

# BSCS Biology An Ecological Approach

## Chapter 21 Ecosystems of the Past

*The theory of evolution by cumulative natural selection is the only theory we know of that is in principle capable of explaining the existence of organized complexity.*  
-Richard Dawkins

### Introduction

The history of life on earth is studied by many specialized scientists including **archeologists**, **paleoecologists**, **paleontologists**, and **geneticists**. Many **patterns** of life from the past are similar to life patterns today. Studying the past reveals clues to the present and even the future of life on earth and the survival of the species.

### Clues to the Past

The partial remains of previous life are preserved in **fossils**. **Paleontologists** are scientists who study fossils as a means of understanding past life forms. Sophisticated age-dating techniques utilize **Carbon 14** and **Potassium 40** to help scientists determine the age of fossils. Sometimes **fossil DNA** can be studied for clues to life from the past. By comparing fossils over the vast reaches of geologic time, scientists have developed a good picture of the history of life on earth from the very beginnings.

### Plate Tectonics and the Evolution of Life on Earth

Scientists have found very similar organisms living great distances apart and on different continents. This led to the theory and study of **continental drift** which explains that continents are “floating” on a liquid core of the earth. Over time, they are slowly drifting apart. **Plate tectonics** is the study of this ongoing movement of the continents. The organisms living on the slowly moving continents simply ride along (in geologic time, of course) and are thus found far apart many generations later.

### Paleoecosystems

A variety of ecosystems have come and gone since life first appeared on earth. Here is a summary of these systems and eras:

Ecosystem/Name	Time Period	Characteristics
Cambrian	540 million years ago	marine life only
Devonian	400 million years ago	land plants and fishes
Carboniferous	350 million years ago	huge plants/ferns, numerous invertebrates, amphibians
Jurassic	240 million years ago	dinosaurs
Cretaceous	140 million years ago	flowering plants, small lizards
Cenozoic	66 million years ago	age of mammals

### The Arrival of Humans

**Primates** are a group of mammals including monkeys, apes, and humans. The first primates lived in trees and generally had only one offspring at a time. They had large brains and eyes focused forward to enable depth perception needed for swinging from trees. The primates do a great deal of **teaching** of their **young**. The **hominids** were primates that “came down from the trees” and walked upright on two legs. **Australopithecines** was one such early hominid. They were replaced by **Homo habilis** followed by **Homo erectus** which was the first hominid to make use of primitive **tools**. **Homo sapiens neanderthalensis** or the **Neanderthal Man** was yet another group of hominids. This so-called **caveman** developed many social **customs** including the burying of the dead and the wearing of jewelry. Modern man began to develop the use of **fire** and the wearing of clothing. **Geneticists** and **anthropologists** have added important information to this part of the development of life on earth.