

Evolution

This course draws on the Museum's long-standing leadership in the fields of paleontology, geology, systematics, and molecular biology to tell a modern story of evolution. Students will learn why evolution is the fundamental concept that underlies all life sciences and how it contributes to advances in medicine, public health, and conservation.

Students will also gain a solid understanding of the basic mechanisms of evolution — including the process of speciation — and how these systems have given rise to the great diversity of life in the world today. We'll also look at how new ideas, discoveries and technologies are modifying prior evolutionary concepts.



Key Science Concepts:

- **There are numerous lines of evidence that support the theory of evolution.** Scientists study evolution in many ways. Charles Darwin developed his groundbreaking views on evolution by observing patterns in nature. This practice is still common today, but the tools of molecular biology and systematics add to the picture.
- **The Tree of Life represents evolutionary history.** There are over a million species on Earth today. The basis of evolution is the theory that all living things share a common ancestor and that evolution is the mechanism that has driven that diversification. Scientists construct evolutionary trees to look for patterns of relationships between species and to examine relationships between diverse species.
- **Evolution happens through a variety of mechanisms.** Natural selection, sexual selection, mutation, and genetic drift all influence the path of evolution as do interactions between species. We can study evolution by looking at the molecular biology of development in the new field of Evo Devo.
- **Many factors influence the formation of new species.** Evolutionary biologists have different definitions of species and therefore subscribe to different notions about the process of speciation. Factors such as geography, environment, and population size determine the formation of new species.
- **Humans have a complex evolutionary history.** Humans are the only species we know of that has evolved consciousness. A complex web of factors, such as geography and culture, has influenced the evolution of our own species, as well as other hominid lineages.
- **Evolution impacts our daily lives.** Nearly one hundred and fifty years after he published *On the Origin of Species*, Darwin's theory still holds up. An understanding of evolution helps fight disease, grow healthy food crops, and preserve endangered species and their habitats.

Authoring Scientists:

Dr. Joel Cracraft is Lamont Curator of Birds and Curator-in-Charge of the Department of Ornithology at the American Museum of Natural History. He received his B.S. (Zoology) from the University of Oklahoma, M.S. (zoology) from Louisiana State University, and his Ph.D. (biology) from Columbia University in 1969. He was on the staff of the University of Illinois, Chicago (Anatomy and Cell Biology) before coming to New York in 1992 as Curator of Ornithology. He also has adjunct professorial appointments in the Department of Ecology, Evolution and Environmental Biology at Columbia University and in the Graduate Program in Biology at the City University of New York.



Dr. Niles Eldredge has been a paleontologist on the curatorial staff of the American Museum of Natural History since 1969. His specialty is the evolution of trilobites—a group of extinct arthropods that lived between 535 and 245 million years ago. Eldredge is the Curator responsible for the content of the major exhibition Darwin, which opened at the American Museum of Natural History in New York on November 19, 2005. The exhibition will arrive at London's Natural History Museum for the 200th anniversary of Darwin's birth in 2009. His book Darwin: Discovering the Tree of Life (2005) accompanies the exhibition.

