What is Physical Geology all about?

Physical Geology examines the earth materials, processes, surface morphology, internal structure, evolution, resources and environment.

Visit http://cs.ndsu.nodak.edu/~slator/htm/PLANET to use "Geology Explorer: Planet Oit Information" being developed at the North Dakota State University

The subject-matter of these studies includes*

- Earth and the earth processes:
  - Nature and Scope of Physical Geology (Chapter 1)
  - Earth's Interior (Chapter 2)
  - The Sea Floor (Chapter 3)
  - Plate Tectonics (Chapter 4)
  - Mountain Belts and Continental Crust (Chapter 5)
  - Geological Structures (Chapter 6)
- Earth hazards, primary earth materials:
  - Earthquakes (Chapter 7)
  - Time and geology (Chapter 8)
  - Atoms, Elements, Minerals (Chapter 9)
  - Volcanism and Extrusive Rocks (Chapter 10)
  - Intrusive Activity and Origin of Igneous Rocks (Chapter 11)
- Secondary rocks and the related matters:
  - Weathering and Soil (Chapter 12)
  - Mass wasting (Chapter 13)
  - Sediments and Sedimentary Rocks (Chapter 14)
  - Metamorphism, Metamorphic Rocks and Hydrothermal Rocks (Chapter 15)
  - Streams and Landscapes (Chapter 16)
- Other surface processes, resources and environment:
  - Groundwater (Chapter 17)
  - Deserts and Wind Action (Chapter 18)
  - Glaciers and Glaciation (Chapter 19)
  - Waves, beaches and coasts (Chapter 20)
  - **Geologic Resources (Chapter 21)**

The current concerns in these studies include

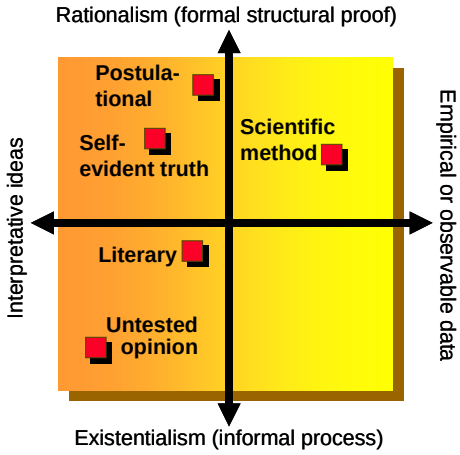
- earth hazards like earthquakes and volcanism and the processes that govern them,
- the issues like global warming, environmental and/or evolutionary impacts of catastrophic events, waste disposal, coastal habitat etc., and
- the earth resources and their potential exhaustibility.

Three basic rules govern the inferences about geological past:

- Present is the key to the past.
- In an undisturbed succession of layers, the one at the bottom is the oldest (this is the *principal of superposition of strata*).
- The principle of cross-cutting relationships.

The Scientific Approach

Geology is perhaps the friendliest face of science that we encounter in daily life, whether at work, or at home, or when we visit a National Park! Science is a continuous quest for the basic rules that apply equally all over the universe. Discovering these rules over such a vast single system then becomes a process of rationalizing empirical observations and securing better observations to refine the resulting structural formalism – a process that requires amenability to falsification as the hallmark of any scientific proposal.



The considerations of space and time limit laboratory modeling of the earth processes, for instance. But then, the notion that San Andreas Fault is a boundary along which N. American plate has slipped by ~600 Km relative to Pacific plate in the past ~25 million years can be easily dispelled by producing the evidence that rocks younger than this age are now found adjacent to one another, and undisturbed, across the fault.

* The chapter numbers here refer to those in the textbook: PHYSICAL GEOLOGY: EARTH REVEALED by David McGeary and Charles Plummer (WCB/McGraw-Hill, 2002). You can also explore the companion website of the book's other version (you will need to match the chapter titles here, though, because the sequencing of chapters in the version presented online differs from your video-adapted version) at the URL: http://www.mhhe.com/earthsci/geology/plummer/student.mhtml