Lab 1 Worksheet: Great Transitions – The Origin of Tetrapods

A. Use the Great Transitions video to answer the following questions in the space provided. (30 points)

1. What are transitional fossils? Why are they important? (3)



2a. What pattern can you observe in all tetrapod limbs (see the diagram below)? (1)

b. What can you hypothesize about the connection between all tetrapods based on this pattern? (2)

3. The image below shows fossils embedded in rock layers. Based on the ages of those rock layers, explain how researchers were able to predict that they would find a fossil like *Tiktaalik* in rock layers around 375 million years old. (3)



4. What three lines of evidence suggest that tetrapods and fish are closely related? (3)

5. How do paleontologists decide where to look for fossils? (2)

6. How is it possible for fossils of ancient fish to be found in a valley in the Canadian Arctic? (2)

7. Why was their discovery of the tip of the snout of a flat-headed fish so significant? (3)

8. Why is *Tiktaalik* considered a transitional fossil? Be specific about the characteristics. (6)

9. Did the transition from fish to tetrapod happen quickly or slowly? Explain. (2)

10. "Transitional organisms are not actual species." Do you agree with this statement? Why or why not?(3)

B. Use the interactive resource to complete the following questions. (70 points)

INTRODUCTION

1. Tetrapods are	. Examples of tetrapods include	,
·	, and	. (5)

2. Tetrapods first appear in the fossil record _____ million years ago. (1)

3. Charles Darwin predicted that tetrapods evolved from _____. What observation leads to that hypothesis? (4)

4. What evidence would you expect to find to support that hypothesis? (3)

ANATOMICAL FEATURES OF TRANSITIONAL FORMS Gills or Lungs?

5. Fish use ______ to breathe underwater. (However, many species of lobe-finned fishes that evolved during the Devonian period also had ______.) (2)

6. In fossils, what anatomical evidence indicates that gills were present? (1) _____

7. Many transitional species had gills which means that they lived in _____. (1)

8. Lungs allow an animal to breathe _____. Why did this adaptation evolve? (4)

9. Tetrapods use ______ to breathe. Do any modern tetrapods have gills? Explain. (4)

The Ribcage

10. Why is a sturdy ribcage important for tetrapods? (3)

Humerus (Limbs)

11. What is homology? To what are fins homologous? (4)

12. Why are lobe-finned fish thought to be the closest relatives to tetrapods? (3)

Digits

13. Most modern tetrapods have ______ digits on front limbs and ______ digits on back limbs, although some species have fewer. How does this number compare to the number of digits on the limbs of transitional fossil forms? (4)

Head and Neck

14. Why do many of the transitional fossils between fish and tetrapods have flat heads? (3)

15. How did the anatomy of the shoulder and head change during tetrapod evolution? (3)

COMPARING FOSSIL FORMS

16. ______ and ______ are fossil species have characteristics unique to fish as well as characteristics found in fish and tetrapods. Describe the characteristics of lobe-finned fish that are similar to those of tetrapods. (8)

17. Which lobe-finned fish is alive today? (1) ______

18. Acanthostega and Icythyostega have been called fish-like tetrapods. Explain why they are described as such and describe the environment in which they probably lived. (5)

19. Why is Tiktaalik such an important transitional fossil? (3)

20. ______ and ______ are early tetrapods that do not have features unique to fish. Describe how these two species differ anatomically and what that means about where they each lived. (8)