

GEOL 1122 Earth's History of Global Change Walker 2008

Lecture 5: Evolution and the Diversity of Life, Charles Darwin, and Alfred Russel Wallace (Chap. 7 text)

I. Amazing Diversity of Life, Biodiversity

Introduced by Madagascar Chameleon Diversity, forehead mites
What does a single square meter of temperate forest have?
Do we really know how many species are on Earth?
Estimated amounts of biodiversity on Earth
What is biodiversity?
Biodiversity in the fossil record, how many estimated fossil species?
Massive reduction in biodiversity in the fossil record: Mass Extinctions
How many Mass Extinctions during the Phanerozoic Eon?

Two Major Empires of Life on Earth:

Prokaryotes and Eukaryotes
These Empires are based on?

Two Major Domains of Life on Earth

Of the Prokaryote Empire: Archaea Domain and Eubacteria Domain
Of the Eukaryote Empire: only the Eukarya Domain
These domains are based on?

Major Kingdoms:

Plant Kingdom and characteristics
Protista Kingdom and characteristics
Animal Kingdom and characteristics
Fungi Kingdom and characteristics

II. So why all this diversity on Planet Earth?

Let's go back in human history to the Victorian time period in England (early-Mid 1800's), Industrial Revolution fueled by the solar energy powerhouse, coal!

What is the fixity of species?
Importance of Linnaeus, binomial nomenclature, taxonomy, fixity of species (Linnaeus was in the 1700's).
When did the fixity of species get questioned? What was the new idea?

Alfred Russel Wallace and his ideas

Biogeographic Provinces
Wallace's Line
Variation in Species

Thomas Malthus, Essay on the Principle of Population (from 1700s)

Charles Darwin, the Voyage of the Beagle, The Galapagos Island, The Origin of the Species (1859) and his ideas

Darwin's Evolution
Evolutionary Phylogeny
Evolutionary (Adaptive) Radiations, Example, Darwin's finches
Evidence Darwin used for his mechanism of Evolution, which is Natural Selection

Tenets of Natural Selection (based on Malthus and Darwin's research)
There are four logical interlocking ideas here