GREAT TRANSITIONS INTERACTIVE

Using the HHMI Click and Learn “Great Transitions Interactive,” you will explore the evolution of four-limbed animals from fish, focusing on transitional forms with features of both fish and tetrapods, and see the progression of anatomical changes from reconstructed fossil skeletons.

INTRODUCTION
1. Tetrapods are ___________________. Examples of tetrapods include ________________, ________________, ________________, and ________________.
2. Tetrapods first appear in the fossil record ________ million years ago.
3. Charles Darwin predicted that tetrapods evolved from _______________. What observation leads to that hypothesis?
4. What evidence would you expect to find to support that hypothesis? What age rocks would you look in and why?

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 ___________.)
6. In fossils, what anatomical evidence indicates that gills were present? ________________
7. Many transitional species had gills which means that they lived in ____________________________.
8. Lungs allow an animal to breathe ______________. Why did this adaptation evolve?
9. Tetrapods use ___________ to breathe. Do any modern tetrapods have gills? Explain.
The Ribcage
10. Why is a sturdy ribcage important for tetrapods?

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

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

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?

Head and Neck
14. Why do many of the transitional fossils between fish and tetrapods have flat heads?

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

17. Which lobe-finned fish is alive today? ________________________

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.

19. Why is Tiktaalik such an important transitional fossil?

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.