

Name: \_\_\_\_\_

SID: \_\_\_\_\_

## Raptors and Sea Monsters Spring 2008

### Final Exam – Sea Monsters

Please print out this test, complete it and bring it to class next week. You may use any resources except working together. Partial credit will be given for attempted answers, with possible bonus points for elaboration. If you have a question, e-mail one of the facilitators. **100 points total.**

#### Part A – Multiple Choice **1 point each**

- The following are characteristic of members of Pliosauridae EXCEPT:
  - a relatively large skull (about 1/4 body length)
  - a shortened tail (shorter than skull+neck)
  - laterally compressed, serrated teeth
  - a relatively short neck (<28 cervical vertebrae)
  - a whale-like, streamlined body plan
- To which clade(s) do the phytosaurs belong?
  - Archosauromorpha
  - Lepidosauromorpha
  - Sauria
  - (a) and (c)
  - (b) and (c)
- Advanced ichthyosaurs (like *Ophthalmosaurus*) used
  - Thunniform propulsion
  - Anguilliform propulsion
  - Paraxial propulsion
  - Carangiform propulsion
  - Dorso-ventral propulsion
- Late Jurassic ichthyosaur flippers exhibited
  - pachyostosis
  - polydactyly
  - hyperphalangy
  - (a) and (c)
  - (b) and (c)
- Mosasaurus are known to have eaten the following EXCEPT:
  - squid
  - pterosaurs
  - other mosasaurs
  - diving birds
  - placodonts
- Basilosaurus* was a(n)
  - sphenodontid lizard
  - ancient whale
  - elamosaur
  - prolacertiform
  - ichthyosaur

7. The order of evolution of Sauropterygians, from most basal to most derived, is:
  - a. Nothosaurs, Pistosaurs, Pachypleurosaurs, Plesiosaurs
  - b. Pachypleurosaurs, Pistosaurs, Nothosaurs, Plesiosaurs
  - c. Pistosaurs, Pachypleurosaurs, Nothosaurs, Plesiosaurs
  - d. Pachypleurosaurs, Nothosaurs, Pistosaurs, Plesiosaurs
  - e. Nothosaurs, Pachypleurosaurs, Plesiosaurs, Pistosaurs
8. Many marine reptiles of the Mesozoic were most likely viviparous. A group that was certainly NOT were the
  - a. plesiosaurs
  - b. ichthyosaurs
  - c. champsosaurs
  - d. mosasaurs
  - e. pliosaurs
9. Which of the following would one NOT find on/with a *Cryptoclidus* skeleton?
  - a. dermal scutes
  - b. gastralia
  - c. gastroliths
  - d. *Cretoxyrhina* tooth marks
  - e. one temporal fenestra
10. The Kansas Chalk Formation, home to many mosasaur skeletons, was once covered by
  - a. the Panthalassa Ocean
  - b. the Tethys Ocean
  - c. Gondwana
  - d. the Western Interior Seaway
  - e. the Deccan Traps

Part B – Fill-in-the-blanks **2 points per blank**

11. Modern crocodylomorphs include alligators, crocodiles, and gharials, but their evolutionary history is quite diverse. Examples include \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_.
12. The top predatory niches in the ocean have been filled by a variety of carnivore groups over the history of life on Earth. Ichthyosaurs ruled most of the seas in the \_\_\_\_\_ Period, to be replaced by plesiosaurs and pliosaurs in the \_\_\_\_\_. The Late Cretaceous oceans were dominated by the \_\_\_\_\_. After the extinction of large marine reptiles with the dinosaurs, primitive whales occupied those niches in the \_\_\_\_\_ Epoch.
13. *Cymbospondylus*, *Utatsusaurus*, and *Chaohusaurus* were all primitive \_\_\_\_\_ that possessed long, laterally flattened tails, ideal for \_\_\_\_\_ locomotion through the water.
14. \_\_\_\_\_ refers to organisms that actively swim, \_\_\_\_\_ crawl along the seabed, and \_\_\_\_\_ float in the water column.
15. *Temnodontosaurus*, an advanced \_\_\_\_\_, had the largest \_\_\_\_\_ of any animal. \_\_\_\_\_ rings help in keeping their shape during locomotion and diving.

Part C – Matching (list all that apply) **1 point each**

- |  |     |                          |
|--|-----|--------------------------|
| 16. Had a lunate homocercal caudal fin   | ___ | a) Nothosaurs            |
| 17. Lived in the Western Interior Seaway                                       | ___ | b) <i>Eurhinosaurus</i>  |
| 18. Sauropterygian   | ___ | c) Thalattosaurs         |
| 19. Member of Archaeoceti  | ___ | d) Mesosaurs             |
| 20. Early Permian anapsids that provided evidence for continental drift theory | ___ | e) <i>Platypterygius</i> |
| 21. Pliosaur   | ___ | f) Placodonts            |
| 22. Triassic marine reptile  | ___ | g) Metriorhynchids       |
| 23. Had a double-hinged jaw  | ___ | h) <i>Kronosaurus</i>    |
| 24. Ichthyopterygian   | ___ | i) <i>Ambulocetus</i>    |
| 25. Only archosaurs completely adapted to marine life                          | ___ | j) <i>Tylosaurus</i>     |

Part D – Short Answers **10 points each**

1. To the right is a famous picture of “Nessie”, the Loch Ness Monster. Give three reasons why Nessie could not be a plesiosaur.




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2. One day while walking near Topeka, you stumble on a pile of rocks near the road that turns out to contain the fossils to the right. What do they belong to, and how can you tell?




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Part E – Essay Responses **15 points each**

1. The order Plesiosauria is divided into two major clades based on a set of morphological distinctions. Below are skeletons of:  
 (a) *Styxosaurus snowii* and (b) *Liopleurodon ferox*. Please name and describe these clades, along with their defining synapomorphies, as well as the locomotion method of the order.

