Text 1
UNDERSTANDING POPULATION GROWTH RATES

The rate of national population growth is expressed as a percentage for each country, commonly between about 0.1 percent and three percent annually.

Natural Growth Vs. Overall Growth

You'll find two percentages associated with population: natural growth and overall growth. Natural growth represents the births and deaths in a country's population and does not take migration into account. The overall growth rate does.

For example, Canada's natural growth rate is 0.3%, while its overall growth rate is 0.9% due to Canada's open immigration policies. In the U.S., the natural growth rate is 0.6% and overall growth is 0.9%.

The growth rate of a country provides demographers and geographers with a good contemporary variable for current growth and for comparison between countries or regions. For most purposes, the overall growth rate is more frequently utilized.

Doubling Time

The growth rate can be used to determine a country or region's (or even the planet's) "doubling time," which tells us how long it will take for that area's current population to double. This length of time is determined by dividing the growth rate into 70. The number 70 comes from the natural log of 2, which is .70.

Given Canada's overall growth of 0.9% in the year 2006, we divide 70 by .9 (from the 0.9%) and yield a value of 77.7 years. Thus, in 2083, if the current rate of growth remains constant, Canada's population will double from its current 33 million to 66 million.

However, if we look at the U.S. Census Bureau's International Data Base Summary Demographic Data for Canada, we see that Canada's overall growth rate is expected to decline to 0.6% by 2025. With a growth rate of 0.6 percent in 2025, Canada's population would take about 117 years to double (70 / 0.6 = 116.666).

The World's Growth Rate

The world's current (overall as well as natural) growth rate is about 1.14%, representing a doubling time of 61 years. We can expect the world's population of 6.5 billion to become 13 billion by 2067 if current growth continues. The world's growth rate peaked in the 1960s at 2% and a doubling time of 35 years.

Negative Growth

Most European countries have low growth rates. In the United Kingdom, the rate is 0.2%. In Germany, it's 0.0% and in France, it's 0.4%. Germany's zero rate of growth includes a natural increase of -0.2%. Without immigration, Germany would be shrinking like the Czech Republic.

The Czech Republic and some other European countries' growth rate is actually negative (on average, women in the Czech Republic give birth to 1.2 children, which is below the 2.1 needed to yield zero population growth). The Czech Republic's natural growth rate of -0.1 cannot be used to determine doubling time because the population is actually shrinking in size.

High Growth

Many Asian and African countries have high growth rates. Afghanistan has a current growth rate of 4.8%, representing a doubling time of 14.5 years. If Afghanistan's growth rate remains the same (which is very unlikely and the country's projected growth rate for 2025 is a mere 2.3%), then the population of 30 million would become 60 million in 2020, 120 million in 2035, 280 million in 2049, 560 million in 2064, and 1.12 billion in 2078. This is a ridiculous expectation. As you can see, population growth percentages are better utilized for short-term projections.

Increased population growth generally represents problems for a country—it means an increased need for food, infrastructure, and services. These are expenses that most high-growth countries have little ability to provide today, let alone if the population rises dramatically.

Text 2
TOPOGRAPHIC MAPS

Topographic maps (often called topo maps for short) are large scale maps, often greater than 1:50,000, which means that one inch on the map equals 50,000 inches on the ground. Topographic maps show a wide range of human and physical features of the Earth. They are very detailed and are often produced on large sheets of paper.

The First Topographic Map

In the late 17th century, French finance minister Jean-Baptiste Colbert hired surveyor, astronomer, and physician Jean-Dominique Cassini for an ambitious project, the topographic mapping of France. Author John Noble Wilford says:

He [Colbert] wanted the kind of maps that indicated man-made and natural features as determined by precise engineering surveys and measurements. They would portray the shapes and elevations of mountains, valleys, and plains; the network of streams and rivers; the location of cities, roads, political boundaries, and other works of man.

After a century of work by Cassini, his son, grandson, and great-grandson, France was the proud owner of a complete set of topographic maps. It was the first country to produce such a prize.

Isolines

Topographic maps use a wide variety of symbols to represent human and physical features. Among the most striking are the topo maps' display of the topography or terrain of the area.

Contour lines are used to represent elevation by connecting points of equal elevation. These imaginary lines do a nice job of representing the terrain. As with all isolines, when contour lines lie close together, they represent a steep slope; lines far apart represent a gradual slope.

Contour Intervals

Each quadrangle uses a contour interval (the distance in elevation between contour lines) appropriate for that area. While flat areas may be mapped with a five-foot contour interval, rugged terrain may have a 25-foot or more contour interval.

Through the use of contour lines, an experienced topographic map reader can easily visualize the direction of stream flow and the shape of the terrain.

Colors

Most topographic maps are produced at a large enough scale to show individual buildings and all streets in cities. In urbanized areas, larger and specific important buildings are represented in black, and the urbanized area surrounding them is represented with red shading.

Some topographic maps also include features in purple. These quadrangles have been revised solely through aerial photographs and not by the typical field checking that is involved with the production of a topographic map. These revisions are shown in purple on the map and can represent newly urbanized areas, new roads, and even new lakes.

Topographic maps also use standardized cartographic conventions to represent additional features such as the color blue for water and green for forests.

Coordinates

Several different coordinate systems are shown on topographic maps. In addition to latitude and longitude, the base coordinates for the map, these maps show Universal Transverse Mercator (UTM) grids, township and range, and other coordinate systems.

Text 3
WHAT IS AN ATLAS?

An atlas is a collection of various maps of the earth or a specific region of the earth, such as the U.S. or Europe. The maps in atlases show geographic features, the topography of an area's landscape and political boundaries. They also show climatic, social, religious and economic statistics of an area.

Maps that make up atlases are traditionally bound as books. These are either hardcover for reference atlases or softcover for atlases that are meant to serve as travel guides. There are also countless multimedia options for atlases, and many publishers are making their maps available for personal computers and the Internet.

The History of the Atlas

The use of maps and cartography to understand the world has a very long history. It is believed that the name "atlas," meaning a collection of maps, came from the mythological Greek figure Atlas. Legend says that Atlas was forced to hold the earth and the heavens on his shoulders as a punishment from the gods. His image was often printed on books with maps and they eventually became known as atlases.

Types of Atlases

Because of the wide variety of data and technologies available today, there are many different types of atlases. The most common are desk or reference atlases, and travel atlases or roadmaps. Desk atlases are hardcover or paperback, but they're made like reference books and they include a variety of information about the areas they cover.

Reference Atlases

Reference atlases are generally large and include maps, tables, graphs and other images and text to describe an area. They can be made to show the world, specific countries, states or even specific locations such as a national park. The National Geographic Atlas of the World includes information about the entire globe, broken down into sections that discuss the human world and the natural world. These sections include the topics of geology, plate tectonics, biogeography, and political and economic geography. The atlas then breaks the world down into continents, oceans and major cities to show political and physical maps of the continents as a whole and the countries within them. This is a very large and detailed atlas, but it serves as a perfect reference for the world with its many detailed maps as well as images, tables, graphs, and text.

The Atlas of Yellowstone is similar to the National Geographic Atlas of the World but it's less extensive. This, too, is a reference atlas, but instead of examining the entire world, it looks at a very specific area. Like the larger world atlas, it includes information on the human, physical and biogeography of the Yellowstone region. It offers a variety of maps that show areas within and outside of Yellowstone National Park.

Travel Atlases or Roadmaps

Travel atlases and roadmaps are usually paperback and are sometimes spiral bound to make them easier to handle while traveling. They often do not include all the information that a reference atlas would, but instead focus on information that may be useful to travelers, such as specific road or highway networks, the locations of parks or other tourist spots, and, in some cases, the locations of specific stores and/or hotels.

The many different types of multimedia atlases available can be used for reference and/or travel. They contain the same types of information you'd find in book format.

Popular Atlases

The National Geographic Atlas of the World is a very popular reference atlas for the wide variety of information it contains. Other popular reference atlases include Goode's World Atlas, developed by John Paul Goode and published by Rand McNally, and the National Geographic Concise Atlas of the World. Goode's World Atlas is popular in college geography classes because it includes a variety of world and regional maps that show topography and political boundaries. It also includes detailed information about the climatic, social, religious and economic statistics of the world's countries.

Popular travel atlases include Rand McNally road atlases and Thomas Guide road atlases. These are very specific to areas such as the U.S., or even to states and cities. They include detailed road maps that also show points of interest to aid in travel and navigation.

Text 4
LATIN AMERICAN CITY STRUCTURE MODEL

In 1980, geographers Ernest Griffin and Larry Ford developed a generalized model to describe the structure of cities in Latin America after concluding that the organization of many cities in that region grew following certain patterns. Their general model (diagrammed here) claims that Latin American cities are built up around a core central business district (CBD). Out of that district comes a commercial spine that is surrounded by elite housing. These areas are then surrounded by three concentric zones of housing that decrease in quality as one moves away from the CBD.

Background and Development of Latin American City Structure

As many Latin American Cities began to grow and develop during colonial times, their organization was mandated by a set of laws called the Laws of the Indies. These were a set of laws issued by Spain to regulate the social, political, and economic structure of its colonies outside of Europe. These laws "mandated everything from treatment of the Indigenous people to the width of the streets."

In terms of city structure, the Laws of the Indies required that colonial cities have a grid pattern built around a central plaza. Blocks near the plaza were for residential development for the city's elite. The streets and development farther from the central plaza were then developed for those with less social and economic status.

As these cities later began to grow and the Laws of the Indies no longer applied, this grid pattern worked only in areas with slow development and minimal industrialization. In faster growing cities this central area became built up as a central business district (CBD). These areas were the economic and administrative cores of the cities but they did not expand much prior to the 1930s.

In the mid- to late 20th century the CBD began to further expand and the organization of the colonial cities of Latin America was mostly demolished and the "stable central plaza became the node for the evolution of an Anglo-American styled CBD." As the cities continued to grow, various industrial activities built up around the CBD because of a lack of infrastructure father away. This resulted in a mix of business, industry, and homes for the wealthy near the CBD.

Around this same time, Latin American cities also experienced in-migration from the countryside and high birth rates as the poor tried to move closer to cities for work. This resulted in the development of squatter settlements on the edge of many cities. Because these were are on the periphery of the cities they were also the least developed. Over time, however, these neighborhoods became more stable and gradually obtained more infrastructure.

Model of Latin American City Structure

In looking at these developmental patterns of Latin American cities, Griffin and Ford developed a model to describe their structure that can be applied to almost all major cities in Latin America. This model shows that most cities have a central business district, one dominant elite residential sector, and a commercial spine. These areas are then surrounded by a series of concentric zones that decrease in residential quality farther from the CBD.

Text 5
COMPARING THE CITY IN THE UNITED STATES AND CANADA

Canadian and American cities may appear remarkably similar. They both display great ethnic diversity, impressive transportation infrastructure, high socioeconomic status, and sprawl. However, when the generalizations of these traits are broken down, it reveals a multitude of urban contrasts.

Sprawl in the United States and Canada

In contrast, even when controlling for population data from annexed territory, six of the ten largest Canadian cities saw a population explosion from 1971-2001 (the Canadian census was conducted one year after U.S. census), with Calgary experiencing the largest growth at 118%. Four cities did experience population declines, but none to the extent of their U.S. counterparts. Toronto, Canada's largest city lost only 5% of its population. Montreal experienced the steepest decline, but at 18%, it still pales in comparison to the 44% loss incurred by cities like St. Louis, Missouri.

The difference between the intensity of sprawl in America and Canada has to do with the countries' divergent approaches to urban development. American metropolitan areas are heavily centered around the automobile, while Canadian areas are more focused on public transit and pedestrian traffic.

Transportation Infrastructure in the United States and Canada

Unlike their neighbors to the south, Canada only has 648,000 miles of total roads. Their highways stretch just over 10,500 miles, less than nine percent of total United States road mileage. Noted, Canada only has one-tenth the population and much of its land is uninhabited or under permafrost. But nevertheless, Canadian metropolitan areas are not nearly as centered on the automobile as their American neighbors. Instead, the average Canadian is more than twice as likely to utilize public transportation, which contributes to its urban centralization and overall higher density. All seven of Canada's largest cities display public transit ridership in the double digits, in comparison to just two in the entire United States (Chicago 11%, NYC 25%). According to the Canadian Urban Transit Association (CUTA), there are over 12,000 active buses and 2,600 rail vehicles across Canada. Canadian cities also resemble more closely to the European style of smart growth urban design, which advocates compact, pedestrian and bicycle-friendly land use.

Thanks to its less-motorized infrastructure, Canadians on average walk twice as often as their American counterparts and bike three times the miles.

Ethnic Diversity in the United States and Canada

Although minority urban development has its similarities in the United States and Canada, their demographic and level of integration differs. One divergence is the

discourse of the American "melting pot" versus the Canadian "cultural mosaic." In the United States, most immigrants usually assimilate themselves rather quickly into their parent society, while in Canada, ethnic minorities tend to remain more culturally and geographically distinctive, at least for a generation or two.

There is also a demographic dissimilarity between the two countries. In the United States, Hispanics (15.1%) and Blacks (12.8%) are the two dominate minority groups. The Latino cultural landscape can be seen throughout many southern cities, where Spanish urban designs are most prevalent. Spanish is also now the second most widely spoken and written language in the United States. This, of course, is the result of America's geographic proximity to Latin America.

In contrast, Canada's largest minority groups, excluding the French, are South Asians (4%) and Chinese (3.9%). The extensive presence of these two minority groups is attributed to their colonial connection to Great Britain. A vast majority of the Chinese are emigrants from Hong Kong, who fled the island in sizable numbers just prior its 1997 handover to communist China. Many of these immigrants are affluent and they have purchased a great deal of property throughout Canada's metropolitan areas. As a result, unlike in the United States where ethnic enclaves are usually found exclusively in the central city, Canadian ethnic enclaves have now spread into the suburbs. This ethnic invasion-succession has dramatically altered the cultural landscape and galvanized social tensions in Canada.

Text 6
PACIFIC RIM AND ECONOMIC TIGERS

Many of the countries surrounding the Pacific Ocean have helped to create an economic miracle that has become known as the Pacific Rim.

In 1944 the geographer N.J. Spykman published a theory about the "rim" of Eurasia. He proposed that the control of the rimland, as he called it, would effectively allow control of the world. Now, more than fifty years later we can see that part of his theory holds true since the power of the Pacific Rim is quite extensive.

The Pacific Rim includes countries bordering the Pacific Ocean from North and South America to Asia to Oceania. Most of these countries have experienced major economic change and growth to become components of an economically integrated trade region. Raw material and finished goods are shipped between Pacific Rim states for manufacture, packaging, and sale.

The Pacific Rim continues to gain strength in the global economy. From the colonization of the Americas to just a few years ago, the Atlantic Ocean had been the leading ocean for the shipment of goods and material. Since the early 1990s, the value of goods crossing the Pacific Ocean has been greater than the value of goods crossing the Atlantic. Los Angeles is the American leader in the Pacific Rim as it's the source for the most trans-Pacific flights and ocean-based shipments. Additionally, the value of United States imports from Pacific Rim countries is greater than the imports from NATO (North Atlantic Treaty Organization) member in Europe.

Economic Tigers

Four of the Pacific Rim territories have been called "Economic Tigers" due to their aggressive economies. They have included South Korea, Taiwan, Singapore, and Hong Kong. Since Hong Kong has been absorbed as the Chinese territory of Xianggang, it is likely that its status as a tiger will change. The four Economic Tigers have even challenged Japan's dominance of the Asian economy.

South Korea's prosperity and industrial development are related to their production of items from electronics and clothing to automobiles. The country is about three times larger than Taiwan and has been losing its historical agricultural base to industries. South Koreans are quite busy; their average workweek is about 50 hours, one of the world's longest.

Taiwan, which is not recognized by the United Nations, is a tiger with its major industries and entrepreneurial initiative. China claims the island and the mainland and island are technically at war. If the future includes a merger, hopefully, it will be a peaceful one. The island is about 14,000 square miles and has a focus on its north coast, centered on the capital city of Taipei. Their economy is the twentieth largest in the world.

Singapore started its road to success as an entrepot, or free port for the transshipment of goods, for the Malay Peninsula. The island city-state became independent in 1965. With tight governmental control and an excellent location, Singapore has effectively utilized its limited land area (240 square miles) to become a world leader in industrialization.

Hong Kong became part of China on July 1, 1997, after being the territory of the United Kingdom for 99 years. The celebration of the merger of one of the world's outstanding examples of capitalism with a major communist nation was watched by the entire world. Since the transition, Hong Kong, which had one of the highest GNP's per capita in the world, continues to maintain its official languages of English and the Cantonese dialect. The dollar continues to be in use but it no longer bears the portrait of Queen Elizabeth. A provisional legislature has been installed in Hong Kong and they have imposed limits on opposition activities and have reduced the proportion of the population eligible to vote. Hopefully, additional change won't be too significant for the people.

China is attempting to foray into the Pacific Rim with Special Economic Zones and Open Coastal Areas which have special incentives for international investors. These areas are scattered along China's coast and now Hong Kong is one of these zones which also includes China's largest city, Shanghai.

Text 7
WHAT IS PHYSICAL GEOGRAPHY?

The vast discipline of geography is divided into two major branches: 1) physical geography and 2) cultural or human geography.

Physical geography encompasses the geographic tradition known as the Earth sciences tradition. Physical geographers look at the landscapes, surface processes, and climate of the earth—all of the activity found in the four spheres (the atmosphere, hydrosphere, biosphere, and lithosphere) of our planet.

Sub-Branches of Physical Geography

Since the Earth and its systems are so complex, there are many sub-branches and even sub-sub-branches of physical geography as a research area, depending on how granularly the categories are divided. They also have overlap between them or with other disciplines, such as geology.

Geographical researchers will never be at a loss of something to study, as they often need to understand multiple areas to inform their own targeted research.

Geomorphology: the study of Earth's landforms and its surface's processes—and how these processes change and have changed Earth's surface—such as erosion, landslides, volcanic activity, earthquakes, and floods.

Quaternary science: the study of the previous 2.6 million years on Earth, such as the most recent ice age and Holocene period, including what it can tell us about the change in Earth's environment and climate.

Meteorology: the study of Earth's weather, such as fronts, precipitation, wind, storms, and the like, as well as forecasting short-term weather based on available data.

Climatology: the study of Earth's atmosphere and climate, how it has changed over time, and how humans have affected it.

Hydrology: the study of the water cycle, including water distribution across the planet in lakes, rivers, aquifers, and groundwater; water quality; drought effects; and the probability of flooding in a region. Potamology is the study of rivers.

Coastal geography: the study of the coasts, specifically concerning what happens where land and water meet.

Oceanography: the study of the world's oceans and seas, including aspects such as floor depths, tides, coral reefs, underwater eruptions, and currents. Exploration and mapping is a part of oceanography, as is research into the effects of water pollution.

Pedology: the study of soil, including types, formation, and regional distribution over Earth.

Biogeography: the study of the distribution of life forms across the planet, relating to their environments; this field of study is related to ecology, but it also looks into the past distribution of life forms as well, as found in the fossil record.

Paleogeography: the study of historical geographies, such as the location of the continents over time, through looking at geological evidence, such as the fossil record.

Landscape ecology: the study of how ecosystems interact with and affect each other in an area, especially looking at the effects of the uneven distribution of landforms and species in these ecosystems (spatial heterogeneity.

Environmental geography: the study of the interactions between people and their environment and the resulting effects, both on the environment and on the people; this field bridges physical geography and human geography.

Geomatics: the field that gathers and analyzes geographic data, including the gravitational force of Earth, the motion of the poles and Earth's crust, and ocean tides (geodesy). In geomatics, researchers use the Geographic Information System (GIS), which is a computerized system for working with map-based data.

Astronomical geography or astronography: the study of how the sun and moon affect the Earth as well as our planet's relationship to other celestial bodies.

Text 8
GEOGRAPHY OF RIVER DELTAS

A river delta is a low-lying plain or landform that occurs at the mouth of a river near where it flows into an ocean or another larger body of water. Deltas' greatest importance to human activities, fish and wildlife lay in their characteristic highly fertile soil and dense, diverse vegetation.

In order to fully appreciate the role deltas play in our larger ecosystem, it is first important to understand rivers. Rivers are defined as bodies of fresh water generally flowing from high elevations toward an ocean, a lake or another river; sometimes, even back into the ground.

Most rivers begin at high elevations where snow, rain, and other precipitation run downhill into creeks and small streams. These small waterways flow ever farther downhill, eventually meeting to form rivers.

Rivers flow toward oceans or other larger bodies of water, oftentimes combining with other rivers. Deltas exist as the lowest part of these rivers. It is in these deltas where a river's flow slows and spreads out to create sediment-rich dry areas and biodiverse wetlands.

Formation of River Deltas

The formation of a river delta is a slow process. As rivers flow toward their outlets from higher elevations, they deposit mud, silt, sand, and gravel particles at the mouths where rivers and larger, more sedentary bodies of water meet.

Over time these particles (called sediment or alluvium) build up at the mouth, extending into the ocean or lake. As these areas continue to grow the water becomes shallower and eventually, landforms begin to rise above the surface of the water, typically elevating to just above sea level.

As rivers drop enough sediment to create these landforms or areas of raised elevation, the remaining flowing water with the most power sometimes cuts across the land, forming different branches called distributaries.

Once formed, deltas are typically made up of three parts: the upper delta plain, the lower delta plain, and the subaqueous delta.

The upper delta plain makes up the area nearest to land. It is usually the area with the least water and highest elevation.

The lower delta plain is the middle of the delta. It is a transition zone between the dry upper delta and the wet subaqueous delta.

The subaqueous delta is the portion of the delta closest to the sea or body of water into which the river flows. This area is usually past the shoreline and it is below water level.

Types of River Deltas

Despite the generally universal processes by which river deltas are formed and organized, it is important to note that the world's deltas vary dramatically in structure, composition, and size due to factors such as origin, climate, geology, and tidal processes. These external factors contribute to an impressive diversity of deltas around the world. A delta's characteristics are classified based upon the specific factors contributing to its river's deposition of sediment -- typically the river itself, waves or tides.

The main types of deltas are wave-dominated deltas, tide-dominated deltas, Gilbert deltas, inland deltas, and estuaries.

As its name would imply, a wave-dominated delta such as the Mississippi River Delta is created by wave erosion controlling where and how much river sediment remains in a delta once it has been dropped. These deltas are usually shaped like the Greek symbol, delta (Δ).

Tide-dominated deltas such as the Ganges River Delta are formed by tides. Such deltas are characterized by a dendritic structure (branched, like a tree) due to newly-formed distributaries during times of high water.

Gilbert deltas are steeper and formed by deposition of coarse material. While it is possible for them to form in ocean areas, their formations are more commonly seen in mountainous areas where mountain rivers deposit sediment into lakes.

Inland deltas are deltas formed in inland areas or valleys where rivers may divide into many branches and rejoin farther downstream. Inland deltas, also called inverted river deltas, normally form on former lake beds.

Finally, when a river is located near coasts characterized by large tidal variations, they do not always form a traditional delta. Tidal variation often results in estuaries or a river that meets the sea, such as Saint Lawrence River in Ontario, Quebec, and New York.

Text 9
THE PROCESS AND DEFINITION OF GEOMORPHOLOGY

Geomorphology is the science of landforms, with an emphasis on their origin, evolution, form, and distribution across the physical landscape. Understanding geomorphology is therefore essential to understanding one of the most popular divisions of geography. Studying geomorphological processes provides significant insight into the formation of the various structures and features in landscapes worldwide, which can then be used as a background for studying many other aspects of physical geography.

History of Geomorphology

Although the study of geomorphology has been around since ancient times, the first official geomorphologic model was proposed between 1884 and 1899 by the American geographer William Morris Davis. His geomorphic cycle model was inspired by theories of uniformitarianism and attempted to theorize the development of various landform features.

Davis's theories were important in launching the field of geomorphology and were innovative at the time, as a new way to explain physical landform features. Today, however, his model is not usually used, because the processes he described are not so systematic in the real world. It failed to take into account the processes observed in later geomorphic studies.

Since Davis's model, several alternative attempts have been made to explain landform processes. For example, Austrian geographer Walther Penck developed a model in the 1920s that looked at ratios of uplift and erosion. It did not take hold, though, because it could not explain all landform features.

Geomorphological Processes

Today, the study of geomorphology is broken down into the study of various geomorphological processes. Most of these processes are considered to be interconnected and are easily observed and measured with modern technology. The individual processes are considered to be either erosional, depositional, or both.

An erosional process involves the wearing down of the earth’s surface by wind, water, and/or ice. A depositional process is the laying down of material that has been eroded by wind, water, and/or ice. There are several geomorphological classifications within erosional and depositional.

Fluvial

Fluvial geomorphological processes are related to rivers and streams. The flowing water found here is important in shaping the landscape in two ways. First, the power of the water moving across a landscape cuts and erodes its channel. As it does this, the

river shapes its landscape by growing, meandering across the landscape, and sometimes merging with others to form a network of braided rivers. The paths rivers take depend on the topology of the area and the underlying geology or rock structure where it moves.

As the river carves its landscape, it also carries the sediment it erodes as it flows. This gives it more power to erode, as there is more friction in the moving water, but it also deposits this material when it floods or flows out of mountains onto an open plain, as in the case of an alluvial fan.

Mass Movement

The mass movement process, also sometimes called mass wasting, occurs when soil and rock move down a slope under the force of gravity. The movement of the material is called creeping, sliding, flowing, toppling, and falling. Each of these depends on the speed and composition of the material moving. This process is both erosional and depositional.

Glacial

Glaciers are one of the most significant agents of landscape change because of their massive size converts to power as they move across an area. They are erosional forces because their ice carves the ground beneath them and on the sides, which forms a U-shaped valley, as with a valley glacier. Glaciers are also depositional because their movement pushes rocks and other debris into new areas. The sediment created when glaciers grind down rocks is called glacial rock flour. As glaciers melt, they drop debris, which creates features like eskers and moraines.

Weathering

Weathering is an erosional process that involves the mechanical wearing down of rock by a plant’s roots growing and pushing through it, ice expanding in its cracks, and abrasion from sediment pushed by wind and water, as well as the chemical break down of rock like limestone. Weathering can result in rock falls and unique eroded rock shapes like those in Arches National Park, Utah.

Text 10
THE GREAT BARRIER REEF

Australia's Great Barrier Reef is considered to be the world's largest reef system. It is made up of over 2,900 individual reefs, 900 islands and covers an area of 133,000 square miles (344,400 sq km). It is also one of the Seven Natural Wonders of the World, a UNESCO World Heritage Site and it is the world's biggest structure made out of living species. The Great Barrier Reef is also unique in that it is the only living organism that can be seen from space.

Geography of the Great Barrier Reef

The Great Barrier Reef is located in the Coral Sea. It is off the northeast coast of Australia's state of Queensland. The reef itself stretches over 1,600 miles (2,600 km) and most of it is between 9 and 93 miles (15 and 150 km) from shore. In places, the reef is up to 40 miles (65 km) wide. The reef also includes Murray Island. Geographically, the Great Barrier Reef stretches from Torres Strait in the north to the area between Lady Elliot and Fraser Islands in the south.

Much of the Great Barrier Reef is protected by the Great Barrier Reef Marine Park. It covers over 1,800 miles (3,000 km) of the reef and runs along Queensland's coast near the town of Bundaberg.

Geology of the Great Barrier Reef

The geologic formation of the Great Barrier Reef is long and complex. Coral reefs began forming in the region about between 58 and 48 million years ago when the Coral Sea Basin formed. However, once the Australian continent moved to its present location, sea levels began to change and coral reefs started to grow quickly but changing climate and sea levels after that caused them to grow and decline in cycles. This is because coral reefs need certain sea temperatures and levels of sunlight to grow.

Today, scientists believe that complete coral reef structures where today's Great Barrier Reef are were formed 600,000 years ago. This reef died off however due to climate change and changing sea levels. Today's reef began to form about 20,000 years ago when it started growing on the remains of the older reef. This due to the fact that the Last Glacial Maximum ended around this time and during glaciation sea level was much lower than it is today.

Following the end of the last glaciation about 20,000 years ago, sea level continued to rise and as it got higher, the coral reefs grew on the hills being flooded on the coastal plain. 13,000 years ago the sea level was almost where it is today and the reefs began to grow around off the coast of Australia islands. As these islands became further submerged with rising sea levels, the coral reefs grew over them to form the reef system present today. The current Great Barrier Reef structure is about 6,000 to 8,000 years old.

Biodiversity of the Great Barrier Reef

Today the Great Barrier Reef is considered a World Heritage Site due to its unique size, structure and high levels of biodiversity. Many of the species living in the reef are endangered and some are endemic only to that reef system.

The Great Barrier Reef has 30 species of whales, dolphins, and porpoises. In addition, six species of endangered sea turtles breed in the reef and two green sea turtle species have genetically distinct populations in the north and south of the reef. The turtles are attracted to the area due to the 15 species of seagrass that grow in the reef. Within the Great Barrier Reef itself, there are also a number of microscopic organisms, different mollusks, and fish that inhabit spaces inside the coral. 5,000 species of the mollusk are on the reef as are nine species of seahorses and 1,500 species of fish, including the clownfish. The reef is composed of 400 species of coral.

The areas closer to land and on the islands of the Great Barrier Reef are biodiverse as well. These places are home to 215 bird species (some of which are seabirds and some of which are shorebirds). The islands within the Great Barrier Reef are also home to over 2,000 types of plants.

Although the Great Barrier Reef is home to many charismatic species like those previously mentioned, it should also be noted that a variety of very dangerous species inhabit the reef or areas near it as well. For example, saltwater crocodiles live in the mangrove swamps and salt marshes near the reef and a variety of sharks and stingrays live within the reef. In addition, 17 species of sea snake (most of which are venomous) live on the reef and jellyfish, including the deadly box jellyfish, also inhabit nearby waters.

Human Uses and Environmental Threats of the Great Barrier Reef

Due to its extreme biodiversity, the Great Barrier Reef is a popular tourist destination and around two million people visit it per year. Scuba diving and tours via small boats and aircraft are the most popular activities on the reef. Since it is a fragile habitat, tourism of the Great Barrier Reef is highly managed and sometimes operated as ecotourism. All ships, aircraft, and others that want to access the Great Barrier Reef Marine Park need to have a permit.

Despite these protective measures, however, the Great Barrier Reef's health is still threatened due to climate change, pollution, fishing, and invasive species. Climate change and rising sea temperatures are considered the greatest threats to the reef because coral is a fragile species that needs water to be about 77 F to 84 F (25 C to 29 C) to survive. Recently there have been episodes of coral bleaching due to higher temperatures.

Text 11
THE GULF STREAM

The Gulf Stream is a strong, fast moving, warm ocean current that originates in the Gulf of Mexico and flows into the Atlantic Ocean. It makes up a portion of the North Atlantic Subtropical Gyre.

The majority of the Gulf Stream is classified as a western boundary current. This means that it is a current with behavior determined by the presence of a coastline — in this case, the eastern United States and Canada — and is found on the western edge of an oceanic basin. Western boundary currents are normally very warm, deep, and narrow currents that carry water from the tropics to the poles.

The Gulf Stream was first discovered in 1513 by the Spanish explorer Juan Ponce de Leon and was then used extensively by Spanish ships as they traveled from the Caribbean to Spain. In 1786, Benjamin Franklin mapped the current, further increasing its usage.

Path of the Gulf Stream

Because these areas are often very narrow, the current is able to compress and gather strength. As it does so, it begins circulating in the Gulf of Mexico's warm waters. It is here that the Gulf Stream becomes officially visible on satellite images so it is said that the current originates in this area.

Once it gains enough strength after circulating in the Gulf of Mexico, the Gulf Stream then moves east, rejoins the Antilles Current, and exits the area through the Straits of Florida. Here, the Gulf Stream is a powerful underwater river that transports water at a rate of 30 million cubic meters per second (or 30 Sverdrups). It then flows parallel to the east coast of the United States and later flows into the open ocean near Cape Hatteras but continues moving north. While flowing in this deeper ocean water, the Gulf Stream is its most powerful (at about 150 Sverdrups), forms large meanders, and splits into several currents, the largest of which is the North Atlantic Current.

The North Atlantic Current then flows further north and feeds the Norwegian Current and moves the relatively warm water along the west coast of Europe. The rest of the Gulf Stream flows into the Canary Current which moves along the eastern side of the Atlantic Ocean and back south to the equator.

Causes of the Gulf Stream

The northern branch of the Gulf Stream, the North Atlantic Current, is deeper and is caused by thermohaline circulation resulting from density differences in the water.

Impacts of the Gulf Stream

The greatest impact the Gulf Stream has on climate is found in Europe. Since it flows into the North Atlantic Current, it too is warmed (though at this latitude the sea surface temperatures are cooled considerably), and it is believed that it helps keep places like

Ireland and England much warmer than they would otherwise be at such a high latitude. For example, the average low in London in December is 42°F (5°C) while in St. John's, Newfoundland, the average is 27°F (-3°C). The Gulf Stream and its warm winds are also responsible for keeping northern Norway's coast free of ice and snow.

As well as keeping many places mild, the Gulf Stream's warm sea surface temperatures also aid in the formation and strengthening of many of the hurricanes that move through the Gulf of Mexico. Additionally, the Gulf Stream is important to the distribution of wildlife in the Atlantic. The waters off of Nantucket, Massachusetts, for example, are incredibly biodiverse because the presence of the Gulf Stream makes it the northern limit for southern species varieties and the southern limit for northern species.

The Future of the Gulf Stream

There has been evidence that the Gulf Stream is weakening and slowing and there is growing concern about what impacts such a change would have on the world's climate. Some reports suggest that without the Gulf Stream, temperatures in England and northwestern Europe could drop by 4-6°C.

These are the most dramatic of the predictions for the future of the Gulf Stream but they, as well as today's climate patterns surrounding the current, show its importance to life in many places around the world.

Text 12
HOW THE NETHERLANDS RECLAIMED LAND FROM THE SEA

In 1986, the Netherlands proclaimed the new 12th province of Flevoland, but they didn't carve out the province from already existing Dutch land nor did they annex the territory of their neighbors, Germany and Belgium. Instead, the Netherlands grew larger with the aid of dikes and polders, making the old Dutch adage "While God created the Earth, the Dutch created the Netherlands" come true.

The Netherlands

The independent country of the Netherlands only dates back to 1815, but the area and its people have a much longer history. Located in northern Europe, just northeast of Belgium and west of Germany, the Netherlands contains 280 miles (451 km) of coastline along the North Sea. The Netherlands also contains the mouths of three important European rivers: the Rhine, Schelde, and Meuse. This translates into a long history of dealing with water and attempts to prevent massive, destructive flooding.

The North Sea Floods

The Dutch and their ancestors have been working to hold back and reclaim land from the North Sea for over 2000 years. Beginning around 400 BCE, the Frisians were first to settle the Netherlands. It was they who built terpen (an Old Frisian word meaning "villages"), which were earth mounds upon which they built houses or even entire villages. These terpen were built to protect the villages from flooding. (Although there were once thousands of these, there are about a thousand terpen that still exist in the Netherlands.)

Small dikes were also built around this time. These were usually rather short (about 27 inches or 70 centimeters high) and made of natural materials found around the local area.

On December 14, 1287, the terpen and dikes that held back the North Sea failed, and water flooded the country. Known as the St. Lucia's Flood, this flood killed over 50,000 people and is considered one of the worst floods in history. A result of the massive St. Lucia's Flood was the creation of a new bay, called Zuiderzee ("South Sea"), formed by floodwaters that had inundated a large area of farmland.

Pushing Back the North Sea

For the next few centuries, the Dutch worked to slowly push back the water of the Zuiderzee, building dikes and creating polders (the term used to describe any piece of land reclaimed from water). Once dikes were built, canals and pumps were used to drain the land and to keep it dry.

From the 1200s, windmills were used to pump excess water off the fertile soil, and windmills became an icon of the country. Today, however, most of the windmills have been replaced with electricity- and diesel-driven pumps.

Reclaiming the Zuiderzee

Storms and floods in 1916 provided the impetus for the Dutch to start a major project to reclaim the Zuiderzee. From 1927 to 1932, a 19-mile (30.5-kilometer) long dike called Afsluitdijk (the "Closing Dike") was built, turning the Zuiderzee into the IJsselmeer, a freshwater lake.

On February 1, 1953, another devastating flood hit the Netherlands. Caused by a combination of a storm over the North Sea and spring tide, waves along the sea wall rose to 15 feet (4.5 meters) higher than mean sea level. In some areas, the water peaked above existing dikes and spilled upon unsuspecting, sleeping towns. Just over 1,800 people in the Netherlands died, 72,000 people had to be evacuated, thousands of livestock died, and there was a tremendous amount of property damage.

This devastation prompted the Dutch to pass the Delta Act in 1958, changing the structure and administration of the dikes in the Netherlands. This new administrative system, in turn, created the project known as the North Sea Protection Works, which included building a dam and barriers across the sea. This vast engineering feat is now considered one of the Seven Wonders of the Modern World, according to the American Society of Civil Engineers.

Further protective dikes and works including dams, sluices, locks, levees, and storm surge barriers were built, beginning to reclaim the land of the IJsselmeer. The new land led to the creation of the new province of Flevoland from what had been sea and water for centuries.

Much of the Netherlands Is Below Sea Level

Today, around 27% of the Netherlands is actually below sea level. This area is home to over 60% of the country's population of approximately 17 million people. The Netherlands, which is roughly the size of the U.S. states Connecticut and Massachusetts combined, has an average elevation of 36 feet (11 meters).

A huge part of the Netherlands is highly susceptible to flooding. Time will tell if the North Sea Protection Works are strong enough to protect it.

Text 13
OVERVIEW OF LIFE EXPECTANCY

Life expectancy from birth is a frequently utilized and analyzed component of demographic data for the countries of the world. It represents the average life span of a newborn and is an indicator of the overall health of a country. Life expectancy can fall due to problems like famine, war, disease and poor health. Improvements in health and welfare increase life expectancy. The higher the life expectancy, the better shape a country is in.

As you can see from the map, more developed regions of the world generally have higher life expectancies (green) than less developed regions with lower life expectancies (red). The regional variation is quite dramatic.

However, some countries like Saudi Arabia have very high GNP per capita but don't have high life expectancies. Alternatively, there are countries like China and Cuba that have low GNP per capita have reasonably high life expectancies.

Life expectancy rose rapidly in the twentieth century due to improvements in public health, nutrition and medicine. It's likely that life expectancy of the most developed countries will slowly advance and then reach a peak in the range of the mid-80s in age. Currently, microstates Andorra, San Marino, and Singapore along with Japan have the world's highest life expectancies (83.5, 82.1, 81.6 and 81.15, respectively).

Unfortunately, AIDS has taken its toll in Africa, Asia and even Latin America by reducing life expectancy in 34 different countries (26 of them in Africa). Africa is home to the world's lowest life expectancies with Swaziland (33.2 years), Botswana (33.9 years) and Lesotho (34.5 years) rounding out the bottom.

Between 1998 and 2000, 44 different countries had a change of two years or more of their life expectancies from birth and 23 countries increased in life expectancy while 21 countries had a drop.

Sex Differences

Women almost always have higher life expectancies than men. Currently, the worldwide life expectancy for all people is 64.3 years but for males it's 62.7 years and for females life expectancy is 66 years, a difference of more than three years. The sex difference ranges from four to six years in North America and Europe to more than 13 years between men and women in Russia.

The reasons for the difference between male and female life expectancy are not fully understood. While some scholars argue that women are biologically superior to men and thus live longer, others argue that men are employed in more hazardous occupations (factories, military service, etc). Plus, men generally drive, smoke and drink more than women - men are even more often murdered.

Historic Life Expectancy

During the Roman Empire, Romans had an approximate life expectancy of 22 to 25 years. In 1900, the world life expectancy was approximately 30 years and in 1985 it was about 62 years, just two years short of today's life expectancy.

Aging

Life expectancy changes as one gets older. By the time a child reaches their first year, their chances of living longer increase. By the time of late adulthood, one's chances of survival to very old age are quite good. For example, although the life expectancy from birth for all people in the United States is 77.7 years, those who live to age 65 will have an average of almost 18 additional years left to live, making their life expectancy almost 83 years.

Text 14
MOST POPULAR WORLD RELIGIONS

While there are and have been hundreds of religions and spiritual beliefs across the globe the major faiths practiced by the majority of people on Earth can be broken down into a few major groups. Even within these groups different sects and types of religious practices exist. Southern Baptists and Roman Catholics are both considered Christian even though their religious practices differ greatly.

Abrahamic Religions

Three of the world's most dominant religions are considered to be the Abrahamic religions. They are named such because of each claiming descent from the ancient Israelites and follow the God of Abraham. In order of founding the Abrahamic religions are Judaism, Christianity, and Islam.

Most Popular Religious

Christianity: with 2,116,909,552 members (which includes 1,117,759,185 Roman Catholics, 372,586,395 Protestants, 221,746,920 Orthodox, and 81,865,869 Anglicans). Christians make up almost thirty percent of the global population. The religion arose from Judaism in the first century. Its followers believe Jesus Christ was the son of God and the Messhia for told of in the Old Testament. There are three major sects of Christianity: Roman Catholicism, Eastern Orthodoxy, and Protestantism.

Islam: with 1,282,780,149 members worldwide believers of Islam are referred to as Muslims. While Islam is very popular in the Middle East one does not need to be Arabic to be Muslim. The largest Muslim nation is actually Indonesia. Followers of Islam believe that there is only one God (Allah) and Mohamed is his last messenger. Contrary to media portrayals Islam is not a violent religion. There are two primary sects of Islam, Sunni, and Shia.

Hinduism: There are 856,690,863 Hindus in the world. It is one of the oldest religions and is practiced mostly in India and South East Asia. Some consider Hinduism to be a religion while others view it as a spiritual practice or way of life. A prominent belief in Hinduism is the belief in *Purusartha* or the "object of human pursuit." The four *Purusartha's* are dharma (righteousness), Artha (prosperity), kama (love) and moksa (liberation).

Buddism: Has 381,610,979 followers worldwide. Like Hinduism, Buddhism is another religion that can also be a spiritual practice. It also originates from India. Buddism shares the Hindu believe in dharma. There are three branches of Buddism: Theravada, Mahayana, and Vajrayana. Many Buddist seeks enlightenment or liberation from suffering.

Sikh: this Indian religion has 25,139,912 which is impressive because it doesn't generally seek converts. A seek is defined as one who "any human being who faithfully

believes in One Immortal Being; ten Gurus, from Guru Nanak to Guru Gobind Singh; Guru Granth Sahib; the teachings of the ten Gurus and the baptism bequeathed by the tenth Guru." Because this religion has strong ethnic ties, some see it as more of an ethnicity than simply a religion.

Judaism: is the smallest of the Abrahamic religions with 14,826,102 members. Like Sikhs, they are also an ethnoreligious group. Followers of Judaism are known as Jews. There are many different branches of Judaism, but the most popular ones are currently: Orthodox, Reform, and Conservative.

Other Beliefs: While most of the world follows one of the several religions 814,146,396 people believe in smaller religions. 801,898,746 consider themselves to be non-religious and 152,128,701 are an atheist who does not believe in any form of Higher being.

Text 15
OVERVIEW OF GENTRIFICATION

Gentrification is defined as the process by which wealthier (mostly middle-income) people move into, renovate, and restore housing and sometimes businesses in inner cities or other deteriorated areas formerly home to poorer people.

As such, gentrification affects an area's demographics because this increase in middle-income individuals and families often results in an overall decline in racial minorities. Additionally, household size decreases because low-income families are replaced by young single people and couples desiring to be closer to their jobs and activities in the urban core.

The real estate market also changes when gentrification occurs because increases in rents and home prices increase evictions. Once this happens rental units are often switched to condominiums or luxury housing available for purchase. As real estate changes, land use is also altered. Prior to gentrification these areas usually consist of low-income housing and sometimes light industry. After, there is still housing but it is usually high end, along with offices, retail, restaurants, and other forms of entertainment.

Finally, because of these changes, gentrification significantly affects an area’s culture and character, making gentrification a controversial process.

History and Causes of Gentrification

Since Glass came up with the term, there have been numerous attempts to explain why gentrification occurs. Some of the earliest attempts to explain it are through the production- and consumption-side theories.

Production-side theory is associated with a geographer, Neil Smith, who explains gentrification based on the relationship between money and production. Smith said that low rents in suburban areas after World War II led to a movement of capital into those areas as opposed to inner cities. As a result, urban areas were abandoned and land value there decreased while land value in the suburbs increased. Smith then came up with his rent-gap theory and used it to explain the process of gentrification.

The rent-gap theory itself describes the inequality between the price of land at its current use and the potential price a piece of land could attain under a “higher and better use.” Using his theory, Smith argued that when the rent-gap was large enough, developers would see the potential profit in redeveloping inner-city areas. The profit attained by redevelopment in these areas closes the rent-gap, leading to higher rents, leases, and mortgages. Thus, the increase in profits associated with Smith’s theory leads to gentrification.

The consumption-side theory, professed by geographer David Ley, looks at the characteristics of people performing gentrification and what they consume as opposed

to the market to explain gentrification. It is said that these people perform advanced services (for example they are doctors and/or lawyers), enjoy arts and leisure, and demand amenities and are concerned with aesthetics in their cities. Gentrification allows such changes to occur and caters to this population.

The Process of Gentrification

Over time, these urban pioneers help to redevelop and “fix-up” run down areas. After doing so, prices go up and the lower income people present there are priced out and replaced with middle and upper-income people. These people then demand greater amenities and housing stock and businesses change to cater to them, again raising prices.

These rising prices then force out the remaining population of lower income people and more middle and upper-income people are attracted, perpetuating the cycle of gentrification.

Costs and Benefits of Gentrification

The largest criticism of gentrification though is its displacement of the redeveloped area’s original inhabitants. Since gentrified areas are often in the run-down urban core, lower-income residents are eventually priced out and are sometimes left with no place to go. In addition, retail chains, services, and social networks are also priced out and replaced with higher-end retail and services. It is this aspect of gentrification that causes the most tension between residents and developers.

Despite these criticisms though, there are several benefits to gentrification. Because it often leads to people owning their homes instead of renting, it can sometimes lead to more stability for the local area. It also creates an increased demand for housing so there is less vacant property. Finally, supporters of gentrification say that because of the increased presence of residents in the downtown, businesses there benefit because there are more people spending in the area.

Whether it is viewed as positive or negative, however, there is no doubt that gentrified areas are becoming important parts of the fabric of cities worldwide.