

# Careers in Geology



## CAREERS IN GEOLOGY:

### Industry in a nutshell

A **geologist** is a scientist who studies the solid and liquid matter that constitutes the Earth as well as the processes and history that has shaped it. The study of geology may involve an understanding of physics, chemistry and biology as well as other sciences. Compared with scientists in other fields, geologists are generally more exposed to the outdoors than staying in laboratories although some geologists prefer to perform most of their studies in the lab.

Geologists may be engaged in exploration for mining companies in search of metals, oils, and other Earth resources. They are also at the forefront of natural hazard and disaster warning and mitigation, studying earthquakes, volcanic activity, tsunamis, weather storms, and the like. In this case their studies would be used to warn the general public of the occurrence of these events. Some geologists are also engaged in the discussion of climate change.

In Mongolia there are 2 big universities that enable undergraduates to complete a geology degree. Every year approximately 219 students graduate.

Mining geologists study the relationship between geology and ore formation in order to help to locate new mineral resources. They are mainly responsible for assessing and analyzing geological data in order to advise on short-term and long-term mine production plans.

### Areas of specialization

Geologists may concentrate their studies or research in one or more of the following disciplines:

- Dendrochronology: the study of dating based on tree ring patterns.
- Economic geology: the study of ore genesis, and the mechanisms of ore creation, geostatistics.
- Engineering geology: application of the geologic sciences to engineering practice for the purpose of assuring that the geologic factors affecting the location, design, construction, operation and maintenance of engineering works are recognized and adequately provided for.
- Geophysics: the applied branch deals with the application of physical methods such as gravity, seismicity, electricity, magnetic properties to study the earth.
- Geochemistry: the applied branch deals with the study of the chemical makeup and behavior of rocks, and the study of the behavior of their minerals.
- Geochronology: the study of isotope geology specifically toward determining the date within the past of rock formation, metamorphism, mineralization and geological events (notably, meteorite impacts).
- Geomorphology: the study of landforms and the processes that create them
- Hydrogeology: the study of the origin, occurrence and movement of groundwater water in a subsurface geological system.

## CAREERS IN GEOLOGY:

- Igneous petrology: the study of igneous processes such as igneous differentiation, fractional crystallization, intrusive and volcano logical phenomena.
- Isotope geology: the study of the isotopic composition of rocks to determine the processes of rock and planetary formation.
- Paleoclimatology: the application of geological science to determine the climatic conditions present in the Earth's atmosphere within the Earth's history.
- Paleontology: the classification and taxonomy of fossils within the geological record and the construction of a paleontological history of the Earth.
- Pedology: the study of soil, soil formation, and regolith formation.
- Petroleum geology: the study of sedimentary basins applied to the search for hydrocarbons (oil exploration).
- Structural geology: the study of folds, faults, foliation and rock microstructure to determine the deformational history of rocks and regions.

### What kind of work can I do?

There are several different kinds of geologists. These include:

#### **Exploration geologist**

Exploration represents the first stage of the mining cycle as its main duty is to discover an economical deposit. Exploration geologists are used to carry out a series of pre planned activities such as; Field mapping, geological interpretation, drill core logging, sampling, geophysical interpretation and much more. Exploration geologists use all aspects of geology and geophysics to locate and study natural resources. The environmental remediation field is often dominated by professional geologists, particularly hydro geologists, with professional concentrations in this aspect of the field.

#### **Hydro geologist /Hydrologist**

A hydrogeologist/hydrologist evaluates and manages the quality, quantity, reliability and sustainability of all aspects of water resources. Hydrologists are concerned with surface water processes such as rainfall, run-off, evaporation, river flows, floods and droughts, erosion and water pollution. Hydrogeologists are concerned with groundwater and the soil-moisture variation, amount, speed and direction of groundwater flow, extraction and replenishment of groundwater, and water chemistry and pollution. From a mining stand point hydrogeologists are paramount in determining the impact mining operations may have on both a local and regional scale and implement measures to ensure the local community are not disadvantaged from mining operations in regards to water access.

## **CAREERS IN GEOLOGY:**

### **Engineering geologist**

Engineering geologists are concerned with the detailed technical analysis of earth material and the risk assessment of geological hazards such as landslides, slips and debris avalanches. Their role is to ensure that geological factors affecting engineering works are identified and provided for. With reference to mining, an engineering geologist evaluates the ground conditions and, together with other professionals, will help design the mine to prevent collapse and wall failure.

### **Petroleum Geologist**

A petroleum geologist explores and charts stratigraphic arrangement, composition and the structure of the earth's surface layers to locate petroleum and natural gas. They estimate the extent of reserves using seismic and geological survey evidence and recommend the most appropriate drilling and production methods.

### **Paleontologist**

A paleontologist examines, classifies and describes animal and plant fossils found in sedimentary rocks. Understanding the evolutionary order of the fossil record is particularly important in oil exploration.

### **Structural Geologist**

A structural geologist assists engineers by advising how rock structures can influence failure of weight bearing loads in bedrock when seeking building foundations. They also conduct water and seepage into deeper zones and aquifers.

#### **Work activities**

- Conducting surveys and interpreting geological data in order to inform drilling and production procedures.
- Ensuring all procedures adhere to health and safety regulations and pit mapping.
- Liaising with a range of experts including other geologists, engineers, metallurgy experts and mine workers.
- Keeping up to date with current geological research.
- Producing written reports.

### **What's it like working in this sector?**

Work as a geologist often involves a lot of time spent on site in remote locations, particularly in the early years as you build your experience. The work can be relatively hard and physically challenging.

## **CAREERS IN GEOLOGY:**

However, the salaries are relatively good. Average starting salary, as per PwC's 2012 Paywell Salary Survey, stand at around 1.5m MNT Gross. However, strong language skills and international study can push this up to above 2m gross MNT.

Senior Geologists (geologists with 5+ years of experience), according to PwC's 2012 Paywell Salary Survey, are earning 2.5m MNT gross per month. However there is a lot of variation in the sector given to the demand for talented professionals. Therefore, particularly if a geologist has language skills and international experience, they can often earn well over 3-4m MNT gross per month and well over 5m MNT gross per month if they are head of function / Chief Geologist.

### **Where can I work?**

Professional geologists work for a wide range of government agencies, private firms, and non-profit and academic institutions. They are usually hired on a contract basis or hold permanent positions within private firms or official agencies.

Local, state, and national governments hire geologists to work on geological projects that are of interest to the public community.

However, the primary employers for geologists in Mongolia are the mining companies and consultancies. There are 513 mining related companies operating in Mongolia. Many of these are international companies and may offer scope for projects overseas as well as world class training and development.

### **What skills do I need?**

In order to be a successful geologist you need to be:

- Prepared to work outdoors in a range of environments and sometimes in remote locations
- Willing to adhere to safety requirements
- Able to prepare accurate records and reports
- Enjoy technical and engineering activities / work
- Able to work on professional programs
- Able to work on a Global Mapper
- Able to work independently or as part of a team
- Physically fit
- Able to identify, analyze and solve problems
- Good oral and written communication skills
- Able to work without supervision and to accept responsibility

### **How can my career develop?**

With a geology qualification there is a lot of scope for travel and international experience.

## CAREERS IN GEOLOGY:

A successful geologist could develop to country manager positions within exploration or mining companies or, if they chose to stay in more of a functional rather than a pure management role, could find themselves acting as project manager of major mining projects.

*If you have ideas on how we can improve this document, or are willing to provide a case study of what it means to work in this sector, please contact [Uyanga@MongoliaTalentNetwork.com](mailto:Uyanga@MongoliaTalentNetwork.com) or call +976 77 11 80 50 or +976 77 11 80 51.*

*With your help we can keep improving the advice that is available and bring greater clarity to important career choices.*