Name_____
Lab Day and Time_____

12:007
The Age of Dinosaurs
Fall 2008

LAB EXERCISE 3
BASIC PARSIMONY

A cladogram showing vertebrate relationships is shown on the next page. Answer these questions based on the cladogram and the character-taxon matrix below it.

1. "Pisces" (indicated on the cladogram with the dotted line) is an old name referring to "fish." What kind of group (monophyletic, polyphyletic, paraphyletic) is Pisces?

2. What is the smallest monophyletic group on the cladogram that includes everything we might refer to as a fish?

3. Is a lungfish more closely related to the land vertebrates or to the ray-finned fishes?

4. On this cladogram, what is the closest relative of the rays?

5. On this cladogram, what is the closest relative of Osteichthyes?

Map the character states shown in the matrix onto the cladogram.

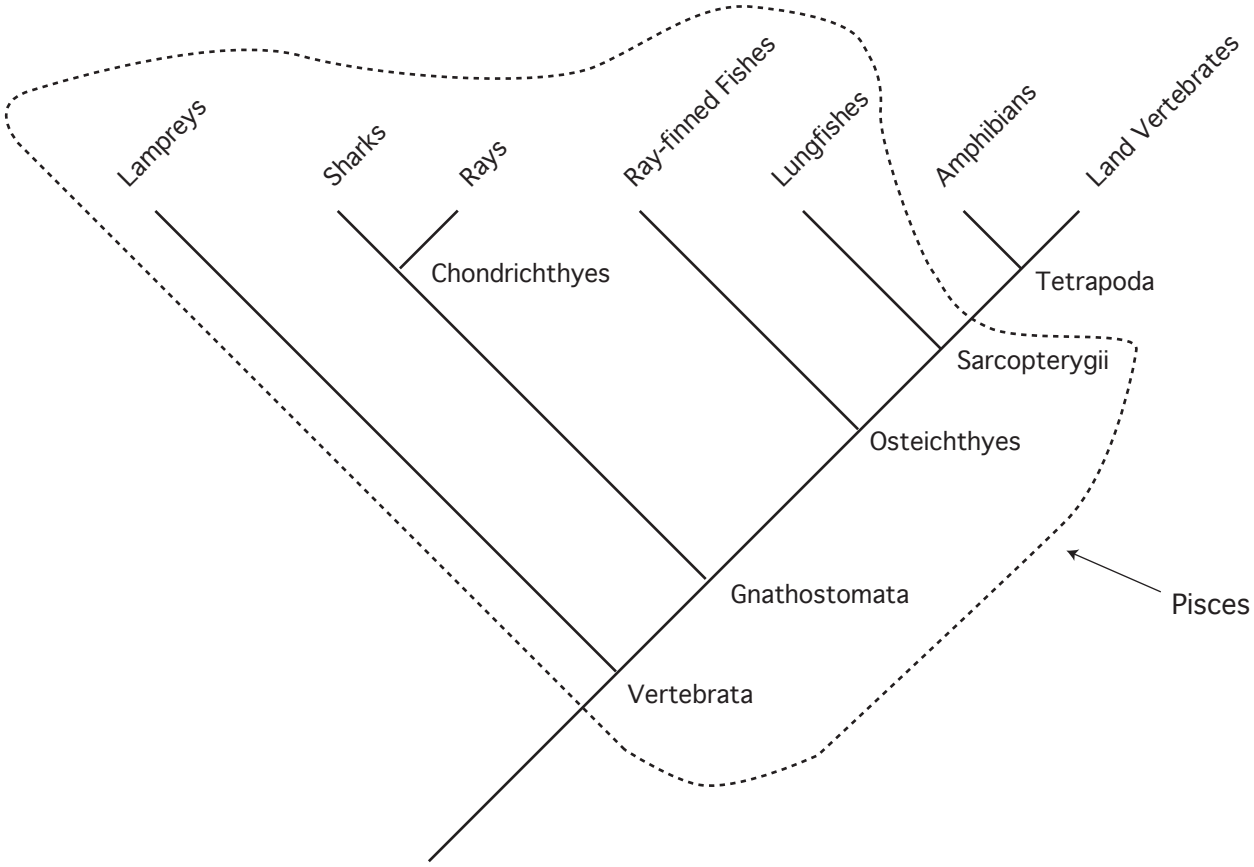
6. What is the smallest number of character state changes needed on this cladogram?

7. Of what monophyletic group is "choanae" a synapomorphy?

8. What would be a synapomorphy for Tetrapoda?

9. Name any character on the cladogram that is a plesiomorphy for Tetrapoda.

10. Are lungs a synapomorphy or plesiomorphy for lungfish?



	Lampreys	Sharks	Rays	Ray-finned Fishes	Lungfishes	Amphibians	Land Vertebrates
jaws	no	yes	yes	yes	yes	yes	yes
lungs	no	no	no	yes	yes	yes	yes
bony skeleton	no	no	no	yes	yes	yes	yes
internal choanae	no	no	no	no	yes	yes	yes
fingers and toes	no	no	no	no	no	yes	yes