

### Vertebrate Evolution – Major Concepts for Exam 3

- 1 Describe *Seymouria*, *Diadectes*, and *Limnoscelis*. Place them in the context of amphibian classification and compare/contrast them with other amphibians and early reptiles.
- 2 What are the major components in an amniotic egg? What is the function of each? How is each part formed? Why are mammals considered to be amniotes? How do we know that extinct anapsids were amniotes?
- 3 Describe the basic skull structure of *Dimetrodon* in the context of synapsid morphology and show the steps by which a basic pelycosaur skull transformed into the mammalian condition.
- 4 What is the difference between the reptilian and mammalian jaw joint and middle ear. How did the changes come about? What is the paleontological and neontological evidence? What is recent evidence that this transition occurred twice in the history of modern mammals, independently.
- 5 Using *Thrinaxodon*, *Morganucodon*, the platypus, and the echidna as key examples, reconstruct the biology and lifestyle of animals at the reptile/mammal boundary.
- 6 How are the earliest lines of mammalian evolution determined? What is the difference between symmetrodonts and triconodonts? Which is closer to modern mammals? How are the other groups of Mesozoic mammals related?  
What major tooth trait is characteristic of modern mammals?
- 7 Using words and diagrams, trace the development of the pelvis from anapsid stem reptiles to thecodonts to dinosaurs to birds. What changes in body plan, locomotion, and life style were associated with these developments?
- 8 Describe the evidence for catastrophic extinction of dinosaurs
- 9 What are the four basic archosaurian ankle types and how do they work? It's not important to know which is crocodile normal and which is crocodile reverse as long as you understand how they differ. How can ankle joints be used to distinguish between primitive archosaurs? What are primitive archosaurs called collectively?
- 10 Draw a diagram of the major reptilian skull types and trace the evolutionary trends.
- 11 How do anapsids, synapsids, diapsids, and turtles solve their jaw mechanics problems? Compare and contrast the skull of a modern turtle with *Proganochelys*
- 12 What is the difference between archosaurs and lepidosaurs. How does the tuatara fit in?
- 13 Describe the body plan of *Archaeopteryx* and indicate those parts that are dinosaur-like and those that are bird-like. Use *Deinonychus*, and the hoatzin to trace the major events in bird evolution.
- 14 draw a diagram of a bird pectoral girdle. Identify the bones and explain the adaptations to flight.
- 15 What characteristics define a dinosaur? What are the two major groups of dinosaurs? Name several typical members of each group? How did the dinosaur pelvis change over time? What factors influenced the distribution of dinosaurs over time?
- 16 How did the ankle joint change from primitive diapsids through thecodonts to dinosaurs? How can ankle joint structure be used to trace out archosaur evolutionary lines?

Identify the following:

*Limnoscelis*  
*Diadectes*  
*Seymouria*  
*Protorothyris*  
*Captorhinus*  
*Labidosaurus*  
*Scutosaurus*  
*Mesosaurus*  
*Proganochelys*  
*Varanops*  
*Ophiacodon*  
*Edaphosaurus*  
*Sphenacodon*  
*Dimetrodon*

*Biarmosuchus*  
*Placerias*  
*Lystrosaurus*  
*Thrinaxodon*  
*Cynognathus*  
*Probainognathus*  
*Kayentatherium*  
*Lycaenops*  
*Moschops*  
*Sinoconodon*  
*Gobiconodon*  
*Ptilodus*  
*Lagosuchus*