UNIT ONE:
GEOGRAPHY: ITS NATURE AND PERSPECTIVES

The word "geography" is probably a familiar one to you since most people take geography for granted. Geography is concerned with place and location – two concepts that are inherently important parts of everyday life. However, the Advanced Placement Geography course invites you to see your world through the lens of the geographer, and in doing so encourages you to enlarge your vision to encompass other places and locations and consider them in new ways.

Don't make the mistake of thinking of a geographer as merely someone that can name all the rivers, lakes, cities, and countries of the world. That would take a lot of memorization, and you would have to question the value of the information by itself. Geographers do have this kind of knowledge, but they are much more interested in understanding how those places shape and are shaped by people, and what their location means in the past, present and future. Some key concepts that define geography as a field of study are:

- **Location** – the position of something on earth's surface
- **Space** – the physical gap or distance between two objects
- **Scale** – the relationship between the size of an object or distance between objects on a map and the size of the actual object or distance on earth's surface
- **Place** – a specific point on earth with human and physical characteristics that distinguish it from other points
- **Pattern** – the arrangement of objects on earth's surface in relationship to one another
- **Regionalization** – the organization of earth's surface into distinct areas that are viewed as different from other areas
- **Globalization** – the expansion of economic, political, and cultural activities to the point that they reach and have impact on many areas of the world

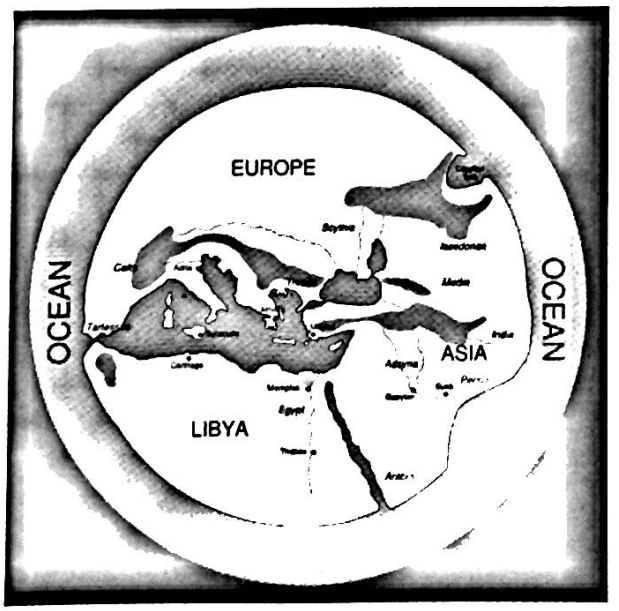
All of these concepts help you to understand the importance of **spatial organization** – the location of places, people, and events, and the connections among places and **landscapes** (the overall appearance of an area that is shaped by both human and natural influences). Geographers believe that the **"why of where"** is critical – explanations for why a spatial pattern occurs. Sometimes geographers ask questions about how particular human patterns came about, so that specific places become distinct from all others. Often these patterns and places combine into regions – large areas that may be compared to other large areas. Some patterns and places may reach many areas of the world so that geographers may comment on the effects of globalization. Spatial organization defines human life on earth, with all of its similarities and differences.

GEOGRAPHY AS A FIELD OF STUDY

Geography was first given structure as a field of study by the ancient Greeks from the words *geo*, "the earth", and *graphein*, "to write." Several scientists described the parts of the known world, and used a combination of mathematics, explorers' reports, rumors, and assumptions to draw maps of the world. The Greeks also laid the foundations for **cartography,** the art and science of map-making. Of course, the maps were much more accurate for the areas around Greece than they were for other parts of the world. A good example is a reconstructed map by Hecataeus, who lived in the late 6th and early 5th centuries B.C.E. One of the great unsolved mysteries of his day was the shape and extent of the southern part of the African land mass. Some scientists believed that it eventually widened and connected to East Asia. The Greeks understood that the earth was round, with Ptolemy estimating in the 2nd century C.E. that the circumference of the earth was about 16,000 miles. He was about 9,000 miles short of reality, an assumption that led Christopher Columbus to believe that he was near Asia when he first landed in the Americas.

Geography was and still is of interest to people in many lands. For example, the ancient Chinese studied geography, although they apparently did not have contact with Mediterranean geographers until much later. Also, while Europeans during the Middle Ages (500-1400 C.E.) lost touch with Greek and Roman geographical knowledge, Muslim scholars in the Middle East built on that knowledge to describe and analyze their known world. These Arab geographers were often great travellers, and they searched the Eastern Hemisphere for new knowledge. Although they were most interested in practical knowledge of locations, places, and products, these scholars proposed theories about the evolution of mountain ranges.

Geography was reborn in Europe in the 17th century as a broad study of both physical landscapes and the roles that humans play in shaping them. The modern scientific study of geography began in Germany during the 17th century, as European power began to slowly spread over much of the globe. In the



Hecataeus' Map of The World. Hecataeus was a Greek historian who lived from about 550 to 476 B.C.E. He described the countries and inhabitants of the known world, and included a map to illustrate where they lived. Hecataeus' map was based on Anaximander's earlier map of the earth, which he corrected and enlarged. Notice how much more accurate the map is in the area around Greece.

1700s, the German philosopher and geographer **Immanuel Kant** defined geography as the study of interrelated spatial patterns – the description and explanation of differences and similarities between one region and another. By the end of the 18th century, place could be determined and described by using lines of latitude and longitude, and maps were becoming much more accurate and reliable. By the turn of the 20th century, students in universities throughout Europe were studying geography as a distinct discipline.
As geography became more and more specialized throughout the 20th century, many sub-fields emerged, including cultural, social, urban, population, medical, economic, and political geography. However, today the field may be divided into two great branches: physical and human geography.

Human geography focuses on people. Where are they? How are they alike and different? How do they interact? How do they change the natural landscapes, and how do they use them? Because other fields of study – such as history, sociology, economics, and political science – also deal with human behavior, human geography often overlaps and interacts with these disciplines.

Whereas human geography emphasizes people and the way they interact with their natural environment, **physical geography** focuses on the natural environment itself. For example, a physical geographer might study mountains, glaciers, coastlines, climates, soils, plants, and animals. Of course, neither human nor physical geography could exist without the other because the two fields inevitably intersect and interact, making them inextricably bound to one another.

KEY GEOGRAPHICAL SKILLS

In order to understand the geographical perspective, students must learn key skills that help to organize and manipulate concepts. These skills include learning to use the vocabulary of geographers as well as those all-important tools – maps.

MAPS AND SPATIAL DATA

All geographers are very interested in the way places and things are arranged and organized on the surface of the earth. This common bond – the **spatial perspective** – means that they notice patterns of both natural and human environments, distributions of people, and locations of all kinds of objects. Words can describe space, and so some geographical data may be communicated through written and spoken language; however, the map is a powerful geographical tool that is almost as old as geography itself. Why describe something when you can draw a picture of it? Mapmaking (cartography) is a time-honored skill that has developed an incredible degree of precision and adaptability.

Absolute and Relative Location

Maps show us two types of location:

- **Absolute location** – Maps provide the exact location of a place on a mathematical grid of the earth divided by two sets of imaginary arcs: **meridians** and **parallels.** A meridian is an arc drawn between the North and South Poles that measures **longitude,** a numbering system that calculates distance east and west of the **prime meridian**. The prime meridian is located at the observatory in Greenwich, England at 0°. The meridian at the opposite

SOME FAMOUS GEOGRAPHERS

Throughout the centuries, many curious people have studied and written about geography. Below is a list of some geographers that have shaped the way that millions of others have come to see the globe.

Eratosthenes, a Greek scholar who worked in the third century B.C.E., accurately calculated the circumference of the earth by measuring the sun's angles at the summer solstice (June 21) at two points along the Nile River – Alexandria and Syene. He used geometry to conclude the circumference based on the distance between the two cities and the angle of the sun at each place.

Ptolemy, a Greek scholar who lived five hundred years later than Eratosthenes, recalculated the circumference of the earth to be much smaller – by about 9,000 miles. He was wrong, but his mistake was taken as truth for hundreds of years. Despite his famous miscalculations, his *Guide to Geography* included many rough maps of landmasses and bodies of water, and he developed a global grid system that was a forerunner to our modern system of latitude and longitude.

Idrisi, an 11th century Arab geographer, worked for the king of Sicily to collect geographical information into a remarkably accurate representation of the world. Under Idrisi's direction, an academy of geographers gathered maps, consulted mariners and travelers, and went out on their own scientific expeditions. Although the final world map that they assembled is lost, much of the information and many partial and sectional maps have survived.

George Perkins Marsh, a 19th century American geographer, is best known for his classic work, *Man and Nature,* published in 1864. He focused on the impact of human actions on the natural environment, so his thinking is basic to the field of Human Geography. He emphasized human destruction of the environment, and used the conversion of ancient Mesopotamia from a "Fertile Crescent" to a vast barren desert. Marsh's message is a familiar one to us today: Conserve the earth, or live to pay the disastrous consequences.

Carl Sauer, an early 20th century geographer from California, shaped the field of Human Geography by arguing that cultural landscapes (products of interactions between humans and their environments) should be the main focus of geographic study. His methods of landscape analysis provided a lens for interpreting cultural landscapes as directly and indirectly altered over time as a result of human activity. His study is basic to environmental geography, a field that centers on the interaction of human and physical geography.

side of the globe is 180°, and all meridians placed in between are designated as either "east" or "west" of the prime meridian. A parallel is a circle drawn around the globe parallel to the **equator,** an imaginary circle that lies exactly half way between the North and the South Poles. Parallels measure **latitude,** or distance north and south of the equator. The equator is 0° latitude, the North Pole is 90° north latitude, and the South Pole is 90° south latitude. So any absolute location of a place on the surface of earth may be described in terms of longitude and latitude. For example, New York City is located at 74° west longitude and 41° north latitude.

- **Relative location** – All places on earth also have relative locations – spots relative to other human and physical features on the landscape. In other words, where does the country of Chile lie relative to Brazil? or Argentina? Where does the Caspian Sea lie in relation to the Black Sea? or the Mediterranean Sea? Relative location is important to think about because it defines a place in terms of how central or isolated it is in relation to other places. For example, if you were to study a map of Central Asia in the 13th Century, you would find an important city called Samarkand that lay on a major trade route called the Silk Road that stretched out in both directions, making the city central to Eurasian trade. Once sea-based trade became faster and more efficient, the Silk Road trade withered away, leaving Samarkand a shrinking, isolated place, far from the center of commerce. So Samarkand's relative location changed, although its absolute location has stayed the same. Today modern cities wax and wane not only in size, but also in levels of prosperity and types of activities as their relative locations change.

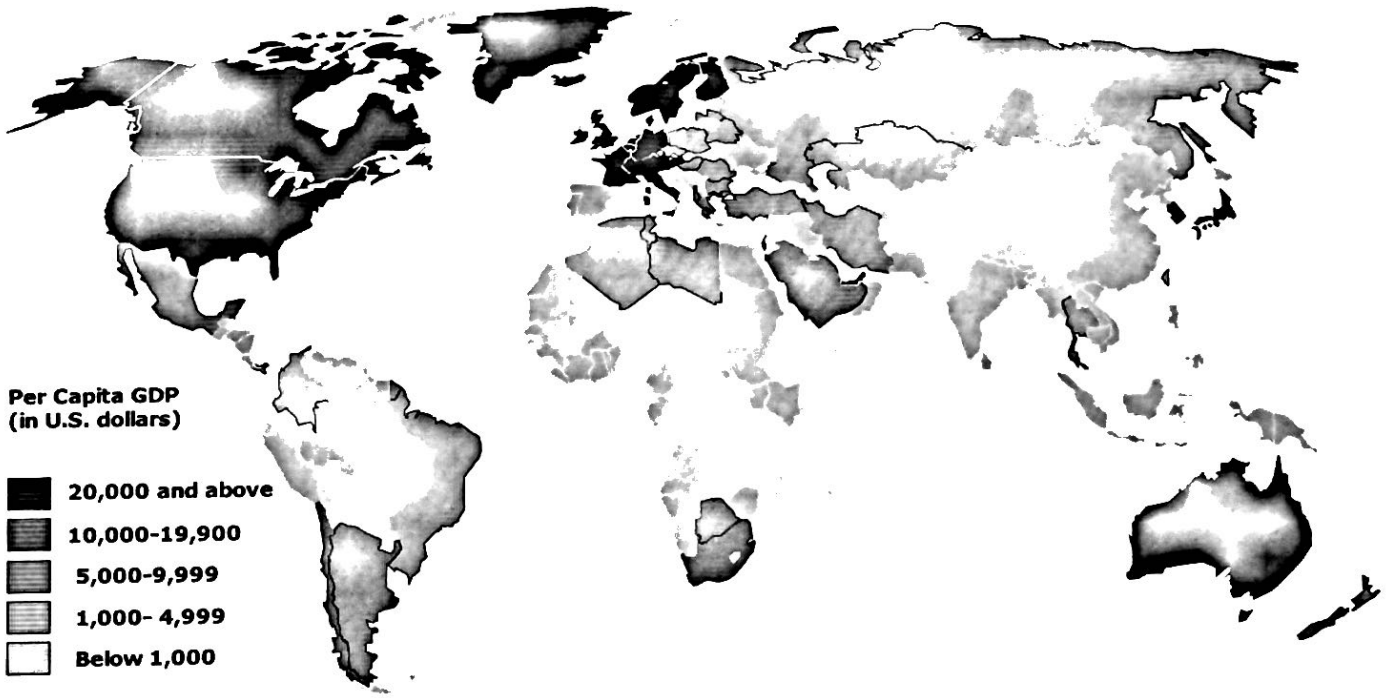
A Changed Relative Location. Although it was once one of the grandest cities in the world due to its location on the Silk Road, today Samarkand is only the third largest city in Uzbekistan.

Use of Maps

Geographers use maps in two basic ways:

- **Reference material** – Maps are efficient tools for storing information. Once a map is drawn, it may be pulled out to help find relative locations of places. Maps show roads or waterways that connect places, and for centuries travelers have used them. For example, 16th century European explorers used maps to help them cross the Atlantic Ocean, just as 21st century Americans use maps to visit vacation destinations.

- **Communications/education** – Maps may also be used to explain spatial perspectives to others. These maps are often thematic because they are designed to explain a type of geographic information. Examples are maps that show soil types, relative elevations, economic prosperity levels, and spatial arrangements of racial and ethnic groups.



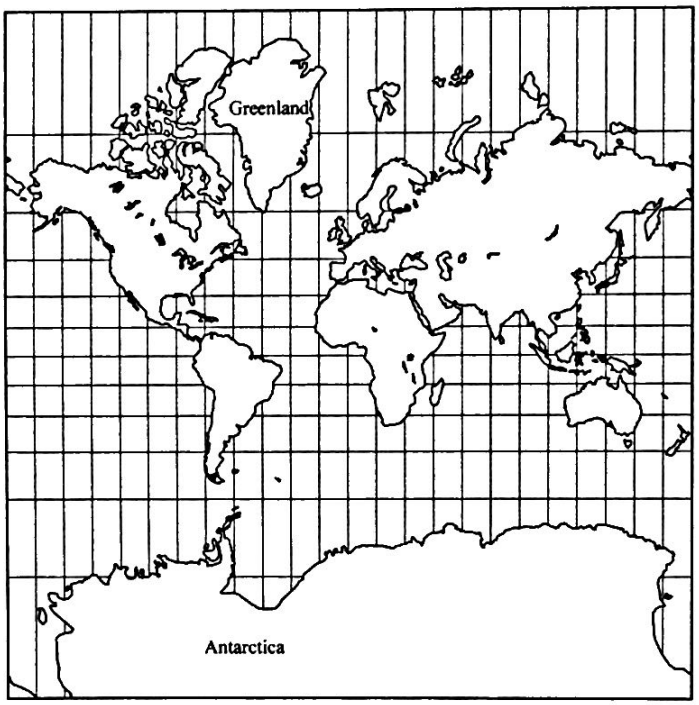
Per Capital GDP. The map above is meant to communicate information about various economic prosperity levels of countries around the world.

Map Projections

An important problem with communicating information through maps is that the only accurate representation of earth is a globe. When spatial information is presented on a flat piece of paper, a cartographer immediately faces the issue of **distortion** caused by trying to represent a three-dimensional object (the earth) on a two-dimensional surface (a flat map). Different methods have been devised to increase accuracy, but it is impossible to avoid some type of distortion. Inaccuracies may take several different forms: the shapes of areas, the distances between places, the relative size of different areas, or the direction from one place to another. A correction for one usually results in a distortion of another. For example, if the cartographer concentrates on getting the shapes right, often the distances between the shapes become inaccurate. As a result, the best map **projection** (method of transferring locations on earth's surface to a flat map) depends on how you are using the map.

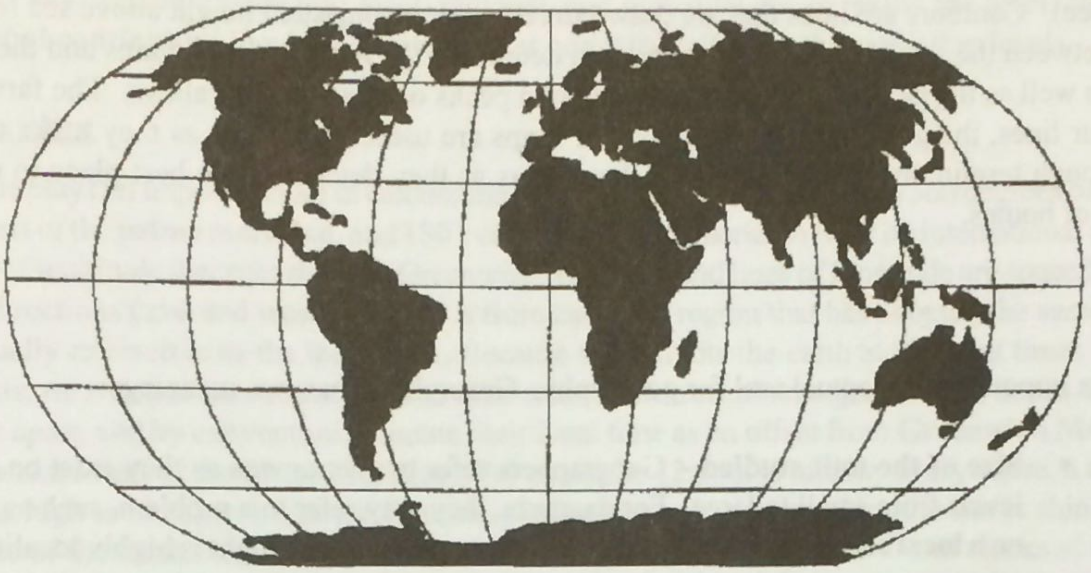
Three common map projections are:

1. **The Mercator projection** was invented by Flemish cartographer Gerardus Mercator in 1569 for a specific purpose – navigating ships across the Atlantic Ocean between Europe and the Americas. Mercator designed parallels and meridians to cross one another at right angles, just as they do on the globe. As a result, the direction is true everywhere on his map, a very important fact for anyone traveling east to west, or vice versa, on the Atlantic. The Mercator map was designed as an aid to navigators since straight lines on the Mercator projection are loxodromes or rhumb lines – representing lines of constant compass bearing – perfect for "true" direction. If a navigator wishes to sail from Spain to the West Indies, all they have to do is draw a line between the two points and the navigator knows which compass direction to continually sail to reach their destination. However, the Mercator projection distorts size of areas, particularly as you get closer to the North and South Poles. Why? Imagine trying to place a whole orange peel on a flat piece of paper. The middle of the peel (the equator) would stay relative intact, but the ends would have to be stretched or cut to make them lie flat. As a result, Antarctica in the south and Greenland in the north look huge on a Mercator projection. Since 16th century European explorers were generally headed east or west in the middle latitudes, this gross distortion of size in the north and south made little difference to them.



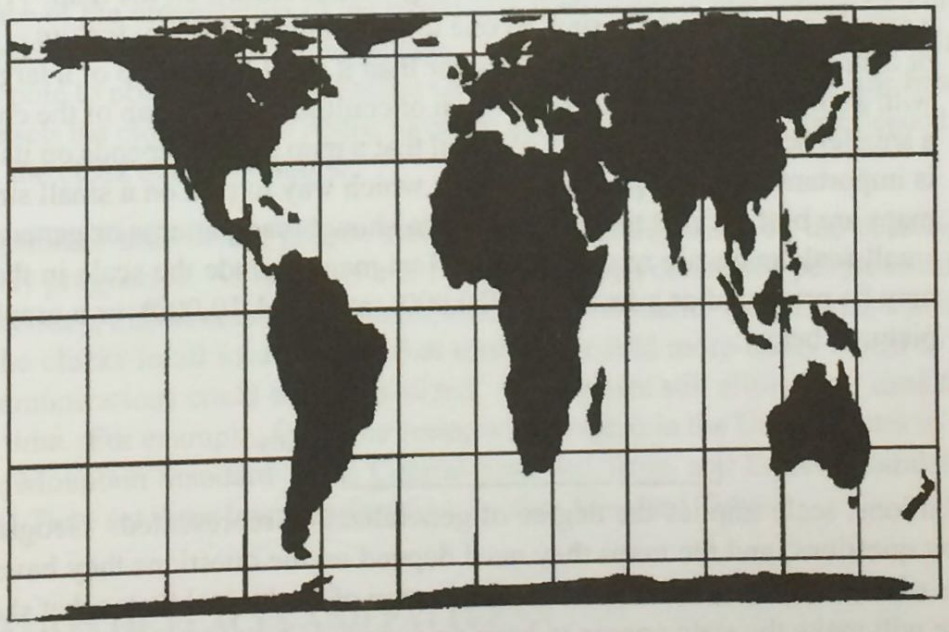
The Mercator Projection: Notice how large Antarctica and Greenland appear.

2. **The Robinson projection** (opposite page) tries to correct for this distortion in the high north and south latitudes by curving these areas inward on the paper. The meridians curve gently, avoiding extremes, but thereby stretch the poles into long lines instead of leaving them as points. As a result, distortion close to the poles is severe but quickly declines to moderate levels moving away from them. Shapes are not distorted very badly within about 45° north or south of the equator or within about 45° of the map's central meridian. The Robinson projection is an attempt to balance all distortions by making errors in all four ways: shape, size, distance, and direction. As a result, it is a good projection for general use, and is often used for wall maps in classrooms.



The Robinson Projection. The northernmost and southernmost areas are more true to size than they are on the Mercator Projection, because the lines of longitude have been curved to more closely resemble a globe.

3. **The Peters Projection** – This controversial projection was first introduced in 1974 by historian and geographer Arno Peters. The Peters map focuses on keeping land masses equal in area. As a result, the shapes are distorted, resulting in an overall map that seems quite unfamiliar to most viewers. However, other projections have made Africa and Latin America appear to be smaller than they really are, so supporters of the Peters Projection believe that it corrects misconceptions based on the Mercator and Robinson projections.



The Peters Projection. This map is controversial largely because it distorts the familiar shapes of the continents and other large landmasses. However, the map accurately compares land masses in terms of area. For example, notice how much larger South America appears in proportion to North America than it does on the other projections. Africa also gains size in comparison to Eurasia.

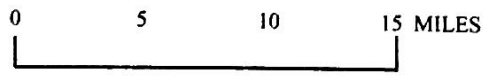
A special type of map is a **contour map,** designed to reveal the nature of local **topography** (the natural land surface). Contours are lines that are drawn to represent a consistent height above sea level. The spacing between the lines helps the map reader to determine the height of mountains and the depth of valleys, as well as the slopes that lead up to mountain peaks or down to the valleys. The farther apart the contour lines, the gentler the slope. Contour maps are useful for hikers as they make their way through rough terrain, and for engineers or developers as they determine the best place to construct buildings or homes.

SCALE

Scale is an important conceptual tool for geography. Generally, it has two meanings:

- **Size of the unit studied** – Geographers refer to phenomena as they exist on different levels from small to large. For example, they may refer to a problem, such as drought, on a **local scale, regional scale,** or **global scale**. If the drought is highly localized, with other areas around the place under study being drought-free, it is an entirely different problem from a drought that affects an entire region. A situation may begin as a local phenomenon, but become regional, or even global, as time goes by. For example, when Mount St. Helens erupted in 1980, the immediate concern was for the area just around the mountain. However, as ash and rock continued to flow, a cloud of volcanic matter traveled first to the region, and eventually to other areas of the globe. Many scientists argue that volcanic eruptions should be studied on a global scale, because they often affect faraway places.

- **Map scale** – Scale also tells us the mathematical relationship between the size of an area on a map and its actual size on the surface of the earth. Scale is a feature of every map, so it is important for understanding what is shown on the map. A map may show a small area of the earth, such as one town or city, and every feature – such as a street or a building – will appear much larger than it would on a map of a larger area. A map with a smaller scale will show a region or continent, and a map of the entire world is on a smaller scale still. The level of detail that a map shows depends on its scale. When it is important to know specifics, such as which way to turn on a small street, large-scale maps are best. If it is more important to show broad patterns or general relationships, small-scale maps are more helpful. Most maps include the scale in the legend, and it may be presented as a fraction (1/10,000), a ratio (1:10,000), or a graphic bar scale as pictured below.



With both definitions, scale implies the degree of generalization represented. Geographers may ask broad or narrow questions, and the maps they need depend on the questions they have. Scale affects our perceptions of accuracy and truth. For example, a map of the United States that shows population density by state will make the state appear to have an even population distribution within its borders. A map on a larger scale (for example, county by county) will reveal that some areas are more densely settled than others. Likewise, a map of the United States that shows the average income of people who live in a state will disguise the fact that people in some areas of the state are wealthier than others.

A map that shows average income by zip code would illustrate the variations within the state. Even though we may separate scale into local, regional, and global levels, in reality the levels interact in a **local-global continuum**, in which phenomena at one level influence those at other levels.

TIME ZONES

Longitude plays an important role in calculating time. The earth is divided into 360 degrees of longitude (180 ° west of the **prime meridian,** and 180 ° east). The prime meridian is set by international agreement on a line of longitude that runs through Greenwich, England, and lines of longitude are spaced 15 ° apart in both directions (east and west) from it. A **time zone** is a region that has adopted the same standard time, usually referred to as the **local time**. Because the sun hits the earth at different times as it spins on its axis, time zones are meant to make time more uniform. Most adjacent time zones are exactly one hour apart, and by convention compute their local time as an offset from **Greenwich Mean Time,** or the standard time at the Prime Meridian. For example, 12 p.m. is midday everywhere, a time when the sun is high in the sky. Likewise 12 midnight is night everywhere, since the sun is shining on the other side of the earth. this uniformity can only be reached if time zones – and clocks – change as one travels on either side of the prime meridian.

Standard time zones are defined by geometrically subdividing the earth into 24 sections bordered by meridians each 15° of longitude apart. The local time in neighboring zones is then exactly one hour different. Time zones often stray from the meridians for practical purposes, such as following political borders so that people in the same country (or state) follow the same standard time. For example, the People's Republic of China has only one time zone, although the country's borders stretch east to west across many meridians. Many areas have also adopted **daylight savings time**, which pushes the clock forward one hour in the spring in order to allow people to enjoy more sunlight in the afternoon during the warm spring and summer months, especially for people after they get off work. The clock is then set back to the original standard time in the fall.

One consequence of the organization of the world into time zones is that somewhere on the globe the date has to change. This occurs at 180° longitude, also called the **International Date Line** that divides the world from pole to pole through the Pacific Ocean. If a traveler crosses the line headed from Asia to America, she sets the clock back 24 hours; likewise, a traveler crossing the line headed from America to Asia will set the clock ahead 24 hours.

Before the adoption of time zones, people used local **solar time**, based on the position of the sun in the sky as the day progresses. As railways and communications connected people in different regions during the 19th century, differences in local times became problematic. Governments in many countries synchronized the clocks in all localities, so that travellers could more easily adjust to time changes, and so that communications could be standardized. Time zones still allow local time to approximate the mean solar time. For example, four time zones were created in the United States in 1883 – Pacific Standard Time, Mountain Standard Time, Central Standard Time, and Eastern Standard Time – with Pacific Standard Time set three hours earlier than Eastern Standard Time.

INTERPRETATION OF PLACES AND PATTERNS

To geographers, the seemingly simple term **"place"** is deceptively complex. Briefly defined, place is the unique location of a geographic feature. As a result, each point, or place, on earth is different

from all others. Its uniqueness may be identified in four ways: place name, site, situation, and absolute location.

- **Place name** – Most places on earth have names or **toponyms** – that distinguish them from others. Some names reflect history. For example, many places in the eastern United States have the word "new" as part of their name. Settlers that came from "England," or "York," or "Jersey" named their new homes "New England," or "New York," or "New Jersey," reflecting the historical migration of people from Britain to North America in the 17th and 18th centuries. Other names are simply – often hopefully – descriptive, like "Springfield," or "Pleasantville," or "Three Rivers." Still others invite a map reader to find out the story behind the name, like "Medicine Hat" or "Yellow Knife." The point is that humans name places to distinguish them from other places, an action that helps to define the uniqueness of each place.
- **Site** – Location may also be defined by site – the physical and human-transformed characteristics of a place. **Physical site characteristics** include climate, topography, soil, water sources, vegetation, and elevation. Site features have usually been important for people in choosing a place to live. Many of the earliest civilizations were centered on rivers, not only for water sources but also for transportation purposes. Rich soil is important for farmers, and hilltops are good choices for people looking for defense from enemy attack. An important site characteristic for Britain is that it is an island off the larger land mass of Europe – a fact that has affected the British people throughout their history. Being an island was quite helpful when Napoleon and Hitler were on the march, since this site characteristic probably saved the British from invasion in both cases. Additionally, being an island has limited Britain's natural resources for growth, a site characteristic that has encouraged British political leaders to take to the seas to find those resources. Humans may transform sites to suit their needs so that the sites are part of the human mosaic, not the physical site itself. Examples are airports, street patterns, public parks, and sports facilities.
- **Situation** – This characteristic refers to relative location. As mentioned earlier, relative location is important in determining the centrality or isolation of a place, a fact that is highly subject to change. Additionally, situation helps us to find an unfamiliar place by comparing its location to a place that we know. If you are giving directions to a person that does not know a place location, you usually start with what he or she does know. For example, you may start with the main street in town to begin giving directions to a smaller street.
- **Absolute location** – A place may be located by mathematically calculating its location using latitude and longitude. Because meridians and parallels allow us to be very precise, absolute location is unique for every place on earth.

Another important type of spatial data is **pattern**, or the arrangement of objects on Earth's surface in relation to other objects. Pattern refers to distribution, like the number of towns that appear along a river and how they are spaced. If the pattern is along straight lines, like rivers, streets, or railroad tracks, the arrangement is **linear.** If objects circle another object, they form a **centralized pattern.** For example, in an Islamic city, houses and public buildings may circle around the mosque, or house of worship. A **random pattern** exists if no regular distribution can be seen.

One type of geographic pattern – a checkerboard rural pattern – may be seen from a plane that is flying above much of the midsection of the United States. The lands are laid out in sections that are separated by types of crops or grazing that takes place, and roads often follow the grid. This **grid** or **rectilinear pattern** reflects a rectangular system of land survey adopted in much of the country under the Ordinance of 1785. Since the towns were laid out in much the same way, many streets form grids, sometimes labeled "1st", "2nd", "3rd" streets, and so on.

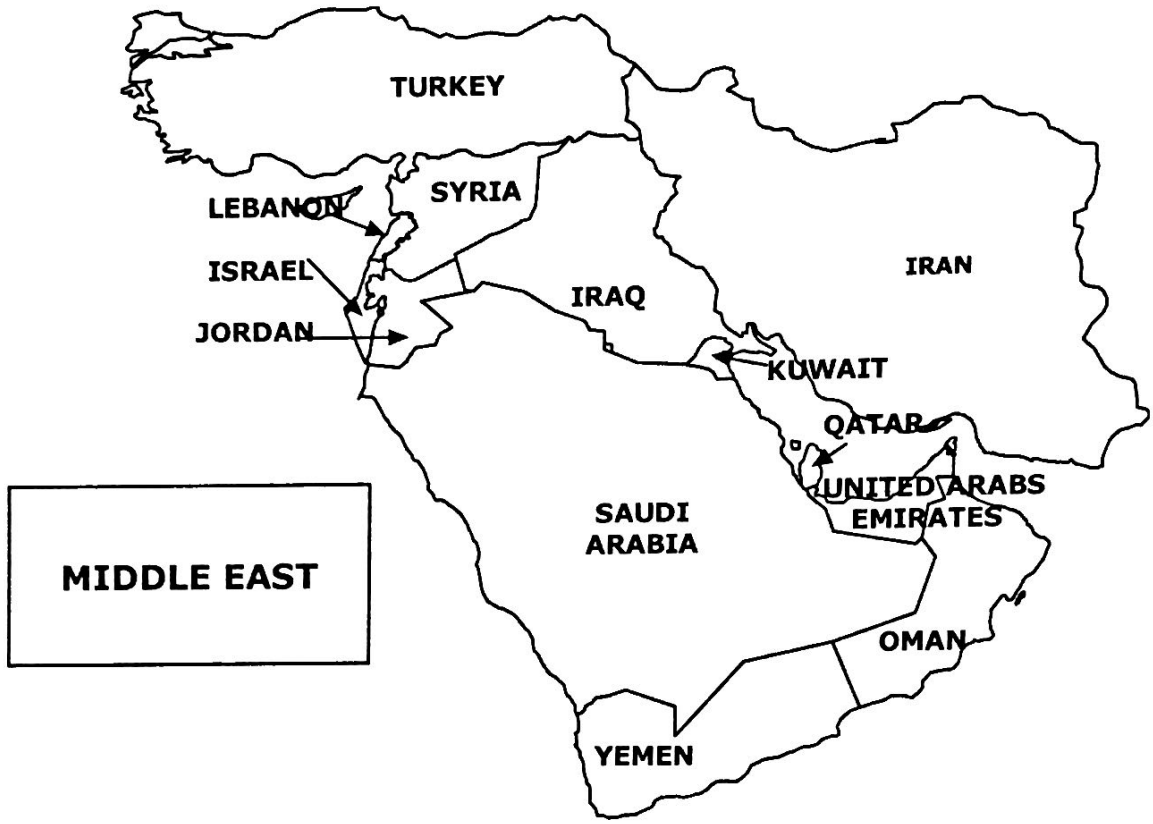
REGIONS AND REGIONALIZATION

Even though every place on earth has its own uniqueness, patterns among places lead us to generalize to areas around them. If similarities are apparent, we may conclude that spatial regularities exist within an area that geographers call a **region.** If we begin to compare regions for similarities and differences, then **regionalization** – the organization of earth's surface into distinct areas that are viewed as different from other areas – takes place.

One way to think about regions is to categorize them into **formal, functional,** or **perceptual regions.**

- **Formal regions** – Sometimes called uniform regions, a formal region is an area that has striking similarities in terms of one or a few physical or cultural features. A good example is a formal political region created when a government draws imaginary lines (that may follow natural features like rivers) around an area, calling it a "state," or a "province." One state or province, then, becomes distinct from another. Formal regions may also be defined by cultural characteristics, such as language or religion. For example, in the Middle East, a geographer could regionalize by using political boundaries, and refer to "Iraq," "Iran," and "Saudi Arabia." Another method of regionalizing in the area is to refer to all as "Muslim lands," in contrast to other regions where other religions prevail. On a smaller scale, regionalization could be based on a division of the area between inhabitants who are "Sunni" or "Shi'ite" Muslims. If the regions are based on religion, the characteristic is predominant, but not universal. In other words, some Shi'ites might live in Sunni lands and vice versa.

- **Functional regions** – Sometimes called nodal regions, functional regions are areas organized around cores, or nodes. Visually, the space can be seen as having interdependent parts that all operate together and connect, but with a center that directs the movements and characteristics of non-central parts. The **core** area has distinct characteristics that lessen in intensity as one travels into the **periphery**, or the region's margins. A city often forms the core of a region. For example, Denver, a U.S. city in the state of Colorado (a formal region), is the center of trade, transportation, business, and culture for a region that extends beyond the formal borders of the state. People in Wyoming might follow Denver's baseball team (the Rockies), but probably not in as great numbers as people that live in Denver. Likewise, *The Denver Post,* a newspaper produced in Denver is read in many towns and rural areas in its periphery. As you travel west from Denver, you will eventually venture into the peripheral areas of Salt Lake City, a core that exerts its own influences throughout a large area of the formal region known as "Utah."



Formal Regions in the Middle East. Formal regions are often designated by governments to mark boundaries that define political authority and differentiate political states from one another.

- **Perceptual regions** – Sometimes called vernacular regions, perceptual regions are not as rigorously structured as formal and functional regions. Instead, they are places that people *believe* to exist as a part of their cultural identity. They reflect feelings and images more than any objective reality, such as physical features, formal political boundaries, or economic centers. Almost all human beings define their lives by thinking about perceptual regions. For example, despite the fact that the Korean peninsula is divided into two formal regions (North Korea and South Korea), the people of the area have a long history of cultural identity as "Koreans" with a common language and similar customs that distinguish them from the nearby region of "Japan." Physical geography certainly has played a role in the development of these perceptions, since Korea is a peninsula and the region called Japan is a series of islands. However, even if Koreans move to Japanese cities, or Japanese move to Korean cities, they shape their new spaces in terms of perceptual regions. Another example on a smaller scale is the appearance of a "Little Italy" or "Little Chinatown" in many American cities. Cultural perceptions shape the way people view their spaces.

INTERCONNECTIONS AMONG PLACES

Places connect to form patterns, and patterns connect to form regions. Likewise, regions connect to form broader regions that eventually connect to other parts of the globe. It's all a matter of scale, and geographers may alter their lens to focus locally, regionally, or globally. For many reasons, global

connections are rapidly growing through a process called **globalization** – the expansion of economic, political, and cultural activities to the point that they reach and have impact on many areas of the world. Geographers use the term **space-time compression** to describe the changes that rapid connections among places and regions have brought. Distant places are brought much closer not only through faster transportation and communication, but through new technologies – such as televisions and computers – that bring images from those places into our homes, businesses, and schools.

One type of evidence for globalization in the political realm is the increasing number of international organizations that have appeared in recent decades. Although the world is still organized by national governments, international organizations such as the United Nations and the European Union are now significant players in world politics. Economic globalization is apparent through the proliferation of **multi-national corporations** that have centers of operation in many parts of the globe. Well-known examples are Coca-Cola, McDonald's, and the Disney Corporation. Television broadcast companies, such as CNN and the BBC, also operate internationally. Cultural globalization manifests itself in popular music, television, and film that spread American culture across the globe.

Critics of globalization sometimes fear that globalization is a threat to regional and local uniqueness. For example, a few years ago French farmers dumped manure in the roads leading to EuroDisney outside Paris to protest American influence. On the other hand, local and regional uniqueness show few signs of disappearing. Instead, the spatial view of earth as a web of interconnected places, from local to global, still accurately describes the geographer's lens on the world.

NEW GEOGRAPHIC TECHNOLOGIES

For many years maps have served as important tools for storing and sharing geographic information. In the past few decades, two important technologies – GIS (geographic information system) and GPS (global positioning system) – have been developed to advance geographical knowledge.

A **GIS (geographic information system)** is a computer system that captures, stores, analyzes, and displays data. GIS measures the position of an object on earth and stores it in a computer along with countless other specific measurements. The geographer may manipulate this data to combine them into an image or a map that is more accurate than anything drawn by hand. Each type of information may be stored in a layer, and then layers may be combined to present the overall image. For example, one layer may show soil composition, another may show forest cover, and yet another the road system in an area. Most maps combine several layers and provide a great deal of information that can be altered by adding or subtracting layers. The layers may be analyzed as they interact, and may be used to solve a multitude of problems, such as soil erosion, water pollution, or the viability of building houses on hillsides.

A **GPS (global positioning system)** uses a series of satellites, tracking stations, and receivers to determine precise absolute locations on earth. Remote-sensing satellites orbiting the earth scan the surface, and then transmit digital images to receiving stations on earth. Images of tiny areas are organized by pixels (picture elements) to create larger images or maps. Although the technology has vast untapped potential for geographers, they already use GPS to map vegetation arrangements and gather data for the ice cover around the North and South Poles. GPS technology is also used to navigate airplanes and ships, and most recently, it is used in automobiles to guide drivers as they try to reach their destinations.

HOW GEOGRAPHERS WORK: FIELD AND CENSUS DATA

Geographers gather their data and get their ideas from many different places. Their methods are reflected in the variety of jobs that geographers have. Many teach in secondary schools and universities, and others work for local, state, or national governments where they may analyze water, minerals, weather, climate, or soil. Recently, geographers have helped fill a demand for environmental managers and technicians. They sometimes consult with builders, architects, or politicians on the impact of human projects on the environment. A knowledge of geography is important to people in health care, transportation, population studies, economic development, and international studies.

Field-based skills refer to the ability to gather, assemble, and analyze data that may affirm, alter, or contradict conventional wisdom in the field. Field-based observations are directly made by the geographer, and go beyond simply reading and understanding the observations of others.

Field-based skills include:

- Familiarity with and ability to manipulate and interpret GIS
- Familiarity with GPS and ability to use remote sensing data
- Cartography and computer mapping
- Competence in data analysis and problem-solving

One of the biggest employers of geographers in the United States is the **U.S. Census Bureau.** Every ten years since 1790, the U.S. government has collected information about the country's inhabitants and compiled a census report. In modern day census forms are mailed to millions of homes in all 50 states, the District of Columbia, and Puerto Rico. Census workers try to count people without permanent residences, but this is a difficult task, particularly in large cities. Data collected from the census includes information about age, race, gender, language, education, employment, income, and housing. This data is useful to many social scientists, including geographers. Today geographers analyze massive amounts of data and arrange and display it in many different types of maps that reflect the nation's changing geographical characteristics.

More than anything, geographic skills are based on keen and careful observations of the world at different scales, a curiosity about why objects are where they are, and the desire to see the world through a geographer's eyes.

TERMS AND CONCEPTS

absolute location
cartography
circular pattern
cultural landscapes
daylight savings time
distortion
environmental geography
equator
Eratosthenes
formal regions