How to succeed in Historical Geology 002

- Come to lecture - listen. I will play the Virgil to your Dante.
- Read the textbook soon after lecture. Take notes.
- Bring presentation printouts to class.
- Read, read, read, read!!!!!!!
- Hand in all writing assignments and labs on time.

Books and such

Text: Historical Geology, 5E
Wicander, Monroe, Bennington, Merguerian

Lab Manual: Bennington, 2010 (Free!)

Geological Highway Map of New York

Your Inner Fish, Neil Shubin
- two essay assignments based on reading.
Field Trips
American Museum of Natural History (Saturday - April 10th)
Minnewaska State Park, New Paltz (Saturday - May 1st)

DO....!
Participate in class!
Ask questions!!!!

Prior to the 1500’s...

Earth is the center of the universe.

Humans created by God in His image 6 days after the creation of the Earth.

Earth history = Human history

Humans are separate from the rest of the animal kingdom.

The universe was created to support us! **We were special.**
The Astronomers (1500’s - 1600’s)

Copernicus (1473-1543)

The Earth is not the center of the universe.

Galileo (1564-1642)

The Geologists (1700’s)

Cuvier (1769-1832)

Hutton (1726-1797)

The Earth is ancient and has a long pre-human history.

Charles Darwin (1809-1882)

Geologist and Evolutionary Biologist

All species, including humans, were evolved from ancestors through a natural, biological process. Humans are a product of the natural world and natural laws.
The Earth is 4.6 billion years old

<table>
<thead>
<tr>
<th>Now</th>
<th>December 31st</th>
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<tbody>
<tr>
<td>Earth Forms</td>
<td>One Year</td>
</tr>
<tr>
<td>4.600,000,000 years ago</td>
<td>January 1st</td>
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Major Subdivisions of Geologic Time

- 3.45 Ga
- 2.3 Ga
- 1.15 Ga
- 4.6 Ga
- 0 Ga

Diagram showing the major subdivisions of geologic time with various geological events and time markers.
Earth is cooling.

Origin of life?
Heavy meteoric bombardment.
Crust, oceans, and atmosphere are forming and reforming.
No surviving rock.

Formation of the Moon
Formation of the Oceans and Atmosphere

- February 3.8 Ga
- March 4.6 Ga
- April 1.15 Ga
- May 2.3 Ga
- June
- July
- August
- September
- October
- November
- December

Hadean Eon
Formation of large continents.
Oxygenation of the atmosphere.

Oldest rock formations.

First shelly fossils.
Evolution of most animal phyla.

Formation of large continents.
Oxygenation of the atmosphere.

Eucaryotic Life

Archean Eon
3.8 Ga
2.5 Ga

Hadean Eon
1.15 Ga

2.3 Ga
The diagram illustrates the timeline of geological eons and significant events. Here’s a breakdown:

- **Archean Eon**: 4.6 Ga
- **Hadean Eon**: 540 Ma
- **Proterozoic Eon**: 2.5 Ga
- **Phanerozoic Eon**: 4.6 Ga

Key events and timeframes:
- **3.45 Ga**: First fossils of multicellular animals
- **3.8 Ga**: Significant event
- **1.15 Ga**: Significant event
- **2.3 Ga**: Significant event

**Ediacaran Metazoans**

- **Dickinsonia**: A freshwater Ediacaran metazoan from the Ediacaran Period.
January
February
March
April
May
June
July
August
September
October
November
December

first shelly fossils

3.45 Ga
2.3 Ga
1.15 Ga
4.6 Ga
0 Ga

evolution of vertebrates
late Nov. - December
December 10

coal swamps
first tetrapods
first amniotes

Didectes

Carboniferous - the Age of Coal

December

coal swamps
first tetrapods
largest mass extinction
first amniotes
December

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<th>Event</th>
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<tr>
<td>5</td>
<td>first tetrapods</td>
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<tr>
<td>10</td>
<td>formation of Pangea</td>
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<tr>
<td>15</td>
<td>largest mass extinction</td>
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<tr>
<td>20</td>
<td>Age of Dinosaurs</td>
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<tr>
<td>25</td>
<td>first amniotes</td>
</tr>
<tr>
<td>31</td>
<td>first birds</td>
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continents drift into their modern positions

Age of Reptiles / Dinosaurs

“Sue” a Tyrannosaurus rex
### December

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<tbody>
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- **Formation of Pangea**
- **Continents drift into their modern positions**
- **Coal swamps**
- **First tetrapods**
- **First amniotes**
- **Age of Dinosaurs**
- **Largest mass extinction**
- **Evolution of modern mammals**
- **First birds**
- **First amniotes**
- **Formation of the Alps and Himalayas**
- **The Age of Mammals**
December 31st
noon

Ice Ages
Hominids evolve

midnight

11:59:59 - First Geologists
11:59:57 - Columbus sets sail
11:59:45 pm - Roman Empire
11:59 pm - Agriculture develops
11:48 pm - First modern humans evolve
10:00 pm - Hominids migrate out of Africa
5:00 pm - First hominids evolve