

Understanding the Geography Standards for teachers in grades 9-12

Geography is about the earth we inhabit and what we do with it. Like all subjects, geography involves a distinctive approach to acquiring knowledge and understanding. That approach stresses the significance of *where* events (people, places, things) occur, how they got there and how they are related to other events elsewhere. When John Snow sought to understand an outbreak of [cholera in 19th c. London](#), he looked at where the deaths occurred and discovered they clustered around a local water pump. Removing the pump handle ended the outbreak. After [Delaware Route One](#) was completed, debate arose about where the off-ramps had been constructed and whether others in the Townsend area should be added. Because off-ramps bring development, their location is critical to controlling or encouraging growth in southern New Castle County. *Where* matters. Society, businesspeople, parents, and students all make location decisions constantly. Where should I shop for a car, what crop should I raise here, where should we draw a school's attendance boundary?

Geography examines the consequences of those decisions. It allows us to understand how human society has arranged itself over the earth's surface, how [Amazon forests](#) have been turned into cattle pastures, how superhighways make neighbors of once distant Los Angeles and Phoenix, why Central Americans risk their lives to grow [coffee on the slopes of active volcanoes](#). An enduring theme of geographical understanding is the different ways human cultures have responded to, and changed, the physical environment.

Too often, [geography](#) is thought of as a listing of places and products, or at best, the study of how topographic features such as mountains have constrained human actions. The geography standards reject rote memorization and a restricted outlook. Instead, they call for students to use the geographic approach with its key issue of why events occur where they do to help us understand how we have organized our land and life across the earth's surface and what that organization means for our future. Knowledge and insight come from examining events in terms of *where* they occur. The forces composing the natural environment may constrain human behavior, but, increasingly [human culture](#) makes significant changes to the natural environment: distinctive places result from this interaction.

Goal Statements for the Delaware Geography Standards

- Students will possess a knowledge of geography and an ability to apply a geographical perspective to life situations. All physical phenomena and human activities exist in space as well as time.
- Students will study the relationships of people, places, and environments from the perspective of where they occur, why they are there, and what meaning those locations have for us.
- Students with the knowledge and perspectives of geography will understand the environmental and human processes that shape the Earth's surface, and recognize the culturally distinctive ways people interact with the natural world to produce unique places.
- Students with an appreciation of the nature of their world and their place in it will be better prepared citizens for a physical environment more threatened and a global economy more competitive and interconnected.

GEOGRAPHY STANDARD ONE: Students will develop a personal geographic framework, or “mental map,” and understand the uses of maps and other geo-graphics [MAPS].

There are two parts to Standard One. In part one, a **mental map** is a person’s internalized picture of a part of the Earth’s surface. It contains our knowledge of the *relative position* of places as well as knowledge of their physical environments and cultural characteristics. Most people develop several mental maps at different scales and with varying levels of detail: local maps of one’s immediate environment, regional maps of the familiar parts of a country, and national and world maps. The sum total of these mental maps represents a person’s geographical factual knowledge. It allows a person to find their way in the world as well as respond with understanding to political, cultural and environmental events. How concerned should a U.S. citizen be about a Tsunami in the Indian Ocean or a coup in Zimbabwe?

Much of the information in a mental map can be found in a good atlas or by examining a globe, but these should be reinforcing tools, not substitutes. In history, seeing the connections across time comes from a basic familiarity with historical events, not constant recourse to an almanac. Similarly in geography, discovering the relationship of events across earth space requires some understanding of the nature of places and their distances from one another.

Mental maps form slowly and come, not from memorization, but from familiarity. One rarely memorizes a neighborhood’s street names and the orientation of one street to another. Rather, constant movement within the neighborhood brings it into mental focus. Mental maps of more distant world regions are best acquired through analyzing geographic problems. The domestic conflicts over the Vietnam War were in part about the extent to which Vietnam and its neighbors registered on the average American’s mental map. Exploring the place of Vietnam and its proximity to China and the rest of south-east Asia allows at least a more reasoned basis for evaluating the claims of the “domino effect.” Similarly, the relationship of Kuwait to Iraq and its proximity to Persian Gulf oil routes would help an understanding of the basis for the First Gulf war.

A student’s mental maps from local to global scales could contain an infinite variety of information, but at a minimum, they should reflect an idea of the distance and direction of one place from another. Major places should be noted, along with their general economic activities and cultural characteristics (religion, language, political orientation). Also considered should be their proximity to major landforms (rivers, mountain chains) and the climatic zones in which they fall.

A second part of the standard addresses the **use** of maps and other geo-graphics. A map is a way of selecting and compressing a large amount of data about where events occur on a sheet of paper that represents a part of the earth’s surface. The map uses symbols to represent human actions or physical features, and allows the viewer to gain an overview of an area that would not be possible from the ground. It is like looking down from several thousand feet - or miles - above the earth. Other geo-graphics include globes, and aerial photographs that use either natural or false colors. The latter involve special film sensitive to particular electromagnetic wavelengths. Thus, a river may appear blue on the photograph but streaked with red by polluted water that

reflects a wavelength different from fresh water, even though the differences are indistinguishable to the naked eye.

Maps are used to undertake geographic analysis. Mapped information can be viewed as patterns of data, just as John Snow uncovered patterns of dots. The patterns convey meaning. For instance, a map of U.S. teenage birth rates showed that almost all the states across the South had higher than average rates while northern states had lower than normal rates. Such a contrasting pattern provokes a wide variety of explanations as well as an incentive for further investigation. Today, much geographic information (events, where they occur) can be digitized in a Geographic Information System (GIS). GIS analysis allows two or more maps to be laid on top of each other so that a number of variables can be examined together. A map of public libraries, each with a circle around them representing a reasonable distance for patrons to travel, can be superimposed on a map of urban population. Inevitably, some population areas will be excluded from any of the circles. A GIS allows an instant count of how many people are excluded, permitting policymakers to decide if enough unserved people exist to support a new library and where it might best be placed.

Maps have the same limitations and potential for misuse as statistics. They cannot represent all aspects of that part of the world they encompass. Instead, what is portrayed is selected by the mapmaker and subject to that person's biases. A map of the U.S. African-American population by county will display one pattern of high and low density areas if *absolute* numbers of African-Americans in each county are used, and a different pattern if the *percentage* of African-Americans in each county is selected. The South Korean government has long lobbied nations to call the sea between it and Japan the "East Sea" rather than the more common "Sea of Japan." A map reflecting the name change could have serious policy implications for the mapmaker.

Enduring Understandings

Students will understand that:

- Mental maps summarize differences and similarities about places. These differences and similarities lead to conflict or cooperation and the exchange of goods and ideas between peoples.
- Mental maps change as the scale moves from local to global; we know more about our home area than more distant places; and these differences affect how we feel and behave towards places that are distant versus those that are close.
- The ways mapped patterns are analyzed and used help solve societal problems.
- Maps can be used to distort or introduce bias into the information they portray.

Geography Standard One 9-12a: Students will identify geographic patterns which emerge when data is mapped, and analyze mapped patterns through the application of such common geographic principles as "hierarchy," "accessibility," "diffusion" and "complementarity."

Essential Questions:

- To what extent is competition or interaction between places influenced by their relative location and accessibility?

- How might the position of a place in a settlement hierarchy affect the life of the people in that place?
- What makes it likely or unlikely that people and/or goods will flow between two points?

At the high school level, the standard returns to the analysis and **use** of mapped information. The first benchmark emphasizes the ability to analyze mapped information and offer explanations for the patterns identified. These explanations make use of common principles that account for the geographical behavior of the phenomena being mapped. Four principles are emphasized in the standards.

Hierarchy involves the observation that patterns at one scale are often connected to patterns at a different scale. For instance, a [map of U.S. cities](#) portrayed as circles of a size proportionate to their population will show many small circles and only a few large ones. Initially, the map may be seen as a static picture, but applying the concept of hierarchy, relationships may be implied between the small and large cities. Generally, small cities depend on specialized services that can only be supported in [large cities](#). One example would be the [dissemination of news](#). Major television and newspaper enterprises are found in large cities. Information flows down the hierarchy of cities from large to small much more rapidly and in a less-edited form than information flowing up the hierarchy. A disease spreads similarly. Research about the spread of [AIDS in the U.S.](#) indicates that the disease began in large cities and spread to smaller surrounding communities.

Related to the concept of hierarchy is [accessibility](#), a measurement of how easily one place can be reached from all others. [Large cities](#) become large because they occupy locations that make reaching a widespread population much easier than from small cities that occupy less accessible points. For instance, in southern Delaware, given where people are located and the network of roads people use to travel between places, Dover is the most accessible point. Seaford, Lewes, and Milford are examples of towns with medium accessibility while Harrington, Bridgeville, and Felton have relatively low accessibility. Hospitals require access to a large number of people to justify the services they provide, so we should not be surprised that a [map of hospitals](#) would show them to be located in Dover and the medium-accessibility towns rather than lower-accessibility communities. The same pattern prevails on a [map of Wal-Mart stores](#) in southern Delaware. Making sense of these mapped patterns requires application of the principle of accessibility.

A third principle is **diffusion**, embodying the idea that, while maps may be static representations of geographic behavior, in reality both the physical and human worlds are constantly changing. People move, freight flows from centers of production to consumption. Precipitation comes and goes and, at a slower pace, soil is removed by erosion and deposited elsewhere. Diffusion captures the idea of phenomena moving over space in particular directions at variable speeds. The Africanized (“killer”) [bee](#) entered the New World in Brazil and slowly spread outwards across northern South America, into Central America and Mexico and then to the United States where climate factors tended to steer it in the direction of the Midwest and Eastern Seaboard. Eventually, cold Canadian weather will contain its diffusion. The rate and direction of spread can be displayed on a map that uses solid lines with attached dates that join all points where the bees have spread by a particular date. Similar maps can display the [diffusion of news](#) in the

colonial period when the network of post roads and pattern of settlements influenced the speed and direction of information flow.

There are at least three [types of diffusion](#) patterns identified by geographers: [expansion diffusion](#), where, for example, the spread of a disease moves from its point of origin by direct contact through a population; [relocation diffusion](#), where the diffusion path leapfrogs over intervening points—an example might be the spread of recent refugees from Bosnia to Utica, New York; and [hierarchical diffusion](#), where information spreads through a hierarchy of settlements. To use our earlier example of the [spread of news](#), in hierarchical flow news might spread from New York to Philadelphia and then to Wilmington and Trenton. Intervening places closer to New York but lower in the hierarchy, such as New Brunswick, New Jersey, would take longer to receive the information.

A final principle, **complimentarity**, addresses the likelihood that two places will interact in some way. Generally, the farther away two places are found, the less likely they are to exchange people or goods or influence each other. Complimentarity is a measure of that attraction. For instance, a [map of the flow of oil](#) from producing to consuming nations would show a large volume being transported from the Middle East to Japan because, despite the distance involved, the Middle East has a large excess of reserves and Japan, with no oil of its own, is a large consumer of the product. In a different scenario, a [map of retail establishments](#) laid on top of a map of population would show fairly high population densities on either side of the Delaware/Pennsylvania border, but a much greater number of service establishments on the Delaware side than in an area 20 miles into Pennsylvania. The reason for the relative absence of stores on the Pennsylvania side is Delaware's lack of a sales tax that increases complimentarity levels for Delaware stores with Pennsylvania residents who would rather travel farther and avoid the tax than frequent stores closer to their neighborhoods.

The reciprocal of complimentarity is transferability. Without the means to transfer people or goods, no movement will occur. For instance, the natural complimentarity between the resources of northern and southern Europe in the early and later Middle Ages led to significant trade levels, but the difficulty of land travel across the Alps forced merchants to move their goods by sea through the Strait of Gibraltar. When the Moors occupied Iberia and blocked that route, transferability could not occur and two separate [circuits of trade among cities](#) developed, one based on Venice in the Mediterranean and the other (the Hanseatic League) focused on cities around the North Sea and the Baltic.

The standard calls for students to be able to utilize these principles in interpreting mapped patterns; however, it should be recognized that often the principles work together and need not be viewed independently.

Geography Standard One 9-12b: Students will apply the analysis of mapped patterns to the solution of problems.

Essential Question:

- How might societal problems be posed so that they are open to solution through geographic map analysis?

The second benchmark emphasizes the use of maps to address societal problems. Clearly, it follows from the first benchmark that before using maps to problem-solve, students must have an ability to analyze the forces likely to produce geographic data patterns. In many ways, this benchmark calls for the culmination of geography learning and understanding to be applied in a socially useful manner. Any number of problems might be selected and carrying out the analysis with GIS is recommended. For instance, maps of population distribution could be compared with a map of [Delaware recycling centers](#). An estimate could be made of how far a person would be willing to travel from home to a recycling igloo, and the population served by each center could be calculated. Observations of where people are forced to travel greater than optimum distances, or places where the population is served by more than one center, could result in recommendations either to add more centers or move existing ones to more usable locations.

While many problems are susceptible to geographic map analysis, they may not be posed in a manner initially [thought of geographically](#). Since almost all events occur somewhere, part of a student's learning is how to rephrase a problem to allow it to be subject to map analysis. Discussion of the causes of high [cancer rates in Delaware](#) often focus on the delay in diagnosis or inadequacy of available treatment. Examining the issue geographically involves identifying the areas where cancer occurrence is high and then exploring causes for those extremes. Analysis might involve looking at particular environmental conditions associated with places of high incidence, or examining the accessibility pattern of treatment centers.

GEOGRAPHY STANDARD TWO: Students will develop a knowledge of the ways humans modify and respond to the natural environment [ENVIRONMENT].

The key to Standard Two is the idea that the relationship between the natural environment and human culture is a two-way street. Too often, only one part is asserted: that the form of the natural environment influences (in extreme cases, determines) the human culture of a place. Mountains may prove obstacles to communication, but transport technology overcomes the barriers. Climate may limit the growth of certain crops, but irrigation or greenhouse protection can extend a plant's natural limits. That is not to say that the natural environment does not pose risks: hurricanes, earthquakes, volcanic eruptions, or droughts all pose risks to human settlement. But as human technology expands, people are able to adapt to the constraints once placed by the natural environment. In the early 20th century, Arizona's aridity limited farming communities to isolated oases. With irrigation projects from the Colorado River and the invention of air conditioning, major metropolitan populations could be sustained in Phoenix and Tucson.

Besides technological adaptation, human culture has increasingly modified the natural environment, shaping it to its needs. Clearing forests for agriculture, paving surfaces for urban areas, damming rivers, exploiting minerals, polluting air, streams and oceans, are all examples of the permanent changes to the natural world resulting from human culture.

At the center of this standard is the recognition that places are the resolution of the forces of nature and adaptations by human culture. Moreover, as this relationship changes over time, so too do places. For student understanding, knowledge of the forces that shape the natural environment is necessary, and may be gained from both this standard and/or the Science standard, Earth's Dynamic Systems. But what makes Geography Standard Two different from the Science standard is the focus on *how* human culture is both influenced by, and adapts to, the natural world.

Enduring Understanding

Students will understand that:

- The human response to the characteristics of a physical environment comes with consequences for both the human culture and the physical environment.

Geography Standard Two 9-12a: Students will understand the Earth's physical environment as a set of interconnected systems (ecosystems) and the ways humans have perceived, reacted to, and changed environments at local to global scales.

Essential Questions

- To what extent can people predict the consequences from human alterations to the physical environment?
- Why might focusing on how people perceive the risks and resources of the natural environment help to explain human behavior in different parts of the world?

At the 9–12 level, knowledge of the processes shaping climate, landforms, vegetation, and soils is placed in the context of systems. A system is a set of interconnected parts that are logically (functionally) connected. Most environmental systems are closed; for instance, the [hydrologic](#)

[cycle](#), the [carbon cycle](#), or the [nitrogen cycle](#). The climate system is also ultimately in balance: energy incoming from the sun is balanced by energy lost to space. However, the amount of energy in various states can change, which explains why global warming of the lower atmosphere via the [greenhouse effect](#) can occur if more greenhouse gasses are introduced.

The key element in all the natural systems is considering energy as the common denominator. For instance, the [tropical rainforest](#) is an almost closed energy system that comes close to supporting itself with no energy assistance from the underlying, often infertile, soil. Human adaptation involves redirecting some of that energy to human uses via burning patches of forest as the basis for a temporary influx of energy to the soil that permits crops of value to people to be grown. One developmental feature of the standard is for students to treat a human change to the environment as a diversion of energy to human society from the path it follows in the natural system.

A second development feature introduces complexity to the human-environment equation. Rather than simply comparing the nature of the physical environment with what people do with it, human perception is introduced. Thus, an environment may be considered hazardous by an objective observer, but explaining human adaptation involves knowing how the environment is [perceived](#) by those who use it. People might not be expected to settle on the sides of active volcanoes, as in Central America, or build on the shores of [hurricane-prone coasts](#)—that they do requires understanding how they perceive the environment and deal with the risk.

GEOGRAPHY STANDARD THREE: Students will develop an understanding of the diversity of human culture and the unique nature of places [PLACES].

The enduring goals of geography - to apply analysis of the importance of “where” events occur and the way in which human-environmental relations shape the nature of the earth’s surface - are embodied in the first two geography standards. In Standard Three, they are both brought to bear on one of geography’s central, enduring subjects, the nature of places. Places may be defined as locations with character. A place occupies a given location on the earth’s surface – what may be called its *site*. That site contains a unique combination of physical environmental conditions: climate, landforms, soils and vegetation. It also contains people with distinct cultural attributes who modify the environment to create a distinctive place. Places, however, reflect one additional attribute, their location relative to all other places, or their *situation*. Places close together can expect to have more interaction – trade, information flow, and human migration – than places farther apart and thus be more subject to change over time. Isolated places change little. Evaluating a location’s site and situation allows identification of those distinctive characteristics that make it a unique place. New York City, originally located on Manhattan Island, has a poor site, bounded by the Hudson and East Rivers that require numerous tunnels and bridges for connection. But its situation is superior, located at the confluence of the Atlantic Ocean and the Hudson River and (later) Erie Canal that gave the city an ability to reach growing 19th century settlements west of the Appalachians in the Ohio river valley. Far surpassing the situation of its rival urban centers, Philadelphia, Boston and Baltimore, it acquired status as the country’s largest city which it has never relinquished.

Enduring Understandings

Students will understand that:

- Places are unique associations of natural environments and human cultural modifications.
- Concepts of site and situation can explain the uniqueness of places. As site or situation change, so also does the character of a place.

Geography Standard Three 9-12a: Students should understand the processes which result in distinctive cultures, economic activity and settlement form in particular locations across the world.

Essential Questions

- Why are some places more culturally diverse or similar than others?
- To what extent does the culture of a place change over time?

At this level, students should understand that *over time*, as successive waves of diffusion wash over particular places, the nature of culture in those places changes. Moreover, after 1492, with the worldwide spread of European colonialism, some have argued that growing cultural diversity among places is being replaced with a slow movement towards cultural similarity. The loss of distinct languages and the spread of English are associated with a growth in global communication and human migration, all of which may be responsible for the spread of western culture, especially among major world cities. Students should understand the potential for such trends to [reduce cultural diversity](#) among places and recognize evidence such as the growth of common building styles, western clothes, and Hollywood movies.

In addition to culture, places are distinctive because of the economic activities found there. At the 9–12 level, students need to understand the processes that account for differences in agriculture and industry in different parts of the world. While environmental limits place constraints on the agricultural economy and the location of raw materials influence the location of industrial enterprises, students should understand that there are other influential factors. Distance to market and transport costs and services are a major factor. For instance, when trans-Atlantic transport improved, wheat could be grown more profitably in North America rather than Europe. When refrigerated ships were introduced, Argentina shifted from an economy based on hides to one based on chilled beef shipped to North America and Europe. In general, agriculture is more intensive (yields per acre are higher) closer to the market and extensive (yields per acre are lower) farther away.

Distance also affects the [location of industry](#). Originally, water power sites attracted industry because power could not be moved. When coal became common, power could be moved, but coal was so heavy it was cheaper to use it on its site of production so industry gravitated to coal fields. When the amount of coal needed in manufacturing and the diversity of raw materials in a finished product expanded, industry shifted to major metropolitan centers where the market for products was greatest. Other factors such as available labor, cost of electricity, type of living conditions, and tax incentives all play their part in the location of industry. Students need to understand how these factors affect the character of a given place.

Finally, places display particular arrangements of [form](#) or built environment (the organization of buildings, streets, and open spaces). American cities adopted the grid-iron street plan; European medieval cities reflect no prior planning; Islamic cities display a focus on points (the bazaar, the mosque), buildings are surrounded by high walls that extend to the edge of property lines, and streets are leftover spaces without order or organization. Each of these settlement forms contributes to place distinctiveness.

GEOGRAPHY STANDARD FOUR: Students will develop an understanding of the character and use of regions and the connections between and among them [REGIONS].

Just as all people are unique, so are places. And just as it is impossible to understand every person in the world, so it is with the world's places. With people we develop concepts such as communities, ethnicities, religious observance, and speakers of particular languages, and social classes to help us make sense of humanity. Similarly, geography has developed the concept of regions to simplify an understanding of places. Regions, unlike places, do not exist; they are a construct or concept. Regions are defined as an area of the earth's surface enclosing places that have some common characteristic. A climatic region may include the area where we find places experiencing a similar climate, such as the tropics; an agricultural region may be an area within which places engage in a similar type of agriculture, such as the corn belt; a political region might be one in which all places are under the jurisdiction of a particular set of laws, such as the United States; an ethnic region might enclose places that house a common ethnic population, such as Kurdistan. If students examine their language, they will see that it is full of regional terms: the "city;" the "suburbs;" my "neighborhood;" "downtown."

An important feature of regions is that although they are a product of a person's mind, once identified they can take on real and universal meaning. We may not know exactly the location of "the South" in the United States, but being "southern" invokes strong feelings pro and con. In Delaware, being south or north of "the Canal" is an important distinction in the minds of Delawareans, although to an outsider, there is no discernable difference between places on either side of Chesapeake and Delaware Canal waterway. Regions are only identifiable once they have discrete boundaries around an area of earth space that separates it from other spaces. Drawing boundaries is often difficult and frequently zones rather than discrete lines are used. Methods of drawing boundaries are an important part of the regional concept.

Enduring Understandings

Students will understand that:

- A region is a concept rather than a real object on the ground, used to simplify the diversity of places.
- Regions must have boundaries to exist, yet there advantages and disadvantages associated with any real or abstract feature used to draw a boundary.

Geography Standard Four 9-12a: Students will apply knowledge of the types of regions and methods of drawing boundaries to interpret the Earth's changing complexity.

Essential Questions

- How might regional analysis help to solve societal problems?
- To what extent are regional boundaries permanent? What might cause them to change over time?

This benchmark calls for an understanding of how to use regional analysis. The key to such analysis requires identifying the boundaries of regions, for without boundaries a region cannot exist. Formal regions require precise boundaries and many political units are formal regions. Students should recognize the ways that formal regional boundaries have been drawn, and the

advantages and disadvantages of each. For instance, the use of physical features such as [rivers](#) or the crests of [mountains](#) raises a number of issues. Where does the boundary go between the peaks of a mountain range? Should the boundary use the center of a river and, if so, what happens when the river changes its course? The use of human features can have similar consequences. Many boundaries have followed survey lines such as compass headings or lines of latitude or longitude. While they have the value of precision, they often ignore and cut across the much more complex boundaries of human culture, as in much of [Africa](#).

[Functional regions](#) pose equal difficulties. Where a region's influence declines over a zone, placing the boundary is often arbitrary: at what point is the region's influence sufficiently diminished? Students need to recognize the value of simple statistical techniques to solve this problem, such as the use of [Theissen polygons](#) that place a boundary at the [mid-point between two regional centers](#).

Students should understand how to use regions in solving societal problems. For instance, the location of hospitals relative to the population served often results in some people having better access to services than others. Determining the regional [service boundaries of hospitals](#) in the state demonstrates that fact and can point to areas where the population is poorly served.

Students should recognize that regions and their boundaries are not always permanent, since the conditions that created them may have changed over time. For instance, the regional boundaries of [Native American tribes](#) prior to European settlement were severely disrupted or obliterated after many Native American groups were forcibly moved from their original lands. On the other hand, in [Northern Canada](#), assertion of Native American rights has produced a new set of regional self-governing territories, such as Nunavut. Similarly, the [European Union](#) is actively seeking to create a single region out of what were once 25 independent states.