

GEOLOGY 302 FOSSILS: LIFE THROUGH TIME FALL 2005 RICK MILLER

"HIGH UP IN THE NORTH IN THE LAND CALLED SVITHJOD, THERE STANDS A ROCK. IT IS A HUNDRED MILES HIGH AND A HUNDRED MILES WIDE. ONCE EVERY THOUSAND YEARS A LITTLE BIRD COMES TO THIS ROCK TO SHARPEN ITS BEAK. WHEN THE ROCK HAS THUS BEEN WORN AWAY, THEN A SINGLE DAY OF ETERNITY WILL HAVE GONE BY."

Hedrick Van Loon, 1951

This is a rather fanciful and poetic quote, but is appropriate for reflecting on the immensity of geologic time. Does it work for you? Aren't we a clever species to have been able to figure out geologic time and the age of the Earth? Kind of a shame that some humans can't seem to accept this information...

TEXTBOOK:

Gould, S. J. (ed.) and 10 authors. 1993. **THE BOOK OF LIFE**. W. W. Norton & Company, New York, 256 p.

EXAMS AND QUIZZES:

There will be at least two exams and a number of short quizzes during semester. Total points between 400-500. (This is subject to change). **Timing of quizzes listed below is approximate and might vary depending upon our lecture schedule. It is your responsibility to find out when the quizzes will be given.**

PROJECT:

Optional, **extra credit** assignment based on web site: "The Fossil Record". It will be graded. If completed and turned in by **10th week** (First Week In November), this project is worth a maximum of **40 points**. After that date, this project is worth a maximum of **25 points, and it must be turned in by the last day of lecture**. I will have the question sheet available by the second week of class.

GRADES:

Grades will be based on your accumulated total points for the entire semester and will be determined by your numerical ranking in the class. This is like being graded on a curve!!
For a "credit" grade you are required to have a "C" or better for the semester. (University Policy)
Extra credit is added in **AFTER** your total points and grade are determined.

OFFICE & INFORMATION:

Office: GMCS 228E

Telephone number and voice mail **(619) 594-5118** (MY OFFICE)

e-mail address: **rmiller@geology.sdsu.edu**

Office hours: TuTh @ 11:00 – 12:00; W 2:00 – 4:00; OR BY APPOINTMENT

COMPUTER STUFF:

Web site: <http://www.rohan.sdsu.edu/~rhmillr>. This is the web site for the extra credit project on the fossil record, and also contains web pages for other geologic and paleontologic information.

Web site: <http://www.geology.sdsu.edu/visualgeology/geology101>. A useful web site for basic geological topics.

SCHEDULE OF EVENTS

(THE FOLLOWING SCHEDULE IS SUBJECT TO CONSIDERABLE MODIFICATIONS. IT IS YOUR RESPONSIBILITY TO BE AWARE OF THESE CHANGES AS THEY ARE ANNOUNCED)

PART 1. GEOLOGIC AND BIOLOGIC CONCEPTS THAT PERTAIN TO THE HISTORY OF LIFE ON EARTH

In order to unravel and even to begin to understand the long, complex history of life on Earth, a number of scientific concepts have to be learned and understood. It is unfortunate that the vast majority of humans have little or no understanding of most of these concepts. In fact, most have serious misunderstandings, which result in some mighty stupid (ignorant?) human behavior patterns.

Some of these concepts are relatively simple and some are more complex, but all of them represent tools that geologists and paleontologists put to good use in fitting the puzzle together.

There are many secrets hidden in the rock and fossil record of this planet; some of these secrets we humans have discovered; a great many are left to be discovered; and many have been obliterated and will never be discovered.

Sept. 1 Introduction to this class.

Who (or what) are we?

A New Introduction & Preface
Chapter 6, p218-251

Introduction to geology and paleontology

Preface & Introduction
Web page: THE FOSSIL RECORD
Web site: GEOLOGY 101 LAB

Sept. 6 Important basic concepts (sedimentary rocks, fossilization, classification of life)

Introduction.

Web page: SEDIMENTARY ROCKS

QUIZ 1. MATERIAL FROM FIRST TWO WEEKS (more specific details will be added)

Sept. 13 A major human discovery I: The geologic time scale

Introduction
Web page: THE FOSSIL RECORD
Web page: GELOGIC TIME SCALE
Web site: GEOLOGY 101 LAB

PART 2. EVOLUTIONARY HISTORY OF THE LAST 4,000 MILLION YEARS

This does sound somewhat presumptuous don't you think? But, within the last 50 years (since 1954) the search for - and discovery of - evidence of ancient life on Earth has blossomed. Earth's ancient rocks have yielded some of their long buried secrets: There have been major discoveries of trace fossils, of actual remains of organisms, and even of organic chemical signatures (hints of life).

An unbiased look at this evidence, coupled with the information available from other branches of geology and associated sciences, has provided a reasonably detailed picture of the earliest history of our planet, and very strong documentation for the processes of biologic evolution.

Sept . 20 A major human discovery II: The Laws Evolution.

Introduction

QUIZ 2. GEOLOGIC TIME

Sept. 27 Early history of planet Earth.
A most inhospitable planet Chapter 1

Oct 4 Appearance of the biosphere. What is it and
where did it come from? Chapter 1

Nucleated cells; sexes appear.
New kinds of organisms - multicellularity Chapter 1

QUIZ 3. TOPIC TO BE ANNOUNCED

Oct. 11 An explosion in the fossil record -
diversity, diversity, diversity! Chapters 1, 2
Web Page: THE FOSSIL RECORD

Oct. 18. Complex communities in the water.
The first chordates appear. Chapter 2
Chordates develop a skeleton and jaws. *Web Page: CHORDATES PART I*

MIDTERM EXAM ON ALL PREVIOUS MATERIAL

Oct. 25 Terrestrial communities: An escape from the water: Chapter 3
Terrestrial vertebrates;
Legs and lungs
Terrestrial plants spread

QUIZ 4. EARLY HISTORY OF CHORDATES AND PLANTS

Nov. 1 Terrestrial plants appear (spores to seeds) Chapter 3
Web Page: HISTORY OF PLANTS

THURSDAY. LAST DAY FOR 40 POINT EXTRA CREDIT PROJECT

Nov. 8 End of the Permian: A small problem of extinction Introduction (also note Index)

QUIZ 5. LATE PALEOZOIC EVENTS

Nov. 15 New faces all over the place. Chapter 4
The ruling reptiles *Web Page: CHORDATES PART II*

Terrestrial plants (flowers appear). Chapter 4
Web Page: HISTORY OF PLANTS

Nov. 22 Hair, fur and feathers = cute & fuzzy? Chapter 5
Evolution of Mammals

QUIZ 6. RULING REPTILES AND PLANTS

THANKSGIVING RECESS

Nov. 29 End of the Cretaceous: Another “small”
problem of extinction

Dec. 6 Cute, fuzzy and feathery things get big and ornery

Chapter 5

Climate changes = vegetation changes =
animal changes

Dec. 13 Hair, fur and feathers.

The Primates:

Human Primates (a naked biped)

Chapter 6

Last class meeting before final exam.

LAST DAY TO TURN ON PROJECT FOR 25 EXTRA CREDIT POINTS.

FINAL EXAM. ALL MATERIAL SINCE THE MIDTERM EXAM

PARTING SHOT...

"The most remarkable discovery made by scientists is science itself. The discovery must be compared in importance with the invention of cave-painting and of writing. Like these earlier human creations, science is an attempt to control our surroundings by entering into them and understanding them from inside. And like them, science has surely made a critical step in human development which cannot be reversed. We cannot conceive a future society without science."

Dixon, Dougal and three other authors. **ATLAS OF LIFE ON EARTH.** Barnes & Noble, New York, 368 p. Lots and Lots of pictures!!