Because We Live on Earth

Nearly everything we do each day is connected in some way to **Earth: to its land, oceans, atmosphere, plants, and animals.** The food we eat, the water we drink, our homes and offices, the clothes we wear, the energy we use, and the air we breathe are all grown in, taken from, surround, or move through the planet.

By 2025, eight billion people will live on Earth. If we are to continue extracting resources to maintain a high quality of life, then we, as individuals and citizens, need to know more about our planet—its processes, its resources, and its environment. And **only through Earth science education can students understand and appreciate our complex planet.**

To ensure a scientifically literate society, one that maintains wise stewardship of Earth's precious resources, the American Geological Institute, in coordination with its Member Societies, endorses the National Research Council's National Science Education Standards (1996) and agrees that Earth science should be:

- Included as part of the science curriculum at all grade levels
- Offered as a core credit science course for high school graduation
- Assessed through state-mandated science tests and exit exams.

Ultimately, however, the future lies in the hands of students, parents, grandparents, teachers, school administrators, school board officials, and politicians at all levels of government. **The future of Earth science literacy—indeed, the future itself—lies in your hands.**

"There hasn't been a moment when I had the chance to look down on our planet from orbit when I haven't been amazed at how geology has played a significant role in the development of humankind."

• Dr. James F. Reilly, Jr., NASA Astronaut/ Geologist, reflecting on his experience working at the International Space Station.

Earth Science Builds Careers for Life

The role of Earth science in meeting society's needs continues to grow in importance. Earth science develops skills that help students become better problem solvers, including three-dimensional analysis and comprehension of time and scale. Earth scientists use these skills to ensure a supply of clean water, explore for oil, gas, and coal, map the oceans, track severe weather, and discover the Earth materials we need to build our homes and roads, and the minerals and nutrients we need to farm the land.

Earth scientists work for a wide range of organizations, including petroleum companies, environmental firms, mining companies, and construction companies. They work in local, state, and federal government agencies and teach in our schools, colleges, and universities. Earth scientists also work in non-traditional industries such as telecommunications and financial planning, assisting their organizations to address Earth-related issues that affect their activities.

More than 800 colleges and universities in the United States offer degrees in the Earth sciences. Nearly half of these colleges offer a Masters Diploma, the professional degree for pursuing a career as an Earth scientist. However, training in the Earth sciences builds a foundation for work in other fields, and nearly half of those graduating with Earth science degrees establish careers in fields as varied as engineering, law, systems analysis, and financial management.

Earth science provides a strong background for many career paths and instills an understanding of how the Earth system influences the many and varied aspects of human activity. However, many students graduate from high school unaware of the contributions that Earth scientists make to society and the unique problem solving skills that Earth science instills. **We must make Earth science education a priority at all levels if we, as a society, are to meet the increasing demands of the future.**

Earth Science Benefits Everyone

Our lives and civilization depend upon how we understand and manage our planet—Earth processes affect us all. Weather patterns influence the availability of water resources and the potential for forest fires; earthquakes, volcanic eruptions, hurricanes, and floods can kill large numbers of people and cause millions or even billions of dollars in property damage.

Just as Earth systems directly affect each of us, we—as individuals, communities and nations—affect our planet. Expanding technologies and growing populations increase demand on natural resources. As we extract and use these resources, we impact Earth today, which will in turn impact those who come after us. To enhance our stewardship of the environment, we must proceed into the future with a sound understanding of Earth systems.

Earth science empowers us to think globally and act locally—to make sound decisions about issues important in our lives as individuals and citizens. People who understand how Earth systems work can make informed decisions about where to buy or build a home out of harm's way. They can debate and resolve issues surrounding clean water, urban planning and development, national security, global climate change, and the use and management of natural resources.

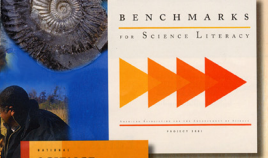
An informed society, conscious of our complex relationships with our planet, recognizes the importance of and insists on Earth science education at all grade levels—elementary, secondary, and adult education. **When we emphasize Earth science education, everyone benefits.**

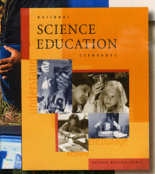
Earth Science Creates Informed Citizens

If we intend to live on—and with—this planet, we truly need to understand how it works, and to understand the interactions of the many components that make up the Earth. **The Earth sciences provide an integrated and interdisciplinary approach to a true understanding of our planet.** Earth science includes and applies knowledge from biology, chemistry, physics, ecology, and mathematics to tackle complex interdisciplinary issues.

Earth science education also improves critical thinking skills. It offers a historical perspective and improves our ability to predict future events. To understand Earth processes that affect us now and tomorrow, geoscientists look for evidence of what happened in the past. This connects students to the past, as well as challenging them to think about the future.

Earth science poses questions that are exciting as well as practical to children and adults alike: Why is California prone to earthquakes? Why is the beach eroding and what can we do about it? Why isn't a floodplain a good location to build a house? Where will we get the fuel to power our cars and planes in the future? Where will we get fresh water to drink? How can I help to protect the environment? Earth science problems and issues are ideally suited for an inquiry-based education approach—an educational process that most closely resembles the reality of scientific endeavor.





Earth Science: Make it Happen

Earth science has been part of the curriculum in American schools for more than 100 years. Yet many people still think that biology, chemistry, and physics constitute a complete science education. In the 21st Century, that attitude is changing.

***The National Science Education Standards* and the *Benchmarks for Science Literacy* define science literacy and reaffirm the centrality of Earth science in education.** The *Standards* promote the idea that Earth science should be taught in parity with biology, chemistry, and physics as part of the country's national strategy for science literacy. Earth science education enhances our understanding and appreciation of critical issues that affect every state, so it is imperative that students in every state graduate with a thorough understanding of Earth science.

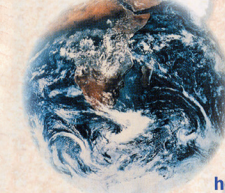
In recent years, 49 states have established science learning standards—outlining what students must know and be able to do. In every case, these standards emphasize the importance of Earth science in producing well-rounded literate citizens. **State science frameworks across the country note that Earth science is necessary for all students and that schools should include Earth science topics in the curriculum from kindergarten through grade 12.**

To understand how state educational systems have applied standards for Earth science content, AGI conducts annual national assessments of K-12 Earth science education. Our research shows how far we have come, and how much more work we have to do to improve Earth science education. Highlights of our studies demonstrate growing emphasis on Earth science education. Nearly fifty percent of all states include Earth science content in state-mandated high school exams, and thirty-seven states count Earth science courses towards high school graduation requirements.

Education is a local and state-based issue. We need your support and assistance to ensure Earth science education is appropriately incorporated across the country. You need to contact your local school administration to determine if Earth science is an option for core-credit science courses at the high school level, and to see if elementary schools and middle schools teach and assess Earth science.

To learn more about how you can support Earth science education in your state's schools, or to obtain additional copies of this brochure to distribute to educators in your state, please contact AGI at (703) 379-2480 or **education@agiweb.org**.

Why Earth Science?



Not so long ago, we had the first view of our planet from space. We were startled to see how beautiful and how fragile our home appeared, "a pale blue dot" said Carl Sagan, very different from the other planets in our solar system. Our home—blue with water, white with clouds, green with life—is a planet unique in our solar system and probably rare in the universe.