

**EAS 100 – Planet Earth
Lecture Topics Brief Outlines**

I. Introduction Section (2/10/2011)

1. Introduction to EAS 100 – Planet Earth; course content, scientific method, Metric system, why geoscience?

Learning objectives: Understand course organization, topics and requirements; learn about the significance and relevance of geoscience for *all*; review the scientific method and the metric system

Reading: Text, pages 1-16

Figures to study: Text, Figures I.2, I.4, I.5, I.6, I.7, I.8, I.9, I.10, I.11, I.13, I.16

Topics:

Course Outline – Topics, course requirements, educational objectives, reading assignments, textbook (see [course outline](#))

Research on learning categories – How much we *retain* after one year

Why (Geo)-Science?

1. Excellent subject for learning fundamental science principles
2. We interact with geoscience every day (relevance)
3. Important to future – energy, climate, environment, natural hazards
4. Scientific literacy – increasingly technological society
5. Increasing awareness and enjoyment of the Earth
6. Science education (for teachers)

Examples of Earth science and need for informed, technological consideration by all citizens

Scientific Method – two views, fundamental process is *observation*, importance of inference, facts versus observations

Metric system – Why metric? (see [metric handout](#))

2. Powers of ten, scale, graphs and maps, models

Learning objectives: Understand the concept and importance of scale, use of scale in maps, graphs and models

Reading: Text, pages 1-16

Figures to study: Text, Figures I.2, I.5, I.6, I.10, I.11

Topics:

Our view of scientists

The concept of scale, examples of scale for common objects,
How much is a Billion?

Scale model of the Solar System

Powers of Ten video

Examples of interpretation of graphs and other scale diagrams

3. Forces and Energy

Learning objectives: Understand that there are four fundamental forces in the universe and that three of these are primarily responsible for the geoscience processes that we experience every day, learn about density and its role in forces and energy through gravity, understand the mechanisms of energy transfer – radiation, conduction and convection, and energy conversion – gravitational to heat, thermodynamics and energy to mass conversion

Reading: Text, pages 321-325

Figures to study: Text, Figures 11.17, 11.18

Topics:

Density (mass per unit volume, usually expressed in g/cm^3 , density of water = 1 g/cm^3)

Four forces – strong force, weak force, gravity, electromagnetic force

Example of gravitational force – Earth's orbit (revolution) around the Sun, the Solar System

Sources of energy

Energy transfer

Energy conversion

4. Geologic Time, Age of the Earth, Age Dating

Learning objectives: Understanding the vastness of geologic time, age of the Earth, methods of age determination, learning about the radiometric dating technique, how superposition, cross-cutting relationships and fossils are used to determine relative age

Reading: Text, pages 238-255

Figures to study: Text, Figures 8.3, 8.5, 8.6, 8.7, 8.8, 8.10, 8.11, 8.12, 8.13, 8.14, 8.16, 8.17, 8.18

Topics:

Relative age determination methods – superposition, cross-cutting relationships, fossils (see Lecture note figures 1A)

Absolute age determination methods, the radiometric dating technique, the concept of half-life (Homework #1)

The geologic time scale

Geologic Time video – The Grand Canyon

5. Uniformity vs. catastrophism, Earth processes

Learning objectives: Understand the concepts of uniformitarianism and catastrophism and how these concepts relate to geological, atmospheric, ocean, atmospheric and astronomical processes that have shaped the Earth through time and continue to affect the Earth and our environment

Reading: Text, pages 112-126, 238-255

Figures to study: Text, Figures 4.2, 4.5, 4.9, 4.10, 4.11, 4.13, 4.14, 4.15, 4.16, 4.19, 4.20, 8.3, 8.5, 8.7

Topics:

Uniformitarianism (uniformity) – “The present is the key to the past”, also, most Earth features are the produce of slow processes acting over geologic time

Catastrophism – infrequent catastrophic events that affect the Earth

Examples of Uniformitarianism and Catastrophic events – glaciation, asteroid/comet impacts, Extinction events