Short Film

Great Transitions: The Origins of Tetrapods

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Educator Materials

AT A GLANCE FILM GUIDE

DESCRIPTION

The discovery of *Tiktaalik*, a fossil with a mix of features common to fish and four-legged animals (tetrapods), is one of the most exciting adventures in the long history of fossil exploration. *Tiktaalik*, along with other transitional fossils, illuminates the key evolutionary steps that groups of animals took as they moved from water to land.

KEY CONCEPTS

- Species descend from other species. Even distantly related species, like humans and sponges, can trace their shared ancestry back to a common ancestor.
- The fossil record provides a history of life on Earth. It includes fossils with features that are intermediate, or transitional, between those of major groups of animals.
- When a series of transitional fossils are viewed together, they reveal the gradual sequence of change connecting one major group to another.
- Evidence that land vertebrates descended from fish includes transitional fossils, anatomical similarities among embryos and adult animals, and genetic evidence of common ancestry.
- The limbs of mammals, amphibians, reptiles, and birds look different, but they are all built on a shared basic arrangement of "one bone, two bones, many bones, and digits."
- To find fossils, scientists develop hypotheses about the types of habitats in which earlier animals lived and when they lived there. They then predict which types and ages of rocks would house fossils of those animals.

CURRICULUM AND TEXTBOOK CONNECTIONS

Curriculum	Standards
NGSS (April 2013)	MS-LS4-1, MS-LS4-2 HS-LS4-1, LS4.A, LS4.B, LS4.C, LS4-2, LS4-4, LS4-5, HS-ESS1-5, HS-ESS2.B
AP (2012–13)	1.A.1, 1.A.2, 1.A.4, 1.B.1, 1.C.1, 1.C.3, 1.D.2, 4.B.3, 4.B.4
IB (2016)	5.1

Textbook	Chapter Sections
Miller and Levine, *Biology* (2010 ed.)	16.2, 16.3, 16.4, 17.3, 19.1, 19.2
Reece et al., *Campbell Biology* (9th ed.)	22.1, 22.2, 22.3, 25.2, 25.5, 25.6

SUGGESTED AUDIENCE

Told by University of Chicago paleontologist Neil Shubin, who led the research team that discovered *Tiktaalik*, this story illustrates the scientific process and the power of fossil evidence. As such, the story provides an introduction to evolutionary science and the fossil record, appropriate for middle and high school science classes. For students with more advanced knowledge, the film will reinforce key concepts in macroevolution, anatomy, and geology.

KEY REFERENCES

Shubin, N. *Your Inner Fish: A Journey into the 3.5-Billion-Year History of the Human Body*.

Carroll, S. B. "It's a Fishapod!" www.biointeractive.org/its-a-fishapod.pdf.