

January 4, 2021

What do geoscientists do?

A few years ago, the president of a professional association representing engineers and geoscientists in a Western Canadian province confessed to me that she did not know what geoscientists actually do. I'll try to answer that question here.

There are four main areas of geoscience:

1. Mineral Exploration and Development
2. Geophysics
3. Environmental Geology
4. General Geology

Mineral Exploration and Development

This is what most people think about (if they think about it at all) when they hear the word geologist. Mineral exploration and development can be broken down into the following subcategories:

Metallic Minerals: also called "*hard rock*" geology. Geoscientists who work in this area explore and help develop mines for materials such as gold, silver, copper, platinum group metals, copper, zinc, lead, uranium, aluminum and any other metal that has a market value.

Fossil Fuel Minerals: also called "*soft rock*" geology. Geoscientists who work in this area explore for petroleum, natural gas and coal.

Industrial Minerals and Aggregates: these include a wide variety of minerals and materials such as metal oxides used for pigments, gypsum for drywall, clay for ceramics, crushed stone, dimension stone, and especially sand and gravel. In terms of sheer volume of materials, sand and gravel make up the largest mined products in the world. In fact the amount of sand and gravel moved by people approaches the amount of material moved by rivers through normal erosion.

Geophysics

Geophysics is the area of geoscience concerned with the physical processes and physical properties of the Earth.; as such, it includes the following areas:

Seismology: this is the study of earthquakes and earth movements and includes the general field of *Plate Tectonics*.

Instrumentation: this includes the development and use of instruments to measure gravity, magnetism, heat flow and other properties. It also includes electromagnetic imaging of the subsurface. Geophysical instrumentation is a huge area of study.

Environmental Geology

Environmental geology includes the following:

Contaminated Sites: this is the investigation and remediation of properties that have been adversely affected by human activity.

Hydrogeology: this is the study of the occurrence, flow and development of groundwater resources

General Geology

The fields of study under this heading are those that often seen as academic but which often have a direct bearing on practical matters. These fields include:

Vulcanology: the study of volcanoes

Quaternary Geology: the study of the Quaternary Period in the geological time scale. This includes the Pleistocene ice ages and the current Holocene Epoch

Engineering Geology: this is the application of geology to engineering problems and includes evaluation of hazards such as earthquakes and landslides.

Historical Geology: the history of the earth, this includes the study of fossils, **Paleontology**

Geochemistry: the chemistry of rocks and minerals