

GEOLOGY

What can I do with this major?

AREAS

Some employment areas follow. Many geologists specialize at the graduate level.

ENERGY (Coal, Gas, Oil, and Other Energy Sources)

Economic Geology
Fossil Energy
Geochemistry
Geomorphology
Geophysics
Hydrogeology
Paleontology
Sedimentology
Stratigraphy
Structural geology
Sustainable energy geology

EMPLOYERS

Petroleum industry:
Oil and gas exploration
Production
Storage
Waste disposal facilities
Coal industry:
Mining exploration
Grade assessment
Waste disposal
Renewable energy companies (geothermal, wind, solar)
Federal government agencies:
National Labs
Department of Energy
Bureau of Land Management
U.S. Geological Survey
Consulting firms
Oil field machinery and supply companies
State government agencies
Well services and drilling companies

STRATEGIES

Geologists working in the area of energy use various methods to determine where energy sources are accumulated. They may pursue work tasks including exploration, well site operations and mudlogging.
Seek knowledge in engineering to aid communication, as geologists often work closely with engineers.
Coursework in geophysics is also advantageous for this field.
Gain experience with computer modeling, Geographic Information Systems (GIS), and Global Positioning Systems (GPS).
Many geologists in this area of expertise work with oil and gas and may work in the geographic areas where deposits are found including offshore sites and in overseas oil-producing countries.
This industry is subject to fluctuations, so be prepared to work on a contract basis.
Develop excellent writing skills to publish reports and to solicit grants from government, industry and private foundations.
Obtain leadership experience through campus organizations and work experiences for project management positions.
Consider gaining expertise in sustainable energy sources (e.g., geothermal energy, energy storage systems).

AREAS	EMPLOYERS	STRATEGIES
<u>ENVIRONMENTAL REMEDIATION/COMPLIANCE</u> (Ground Water, Surface Water, Soils, Air, and Sediments) Remediation Liability Audit Compliance Sustainability	Federal government agencies: National Labs Environmental Protection Agency Forest Service Army Corps of Engineers U.S. Geological Survey Bureau of Land Management Department of Defense State highway departments Public utilities companies Mines Environmental consulting firms Water testing labs Land use planning agencies Civil engineering firms Surveying companies	<i>Scientists in this category may focus on studying, protecting and reclaiming the environment.</i> Obtain lab experience through coursework, research with professors and internship programs related to environmental geology. Consider additional environmental courses in other departments to complement this concentration. Develop excellent written and speaking skills, particularly for interest in public policy. Gain a thorough understanding of federal and state government guidelines for the management of solid, liquid, and gaseous waste. Investigate certification programs for Hazardous Waste Operations and Emergency Response Standard (HAZWOPER). Consider earning a law or policy master's degree for work with land-use laws and legal matters. Consider internships in environmental law/policy if interested in environmental regulations and sustainability.
<u>GEOLOGIC MAPPING</u> Structural geology Stratigraphy Sedimentology Remote sensing Geophysics	Federal government agencies: US Geological Survey Department of Defense Private companies	<i>Geologists interested in geologic mapping collect, process, analyze, translate, and disseminate earth-science information through geologic maps.</i> Pursue experience reading maps and interpreting data sources including geological surveys and satellite images. Learn about surveying through part-time jobs, internships or academic opportunities. Develop attention to detail and excellent technical skills to utilize geologic and spatial mapping programs. Gain experience with modeling and Geographic Information Systems (GIS). Develop proficiency in using modern survey tools (e.g., geologic mapping via drones).

AREAS	EMPLOYERS	STRATEGIES
<u>HAZARDS</u> Engineering geology Seismology Volcanology Geomorphology Geologic engineering Civil engineering Environmental geology Structural geology	Federal government agencies: National Oceanic and Atmospheric Administration U.S. Geological Survey Department of Defense Private research groups and foundations Consulting firms	<i>Geologists in this area focus on the detection of hazards such as earthquakes, volcanoes, landslides, floods, tsunamis, and the effects of these hazards on the landscape.</i> Gain experience in technical mapping such as digital terrain modeling; a high degree of computer skills is expected. Consider an additional major or minor in physics, geophysics and/or engineering; knowledge of engineering is essential. Develop excellent writing and presentation skills and be willing to travel to conduct research. Prepare to work with teams of scientists and other staff in the field for extended periods. Research Fundamentals of Engineering (FE) exam requirements, as this is typically the first step in becoming a Professional Engineer (PE). Professional Engineer (PE) licensing guidelines vary by state. Check with the National Council of Examiners for Engineering and Surveying (NCEES) for links to state boards. Obtain Ph.D. for research and administrative opportunities.
<u>MINERALS</u> Mining engineering Mineralogy Geochemistry Economic geology Paleontology Stratigraphy Sedimentology Crystallography	Geological exploration firms Mining companies Consulting firms Federal government agencies: Geologic Survey Office of Surface Mining, Reclamation and Enforcement Bureau of Land Management Railroad companies Well services and drilling companies	<i>Geologists who study mineralogy or mining geology area are interested in locating the accumulations of minerals or metals within the earth's crust. They may pursue work tasks including exploration, well site operations, mine design, reclamation, and groundwater management.</i> Become familiar with environmental regulations, sustainability, and government permit issues. Consider specializing in a particular mineral or metal to build an area of expertise. Secure experience in the field through part-time positions and internships. Seek opportunities to develop strong technical skills, as mining geologists rely heavily on computerized models to learn about mineral deposits.

AREAS	EMPLOYERS	STRATEGIES
<u>PLANETARY SCIENCES</u> Remote Sensing Geomorphology Mineralogy Petrology Geochemistry	Federal government agencies: National Labs National Aeronautics and Space Association Geological Survey	<i>Geologists involved in planetary sciences may participate in processing and analyzing data from various missions to bodies in our solar system, assisting in finding potential landing sites for exploration vehicles, mapping neighboring planets and their moons and conducting research to better understand the origins, evolutions and geologic processes operating on these bodies.</i> Explore opportunities for undergraduate research. Work in this area is limited and requires many years of experience and developed research. A Ph.D. is often required. Take additional coursework in physics to specialize in planetary sciences. Pursue internships in national labs with space programs such as The Ames Laboratory, Jet Propulsion Laboratory and Johnson Space Center. Seek experience with remote sensing and Geographic Information Systems (GIS) technologies. Develop extraordinary analytical writing skills for grant writing and research. Explore the expanding private spaceflight sector.
<u>EDUCATION</u> Teaching Research	Elementary/secondary public or private schools Colleges and universities Museums	Explore opportunities for undergraduate research. Develop strong communication skills, both oral and written. Seek volunteer or paid experiences, such as camp counselor or tutor, with target age group. Explore experiences in other settings (e.g., science museums, planetariums) for hands-on teaching. Obtain certification/licensing for public school teaching, which varies by state. Acquire multiple certifications for increased employability in secondary education. Complete a master's degree for community college teaching. Pursue Ph.D. for college/university teaching and research. Grant writing skills are essential in academia.

GENERAL INFORMATION

- A bachelor's degree is good background for pursuing technical graduate degrees as well as professional degrees in Business Administration, Medicine or Law.
- Within the many facets of geology, there is often overlap of job functions. However, many geologists find advantage in becoming more specialized.
- Get relevant experience and start building professional networks early through internships, research assistant positions, and field camps. Other opportunities may include volunteering, part-time jobs, or co-ops in various geological areas.
- Possess a love of the outdoors, an interest in nature and a desire to travel.
- Develop physical stamina to work and conduct research in remote areas under various conditions.
- A bachelor's degree may be sufficient for entry-level industry positions.
- Seek graduate school if aiming for specialized fields (hydrogeology, geophysics, environmental geology, etc.). A master's degree is often preferred for career advancement, particularly in energy, environmental, and geotechnical roles.
- Employment prospects are best for those with master's degrees, familiarity with advanced technologies such as computer modeling and willingness to relocate.
- Maintain a high GPA and secure strong faculty recommendations for admittance to graduate school.
- Research licensure and certification laws by state for pursuing registered geologist credential.
- Obtain experience in mapping and surveying. Develop skills with measuring equipment as well as laboratory equipment and processes.
- Consider developing strong technical skills (e.g., GIS, remote sensing, programming) in addition to core geological knowledge.
- Acquire a business background to help in managing projects and assessing economic costs and benefits.
- Join groups directed toward improvement of natural resources, environment and pollution control including professional organizations related to interest area(s).
- Develop exceptional computer skills.
- Learn a foreign language for work in international environmental and geotechnical projects.
- Excellent verbal and written communication skills are essential. The ability to market your skills and write proposals is necessary to maintain steady work. Grants may be necessary to start and continue projects.