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# Geology Is: A Geosciences Program for High School Students

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Project "Geology Is" arose out of a desire to fill an apparent gap in science education at the secondary level. It was noted that, over the years, the traditional secondary science sequence of biology, chemistry, and physics has several very weak aspects.

One of the problems is that no course links the traditional courses with the whole natural environment. For example, biology involves the study of plants and animals upon the earth; chemistry investigates the composition of substances that usually occur on or in the earth; and physics deals with the states and properties of matter and energy that, again, are basic in and on the earth. You might notice, however, that the one real commonality of these three sciences, the earth, is only a container — no real study of it is made. "Geology Is" fills this gap by involving the study of the earth itself and how the earth relates to our physical and biological environment.

The second weakness in the traditional science curriculum is that there are few courses for the average or below-average student beyond general science (whatever that may be) and biology. The various math requirements in traditional chemistry and physics courses preclude many of the average and below-average students. Since geology is based primarily on common sense, observation, and some logic, it can be taught at almost any ability level and opens the door for many students who cannot take the more advanced science courses.

Finally, a third weakness is that even though most colleges and universities offer the geosciences as an important part of their general studies curriculum, incoming secondary students have little geoscience background. As a result, they encounter problems in even the most elementary level geoscience course. Shouldn't a high school offer a geoscience background to the student as it does in biology, chemistry, and physics?

Even beyond the science classroom, in today's complex world it is vital for citizens to have some basic understanding of the geosciences to make intelligent decisions about their physical environment — the earth! Remember, the earth is finite, so the kind of decisions made regarding such things as mineral resources, energy, water resources, land-use planning and geologic hazards will have a great bearing on man's future on this planet. Even on a personal level, we must contend with the earth — building a lake, choosing a home site, finding a

campground. In a course such as "Geology Is," the student has an opportunity to develop an understanding of these topics.

The course begins with a chapter entitled "What is Geology?" This is an introduction to the scope, history and importance of geology in today's world. In this chapter, the student learns about society's dependence on the earth. An overview of some of man's problems involving the earth is studied.

After "What is Geology?", the student is ready to begin the study of the earth. This study begins with a look at the earth and its environment in space. Moving in closer, we study the earth's origins and characteristics.

Next, the student is introduced to the "stuff" earth is made of in a unit entitled "Earth Materials." Here, after a brief look at earth chemistry, common minerals and rocks are identified and classified. The earth materials unit concludes with a section on mineral resources. Earth materials, therefore, are studied not only from a geologic point of view but also for their economic, political and social implications.

Seeing the earth is also very important in the study of geology. In the unit "Observing the Earth", the student is taught how to read and interpret topographic and geologic features on maps and aerial photographs.

Using the background knowledge gained about the earth in previous units, the student is ready to delve into the earth's dynamic forces. First, those forces active within the earth are studied. Topics in this unit revolve around the theory of plate tectonics and include earthquakes, vulcanism and mountain building. On the surface, forces such as running water, groundwater, glaciation, wind action and wave action are studied. Again, as with the earlier units, not only are the geologic processes stressed, but also how each process or combination of processes affects man in his physical and biological environment.

Near the end of the course, after the basic material is studied, students are encouraged to work on small-group projects concerning one or more of the following topics:

Environmental Geology
Local Descriptive Geology
Local Mineral Resources
Careers in the Geosciences
Astrogeology

Throughout the course, a variety of activities are used to interest and motivate the student. These include classroom experiments and discussions, audio visual packets, guest speakers, role playing activities and actual field work.

Finally, the cost of a program such as "Geology Is" is minimal for a full-year science course. Most materials and equipment needed are available locally and probably are already on hand at the high school.

Beyond these materials, the only cost is for such items as rocks, minerals, a few maps and of course the basic "Geology Is" Text/Lab Manual. However, more cost may be involved if optional activities are planned.

"Geology Is" can be a viable addition to a secondary science program in any setting and is an important, relevant subject in today's world. The course is designed for a wide variety of student interests and abilities, and can be obtained at a very reasonable cost.

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### Education in Iowa

"Education is important in Iowa, as it has the nation's highest literacy rate. Nine out of 10 Iowan 9th-graders complete the 12th grade. . . . Fifty-one thousand high-school seniors in Iowa are eligible to vote in the November general election."

**Jesse Jackson**
**Waterloo Courier, 1/27/80**

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### Black Contributors

Profiles of the lives and achievements of 24 outstanding black scientists, engineers and inventors appear in *Black Contributors to Science and Energy Technology*. Copies are available free from DOE's Technical Information Center, P.O. Box 62, Oak Ridge, Tennessee 37830.

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### Physics Certificate

The American Association of Physics Teachers (AAPT) will provide free, upon request from any high school physics teacher, one certificate to honor the school's outstanding physics student. AAPT membership is not required. Write: AAPT, Graduate Physics Bldg., SUNNY at Stony Brook, NY 11794.

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### Eye Safety

Any teacher making a request on school stationery can receive a free sample of splash goggles by writing: Donald D. Hedberg, President, Lab Safety Supply Company, P.O. Box 1368, Janesville, Wisconsin 53545.