian – Early Triassic:	<b>Therapsid synapsids</b>
Middle Triassic – Late Triassic:	<b>Crurotarsan archosaurs</b>

Jurassic – Cretaceous:

Dinosaurs

Features of each group that made them successful in their time

Permo-Triassic Extinctions: Causes and effects

Carrier's Constraint on breathing and locomotion, and how archosaurs (and within archosaurs, dinosauriforms) got around it!

**Ornithomiridae:**

Elongate tibiae and metatarsi; bird-like necks

**Dinosauriformia:**

Parasagittal stance, digitigrade posture (striding locomotion)

**Sauropodomorpha:**

Dinosauria's sister-taxon; herbivorous quadrupeds