

Unit 1: Nature of Physical Geography

Student Notes

What is Physical Geography?

- Geology is a science that works to understand planet earth.
- Geology is divided into two subcategories:
 - Historical geology – works to understand the origin of Earth and its development through time. It looks to establish an orderly chronological arrangement of physical and biological changes that have occurred in the geological past of earth.
 - Physical geology – focuses on understanding planet earth and the processes and phenomena which determine the nature and shape of the earth.
- Some examples of careers that are considered to be in the discipline of geology are:
 - paleontologist – studies fossils
 - geophysics – studies earth's interior
 - seismologist – studies earthquakes
 - oceanographer – studies the oceans

History of Physical Geography

- Physical geography first began more than 4 thousand years ago with explorers who mapped features and places seen on earth.
- The Greeks then began to look at the earth with regards to its form, size and geometry.
- The more recent history of physical geography (before the 1950's) was based on ideas surrounding:
 - uniformitarianism
 - theory of evolution
 - exploration of the world
 - early conservation movement
- Since the 1950's physical geography was based on ideas surrounding:
 - qualitative techniques and findings
 - study of human/land relationships

Characteristics of Physical Geography

- When studying physical geography we have to remember a few of its characteristics. Physical geography is:

- integrative – uses information from a number of disciplines (Ex: geology, meteorology, biology, etc)
 - spatial – studies the locations, distributions, and patterns that influence the Earth's surface (Ex: as large as the Milky Way to as small as a pond)
 - holistic – looks at the “big picture” and how all processes and events on earth are interrelated (Ex: cutting down a forest influences the climate and vegetation of areas located many km away)
 - change – recognizes that the earth is dynamic and changes can happen quickly or slowly (Ex: rivers can flood quickly causing devastating catastrophes; however mountains erode over many years)
 - systems oriented – uses a systems approach to organize and understand processes. (Ex: the earth is divided into 4 systems or spheres that are studied)

Earth's Spheres/Systems

- The earth is divided into 4 spheres/systems (a group of interacting parts that form a complex whole).
 - These spheres affect each other in many ways and result in a dynamically changing body that exchanges matter and energy and recycles them into different forms.
 - 4 Spheres: Atmosphere, Geosphere, Hydrosphere, Biosphere
 - Atmosphere – consists of the gaseous envelope surrounding the earth
 - Geosphere – consists of the densest part of the earth which is mostly rock. Also known as the lithosphere (solid rock surface as well as the top layer of the mantle).
 - Hydrosphere – consists of all the water found on earth
 - Biosphere – consists of all living organisms on the earth and their environments.
 - Each of these spheres are interacting with each other and it is believed that this is a significant reason why matter has been able to be maintained on Earth.
 - We as humans (part of the biosphere) make a significant impact on each of these spheres.
 - Examples of sphere interactions:
 - The eruption of a volcano (geosphere) interacts with the atmosphere by emitting products such as CO₂ and water vapor.
 - The biosphere (plants/animals) both interact with the atmosphere as plants need CO₂ to survive and animals need O₂ from the atmosphere to survive as well.
 - Great amounts of the hydrosphere can interact with the geosphere and cause a landslide.

Studying Physical Geography

- Physical geography is studied through a systematic process called the scientific method which looks at data and/or facts to make predictions.

- All science is based on the assumption that the natural world behaves in a consistent and predictable manner.
- Approach to Method:
 - A. Problem for consideration
 - B. Design an experiment
 - C. Collect data
 - D. Create a hypothesis based on data
 - E. Test hypothesis repeatedly
 - F. Publish a paper proposing theory
 - G. Peer review/testing
- When studying physical geography the following must be taken into account to help geologists formulate theories:
 - Law of Uniformitarianism – assumes that the same natural laws and processes that operate on earth and in the universe today have always operated this way in the past.
 - Gaia Hypothesis – suggests that the earth is a living, self regulating entity which maintains a flow of energy and recycling of materials to continue and grow and prosper. Everything that happens to alter earth's systems has an impact on earth.
 - Catastrophic Events – there have been sudden events that have altered the physical world over a short period of time such as hurricanes, volcanoes, meteors, etc...
 - Geological Time – it is understood that although we might not see change, geological time is exceedingly long and change has occurred over its many millions of years.