

First Week Geology lecture notes

S = slide with text

S 1

Why Study Geology

- **Resources**

- Environment

- Hazards

- Climate Change

S2

Science of Geology

- Geo – “Earth” and logos – “discourse”

- Physical geology examines the materials composing the Earth and seeks to understand the processes that operate on and under the surface

- Historical geology studies the origin of the Earth and its development through time

S3

Historical Notes

- Prehistory to early geology – writings date back to more than 2300 years ago

- Catastrophism – landscapes created by great catastrophes

- Uniformitarianism – (modern geology) processes that operate today also operated in the geologic past

- Geology today- same processes but perhaps different rates with an occasional catastrophe

S4

Geologic Time

- Relative dating

- Fossils

- Radiometric dating

S5

Radioactivity

- Discovered in 1896
- First used for dating in 1905
- Has been refined

S6

Scientific Inquiry

- Hypothesis – tentative explanation for facts gathered
- Theory – tested hypothesis that has survived extensive scrutiny and competing models and hypothesis have been eliminated
- Scientific methods

S7

Earth's Spheres

- Hydrosphere
- Atmosphere
- Biosphere
- Geosphere

S8

Earth System Science

- System- a group of interacting parts that form a complex whole
 - Closed systems - energy moves freely in and out
 - Open systems – energy and matter move freely in and out
- Feedback mechanisms
 - Negative feedback – maintain system as is
 - Positive feedback – enhance or drive change in system

S9

Cycles in Earth System

- Energy for the system
 - Sun drives external processes in atmosphere, hydrosphere and surface of geosphere

-Earth's interior is the source of energy for volcanoes, earthquakes, and mountain building

- Linked systems

- Rock cycle

- Early Evolution of the Earth

- Surface of the Earth

- Dynamic Earth - Plate tectonics

S10

Earth systems operate on a variety of spatial and time scales.

Geologists study a variety of scales from the atomic through minerals, rocks, landforms, world, Solar System and beyond

S11

How the universe formed

Big Bang

Nebular Hypothesis

Planets around other stars are being found leading researchers to look again at how the universe formed - stay tuned