

geography

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(from Greek *geo*, “earth,” *graphein*, “to write”), the scientific study of the Earth's surface. Geography describes and analyzes the spatial variations in physical, biological, and human phenomena that occur on the surface of the globe and treats their interrelationships and their significant regional patterns.

Geography is one of the oldest subjects of study, and it has been called the mother of sciences. In the classical world geography had close ties with history (as in Herodotus) in attempting to describe what other lands and peoples were like or with astronomy and philosophy (as in Eratosthenes and Ptolemy) in trying to ascertain the size of the Earth and to locate places on it. Alexander von Humboldt (1769-1859), a German naturalist and geographer, was a key figure in the rise of modern geography because of his exact measurements, his careful recording of observations, and his mapping of significant areal patterns of human and natural features.

Though once associated entirely with mapping and the exploration of the Earth, the discipline of geography is today a wide-ranging one. Any pattern of spatial variation of phenomena on the surface of the Earth may be influenced by many of the processes that animate the natural and human realms, requiring geographers to be conversant with the principles of the biological, social, and earth sciences. Desertification in Africa, for example, is often attributed to drought, but studies reveal that it has been accelerated by overgrazing, overexpansion of farming, and removal of trees and shrubs for firewood. Many such phenomena are studied by other specialists, but it is the distinctive task of the geographer to investigate their distributional patterns, their regional complexes, the networks that link the elements, and the processes involved in the interaction among them.

The special subdisciplines of geography are divided into areas of physical, human, and regional geography. Physical geography is further subdivided into geomorphology, climatology, biogeography, and hydrology. In this category particular attention has been paid to coastal areas, to water and mineral resources (including energy), and to natural hazards. Human geography includes historical geography, cultural and social geography, population geography, political geography, economic geography (including the study of agriculture, industry, trade, and transportation), and urban geography. Medical geography, environmental management, and conservation of resources fall between these two large fields. The scale of study in regional geography may range from worldwide

regionalization, to a continent, a major cultural area, a country, a subregion within a country, or a city.

Geography utilizes a battery of methods and techniques. Particularly important are direct field observations and mapping. Methods of observation have been enhanced by such means as aerial photography and electronic remote sensing from artificial Earth satellites. Statistical methods help in spatial analysis of quantitative data, particularly census and survey data. Maps, however, remain the distinctive tool for the geographer.

The discipline of geography has many uses. It enables individuals to know the basic features of the world in which they live, the great variety of lands and peoples, the complex associations and interrelations of human beings with resources and nature, and the problems faced by inhabitants of other countries and regions. Geographic research provides explanations of the distribution of physical, biological, and human features on Earth and of their complex chains of interconnection. Applied geographic analysis has proved useful in managing resources, in understanding problems of the environment, in analyzing natural hazards (such as droughts or floods), and in measuring the distribution of environmental pollution or contamination by discharges of urban, agricultural, and industrial wastes. The analysis of unanticipated environmental effects caused by the construction of large dams and reservoirs has been particularly important. Geographers are engaged in planning land use and housing. They are an important resource in national and international agencies that deal with the study, inventory, development, or administration of natural or human resources.

To cite this page:

MLA style:
"Geography." *Encyclopædia Britannica*. 2004. Encyclopædia Britannica Premium Service. 25 Mar. 2004 <http://www.britannica.com/eb/article?eu=37167>.

APA style:
Geography. *Encyclopædia Britannica*. Retrieved March 25, 2004, from Encyclopædia Britannica Premium Service. <http://www.britannica.com/eb/article?eu=37167>

Britannica style:
"geography" *Encyclopædia Britannica* from Encyclopædia Britannica Premium Service. <http://www.britannica.com/eb/article?eu=37167> [Accessed March 25, 2004].

 [Back to top](#)

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