Earth System History

Study of the interconnected physical, chemical and biological changes that our planet has experienced over the course of geologic time.

Fundamentals of Geology

- **Principle of Actualism (Uniformitarianism)**
  - Application of modern processes to ancient system
  - There are inviolable laws of nature that have not changed in the course of time
  - The Present is the Key to the Past
- **Catastrophism**

Geologic Materials

- **Minerals**
- **Rocks**
- **The Rock Cycle**
  - Do you remember?

Sedimentary Rocks

- **Stratum (Bed):**
  - Tabular layer of sediment accumulated in discrete episodes

Rock Units

- **Formations**
  - Unit of rock formed in a particular way
  - Formally named, often for nearby geographic feature
    - Kaibab Limestone (Rim of the Grand Canyon)
- **Member**
  - Smaller rock unit
- **Group**
  - Groups of formations
Geologic Time Scale

- Developed using
  - Relative Dating
    - Principles of rock and fossil relationships
  - Absolute Dating
    - Radioactive Decay

Earth’s Interior

Outer Earth

Plate Tectonics

Water Cycle

Directional vs. Cyclic Changes

- Evolution
  - the changing of organisms that constitute biosphere is a one-way process
  - Evolution and Mass Extinctions
- Cooling
  - the Earth’s internal temperature is slowly decreasing
- Sea Level has risen and fallen
- Orogenies come and go
- Surface temperatures have risen and fallen