Discovering a "Missing Link"

Summary: The fossil record is littered with gaps. The job of many evolutionary biologists and paleontologists is to search for transitional fossil forms that fill these gaps. Geological maps lead them around the globe in search of sites that will offer them the best chances for finding fossils from a particular time period. In this project, you will research the discovery of a significant transitional fossil that occurred in 2004. Your job in this assignment is to present scientific information in an entertaining way. You will submit two journal entries from the perspective of a paleontologist in which you give a detailed description of the expedition, describe the characteristics of this animal and convey the significance of this fossil find.

Purpose: Your journal entries are meant to provide your audience with scientific information. Your goal is to describe what it is like to be a paleontologist working in the field and to convey information about the recent fossil discovery of *Tiktaalik roseae*.

Audience: Your primary audience is yourself but your detailed journal entries are written in such a manner as to provide great insight into your research.

Writer's Role: You are writing from the perspective of one of the paleontologists who went on the *Tiktaalik* expedition.

Form: Your assignment will take the form of two journal entries. The first entry will be written from the expedition site in the Canadian Arctic. The second entry will be written from the laboratory after you have observed the specimens you collected during your expedition.

Research:
#1. Visit the *Tiktaalik* Home Page at the University of Chicago Website. This page gives a detailed description (including photographs) of the expedition to the Canadian Arctic and the discovery of *Tiktaalik*.

University of Chicago "Tiktaalik Homepage" at http://tiktaalik.uchicago.edu/

Focus Questions related to the expedition:

1. Who are the paleontologists that led this expedition?
2. Where did they go to look for fossils?
3. What type of fossils were they looking for?
4. What made this site an ideal location for collecting fossils?
5. What were some problems the paleontologists encountered working in this environment?
6. Describe how the fossils were collected and shipped back to the laboratory.

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#2. Use 2+ of the following articles to answer the following questions related to *Tiktaalik*'s discovery.

Focus Questions related to laboratory findings.

1. How did the paleontologists decide on the name *Tiktaalik*?
2. Define tetrapod.
3. *Tiktaalik* is commonly referred to as a "missing link". For what two types of organisms is *Tiktaalik* a transitional form?
4. What environmental force(s) led to the natural selection of limb-like fins during the time that Tiktaalik roamed the earth (Devonian era)?
5. *Tiktaalik roseae* is sometimes referred to as a "fishapod". Use T chart to distinguish *Tiktaalik's* fish-like characteristics from its tetrapod-like characteristics.

Resources:

Ahlberg, Erik and Jennifer A. Clack. "A firm step from water to land." Nature 440(2006): 747-749.

Clack, Jennifer A. "Getting a Leg Up on Land: Recent fossil discoveries cast light on the evolution of four-limbed animals from fish." Scientific American. Com. November 21, 2005. 17 Jul 2006 <http://www.sciam.com/article.cfm?chanID=sa006&colID=1&articleID=000DC8B8-EA15-137C-AA1583414B7F0000>

Daeschler, Edward B., Neil H. Shubin and Farish Jenkins, Jr. "A Devonian tetrapod-like fish and the evolution of the tetrapod body plan." Nature 440(2006):757-763.

Daeschler, Edward B., Neil H. Shubin and Farish Jenkins, Jr. "The pectoral fin of *Tiktaalik roseae* and the origin of the tetrapod limb." Nature 440(2006):764-771.

Helmuth, Laura. "Neil Shubin, paleontologist, University of Chicago: the 'missing link?' at least a step in a new direction (Interview)." Smithsonian June 2006: 36.

Murphy, Dennis. "*Tiktaalik rosea*." Devonian Times. July 6, 2006. 17 Jul 2006 <http://www.devoniantimes.org/>.

Murphy, Dennis. "Opportunity Knocked: The Devonian Transformation." Devonian Times. July 9, 2006. 17 Jul 2006 <http://www.devoniantimes.org/>.

Vergano, Dan. "Fish out of water could bridge the fossil gap." USA Today April 6, 2006: 06D.

"What has the head of a crocodile and the gills of a fish?" Understanding Evolution. May 2006. The University of California Museum of Paleontology. 17 Jul 2006 <http://evolution.berkeley.edu/evolibrary/news/060501_tiktaalik>