



GEOLOGY:

A promising field of Science for Education and Professional Career

DR TRILOCHAN SINGH

Scientist 'G' (Retd)

170/DG-III, Vikas Puri, New Delhi-110018.

GEOLOGY is about the study of the Earth. It is an exciting and multi-disciplinary science, dealing with various aspects involving physics, chemistry, biology, maths, medical, and even astronomy, with many interesting and practical applications. It has a role in day to day life. Rising oil prices, tsunamis, earthquakes, global warming, flooding, groundwater pollution, etc., all involve Geology.

Geology teaches us the origin and history of the Earth; and materials of which the Earth is made of, including the structure of those materials. An important aspect is how the Earth's materials, structures, and processes have changed over time. An interesting aspect is the study of life and its evolution.

One who studies the Geology is called a 'GEOLOGIST'.

Geologists are the scientific detectives who put all their efforts to reveal what had happened in the past and what might happen in the future of the Earth. They apply their knowledge to solve many practical problems.

Geologists study Natural Resources : Geologists are involved in exploration and production of natural resources, such as minerals, metals, oil, coal, water, etc., upon which our society and industry depends. Geologists also plan the mines for extraction of minerals. They are responsible to determine safe disposal of the waste and how to remediate areas contaminated with toxic substances. Thus, Geologists are unique in that they occupy both ends of a spectrum within the society.

Geologists study Earth Processes : Geologists work to protect and clean up the environment. Many processes such as landslides, earthquakes, floods, etc., are hazardous to the people. Geologists study to understand these processes to minimize the catastrophic effect of these hazards.

Geologists study Earth History and Past Climate : Climate change is a burning topic these days. Geologists study the past climates of the Earth, which has been changing over time. This study is valuable to understand how the current climate is changing and what the results might be.

Above all, studying Geology is a fun. It is the field based science dealing with the natural phenomenon around, which enhances the classroom knowledge manifold.

BRANCHES OF GEOLOGY

Physical Geology – is the study of dynamics of the Earth, including exterior as well as interior features of the Earth.

Geomorphology : is the study of landforms, their formation and modifications.

Mineralogy and Crystallography – is the study of the chemical composition and structure of the minerals to understand their genesis.

Petrology – is the study of composition and origin of rocks, classification and genesis of the rocks, viz., Igneous, Sedimentary and Metamorphic.

Structural Geology – is the study of physical structure of rocks and description of deformed rock mass to understand the forces that deform the rocks, and to understand their deformational history.

Historical Geology – deals with the historical development of the Earth from the study of its rocks and fossils therein :

Stratigraphy : deals with origin, composition, sequence and correlation of rocks.

Palaeontology : deals with origin and evolution of life on the Earth.

Economic Geology – deals with ore genesis, their commercial & industrial applications.



APPLIED GEOLOGY

Geophysics - is the study of the behaviour of rock materials in response to stresses as per the principles of physics. Seismicity/Earthquake activities are of general interest.

Geochemistry – is the study of the chemical composition of the Earth’s materials and the chemical changes occurring within and on the surface the Earth.

Hydro-Geology – is the study of the origin, occurrence & movement of water bodies, and aquifers.

Engineering Geology – is an application of Geology in civil engineering, such as construction of mega structures (Dams), and infra-structures (bridges, roads, tunnels, etc.)

Petroleum Geology – is the study of occurrence of petroleum products in the Earth’s crust, both off-shore and on-shore.

Environmental Geology – deals with the human interactions with the Earth environment, hazards and resources.

Glacial Geology – is the study of glacial landforms and their behaviour.

Marine Geology – is the study of ocean floor, coastal margins, continental shelves and slopes in ocean basins. It involves geophysical, geochemical, sedimentological and paleontological investigations of the sea and sea floor.

Military Geology – is an application of Geology in the field of war, such as terrain evaluation.

Medical Geology - is an emerging interdisciplinary scientific field studying the relationship between natural geological factors and their effects on human health, such as inhalation of ambient and anthropogenic mineral dusts and volcanic emissions; deficiency of trace elements and minerals; etc.

GEOLOGY EDUCATION IN INDIA

The subject of Geology in the Indian Universities is introduced at the Graduate level, except for a very few colleges where Geology is taught at the Class XII level. Many universities provide Graduate level (B.Sc.) and Post Graduate level (M.Sc. and M.Tech) courses in Geology / Earth Science. Post PG courses, such as PG Diploma, M.Phil and Ph.D Courses are also offered by many universities. Many IITs (Indian Institute of Technology) also offer M.Tech in Geology.

To peruse a career in Geology one should opt ‘Geology’ as one of the subjects at B.Sc. level. Subsequently, M.Sc. or M.Tech is must to get job related to Geology. There are nearly 102 universities in India that offer various courses or programs related to Geology. Many universities have more than one affiliated Institutes / Colleges offering Geology course. Earlier, it was thought that only the boys opt this subject because it is a field oriented subject, but now a days more and more girls are studying Geology.

GEOLOGY AS A CAREER

Geology can be a very interesting and rewarding career. It gives ample opportunities for :

Exploration - Visiting exceptional geologic sites, such as national parks and monuments, mines, and oil fields. It also gives an opportunity to see amazing locations.

Friendship - Meeting new people, technical persons of varied fields, local inhabitants, and many more. Many friendships endure long in future.

Experience - Gives an opportunity to see those geological features that have been read in the text books, visiting underground mines, and so on.

Nature - Immerse yourself in nature and possibly may come face-to-face with some amazing wildlife.

Epiphany - The hands-on nature of the course will help all the pieces come together and you will be able to say - “Now it finally makes sense”.



Fitness - It increases strength, endurance, and energy level, to experience greater overall well-being.

and finally

Self-Confidence - Real-world Geology challenges when accomplished, it develop the confidence that shines not only in the interviews, but also in the professional career.

EMPLOYMENT OPPORTUNITIES

Geology offers a very interesting and rewarding career. It is more like a hobby, particularly for the nature's lover. It is also said that the Geologists are paid for their hobby.

Employment opportunities for Geologists are very good. Most Geology students with a strong academic background and good grades have no trouble finding employment if they are willing to move to a location where work is available.

The Geologists are employed in the State and Central Government Agencies, Corporations, Corporate Sector, Environmental Consulting Firms, Universities, and NGOs. Geologists are in demand mainly in Mining (coal and economic minerals); Oil Exploration; Engineering Geology (Geotechnical); Geophysical Survey, etc. Rather, there is currently a shortage of well-trained geoscientists and the demand is growing. Over the next several years the number of Geology job openings is expected to exceed the number of students passing out from universities with Geology courses.