

THINK AS A GEOGRAPHER: COMPARING METROPOLITAN REGIONS

Comparing similar places, regions, or trends is one way to highlight significant elements in phenomena. For example, comparing the size of the largest cities on earth suggests patterns in urban developments. Over the past 12,000 years, the size of the largest cities in the world has generally increased. The first cities to reach a population of 100,000 were probably in Iraq around 2000 B.C.E. By the beginning of the Common Era, several cities were approaching or had passed 1,000,000. Sometime in the late 1800s, London probably exceeded 5 million residents. Today, nearly 30 urban areas, which include several neighboring cities, have more than 10,000,000 residents each.

WORLD'S LARGEST METROPOLITAN STATISTICAL AREAS (MSA)		
City	Entire MSA	Main City Alone
Tokyo, Japan	37,833,000	8,968,000
Delhi, India	24,953,000	11,008,000
Shanghai, China	22,991,000	17,836,000
Mexico City, Mexico	20,843,000	8,873,000
Sao Paulo, Brazil	20,831,000	11,822,000
Mumbai, India	20,741,000	12,478,000
Osaka, Japan	20,123,000	8,860,000
Beijing, China	19,520,000	11,716,000
New York, United States	18,591,000	8,337,000
Cairo, Egypt	18,419,000	6,760,000

1. Based on the data for these ten MSAs, which region of the world has the most megacities?
2. How many of these cities are on seacoasts? (Use a map to check their location if necessary.) Explain why this might be significant.
3. Estimate the typical ratio between the relationship in size between the entire MSAs and the main cities alone. What factors of political or physical geography might explain the variations in ratios?

Urban Land Use Models

Like a piece of architecture, the city is a construction in space, but one of vast scale.

—Kevin Lynch, *The Image of the City*, 1960

Essential Question: How do geographers describe and analyze the structure and functions of cities?

Cities are enormously important and complex. Since the first cities emerged in human civilization, they have been centers of economic, political, and cultural power. They have been places of innovation. And they are growing faster today than ever before in history, a trend projected to continue.

Cities, as concentrations of humans and the human-created built environment, are a core component of human geography. They play a key role in the study of population, cultures, politics, economics, and even agriculture.

Urban Models

Like most other models, the urban models used by geographers are based on observations of real places. Though models vary, all share certain characteristics:

- They classify and categorize land use in urban areas.
- They describe how various urban land uses are segregated spatially.
- They offer explanations for the location of different urban land uses.

Urban Zones

One principle underlying all urban models is **functional zonation**, the idea that portions of an urban area—regions, or zones, within the city—have specific and distinct purposes. The various zones fit together like a puzzle to create the entirety of the city. However, unlike a puzzle, the pieces of a city are not clearly delineated, and geographers have tried to identify and classify them with models. The resulting urban models provide geographers with a framework to describe, understand, and analyze cities.

The Central Business District

A vital part of any urban model is the **central business district**, or CBD, which is the commercial heart of a city. Often located near the physical center of a city, or the crossroads where the city was founded, the CBD is the focus of transportation and services. Just as the concept of bid rent explains agricultural land use, it helps explain land use in central business districts. The value of land in CBDs is often too high for uses other than commerce.

Competition for the limited space available in the CBD gives it certain identifiable characteristics:

- In some countries, including the United States and Canada, the CBD has skyscrapers and “underground cities” that might include facilities for parking, shopping, and rapid transit.
- In Europe, many CBDs are located in the historic heart of the city where buildings are lower but services are still concentrated.
- Because the cost of land is high in CBDs, manufacturing activities are rarely in them.
- Residential portions of CBDs are usually high-density housing, such as high-rise apartment buildings. The costs are too high and the space too limited for low-density housing.



The central business district of Chicago, Illinois

Models of North American Cities

The first three models described in the following text are the “classic models” that were based on the city of Chicago. Located on prairie at the southern end of Lake Michigan, Chicago expanded to the north, west, and south without physical interruptions. This made the city a good place to examine urban structure without the complications caused by irregular topography.

Concentric Zones

The **concentric zone model** describes a city as a series of rings that surrounds a central business district. The first ring surrounding the CBD is a **zone of transition** that includes industrial uses mixed with poorer quality housing. Manufacturing there can take advantage of proximity to the city-center workers and affordable land. Housing in this zone often consists of older, subdivided homes that result in high density. This model is also known as the **Burgess Model**, after sociologist E. W. Burgess who proposed it in the 1920s.

Burgess described three additional rings, all residential. As distance from the CBD increased, he noted a zone of working-class housing, followed by a ring of higher quality housing, and finally a zone of larger homes and lots in suburban areas on the edge of the city. With greater distance from the CBD, land became more plentiful and affordable, residences became larger and of higher quality, and population densities decreased. The suburbs of the 1920s were much closer to the CBD than are the suburbs of today.

Sectors

In the 1930s, economist Homer Hoyt developed a different way of looking at cities—the **sector model**. While Burgess had seen rings of land use growing outward from CBD, Hoyt described how different types of land use and housing were all located near the CBD early in a city’s history. Each grew outward as the city expanded, creating wedges, or sectors of land use, rather than rings.

Hoyt’s Model describes sectors of land use for low-, medium-, and high-income housing. The model also notes a sector for transportation extending from the edge to the center of the city. This sector would contain rail, canal, and other major transport networks within it. The transportation sector would also favor an adjacent zone of manufacturing. The model places the sectors for the low-income, lower-quality housing next to these industrial and transportation zones, and it places high-income residences extending in a wedge away from these zones along wide tree-lined boulevards or on higher ground.

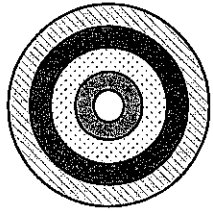
Multiple Nuclei

Geographers **Chauncy Harris** and **Edward Ullman** developed the **multiple-nuclei model** by studying changes in cities in the 1940s. This model suggested that functional zonation occurred around multiple centers, or nodes. The characteristics of each node either attracted or repelled certain types of activities. The result was a city that consisted of a patchwork of land uses, each with its own center, or nucleus.

In the multiple-nuclei model, the CBD and related functions continued to exist but were joined by smaller business districts that emerged in the suburbs. A zone of industry could be in a variety of locations, including the traditional CBD or port, or it could move to new outlying locations near an airport or other

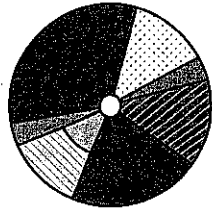
URBAN LAND USE MODELS

Concentric Zone Model



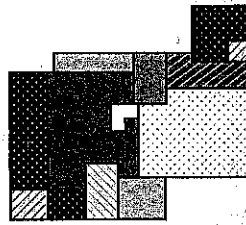
- Central business district
- ▨ Transition zone
- ▤ Low-cost residential
- ▥ Moderate-cost residential
- ▧ Commuters' zone

Sector Model



- Central business district
- ▤ Low-cost residential
- ▥ Moderate-cost residential
- ▧ High-cost residential
- ▨ Industrial
- ▩ Transportation
- Education and recreation

Multiple-Nuclei Model



- Central business district
- ▨ Light manufacturing
- ▤ Low-cost residential
- ▥ Moderate-cost residential
- ▧ High-cost residential
- ▨ Heavy manufacturing
- ▩ Outlying business district
- Suburban residential
- Suburban industrial

transportation junction. This industrial zone would attract related industries and an area of higher density housing. A university or a business park might attract nearby restaurants, theaters, and other amenities. As a result, people might create a district of student housing or high-quality homes nearby.

The **peripheral model**, a variant of the multiple-nuclei model, describes suburban neighborhoods surrounding an inner city and served by nodes of commercial activity along a ring road or beltway. This model's name derives from the role of the service nodes with their related suburbs that develop on the periphery of the original city.

Galactic Cities

Beginning in the 1950s, suburban growth in the United States skyrocketed as governments built highways that improved transportation in and out of cities and subsidized the purchase of houses. These developments and a close study of Detroit prompted Chauncy Harris to create the **galactic city model**, describing the spread of U.S. cities outward from the CBD to the suburbs, leaving a declining inner city. As suburbs grew, some of the functions of the CBD began to appear in them. At key locations along transportation routes, mini-downtowns of hotels, malls, restaurants, and office complexes emerged. Modern geographers have dubbed these nodes **edge cities**.

Edge cities are nodes of economic activity that have developed in the periphery of large cities. They usually have tall office buildings, a concentration of retail shops, relatively few residences, and are located at the junction of major transportation routes.

World-Regional Models

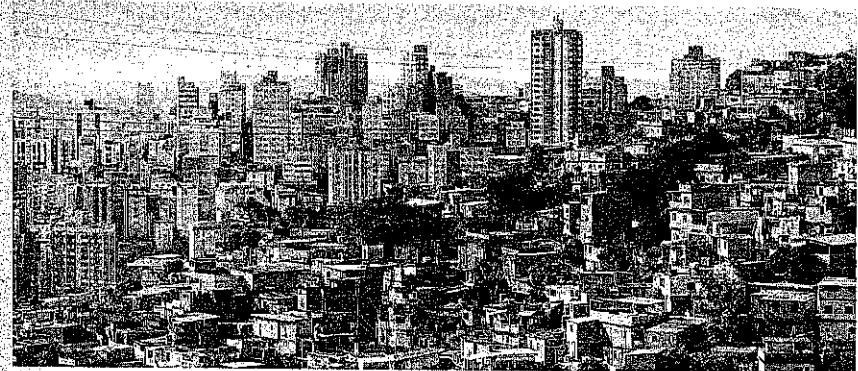
Geographers have also developed models to describe cities outside of North America. Rings, sectors, and multiple-nuclei can be found in these models, along with some additional elements. But the models share the same basic characteristic of North American models, that of functional zonation.

Latin American Cities

The **Griffen-Ford Model** is often used to describe Latin American cities. It places a two-part CBD at the center of the city: a traditional market center adjacent to a modern high-rise center. The most desirable housing in the city is located there, adjacent to the developed center of the city. This high-quality housing extends outward from the urban core, accompanied by a commercial **spine** of development. Theaters, restaurants, parks, and other amenities are also located along this spine, or corridor, which ends in a growing secondary center. In the model, this secondary center is identified as a **mall**.

In contrast to the concentric zone model in North America, as distance increases from the center of Latin American cities, the quality of housing decreases. Public transportation, the urban water supply, and access to electricity all decrease away from the center, sometimes disappearing altogether. The outer ring of the city, the **periférico**, is characterized by poverty, lack of infrastructure, and areas of poorly built housing known as **shantytowns**. Often, the residents of shantytowns are recent migrants to the city. The model notes the possible presence of an industrial node and, closer to the commercial spine, middle-class neighborhoods.

Many Latin American cities also contain **favelas**, or **barrios**, which are neighborhoods where extreme poverty, homelessness, and lawlessness are common. Most favelas are in **disamenity zones**, areas not connected to city services and under the control of drug lords and gangs. Disamenity zones are often in physically unsafe locations, such as on ravines or on steep, unstable mountain slopes.



Favelas in southeastern Brazil

European Cities

Many of today's cities in Europe are descendants of medieval and pre-industrial cities. City walls, which had been built for protection before the wide use of gunpowder weapons, restrained growth. These cities grew very slowly for centuries, with little planning. The result is a dense mix of commercial and residential land use with narrow, winding streets. Distinct land-use zones are hard to find in the core areas of these cities. Later urban renovations cut through areas to produce elegant, wide boulevards with high-quality housing and shops.

Central business districts in Europe differ in important ways from those in North America. Attempting to preserve the historic character of their urban cores, city leaders have limited new construction and restricted the height of buildings. Often, former palace grounds have been transformed into large urban parks. European CBDs also have many more residents living in relatively low-rise apartment buildings. As a result of the larger population living downtown, commercial uses go beyond those in North America by including many more small businesses such as vegetable markets, bakeries, and butcher shops.

In contrast to North America, European suburbs are likely to have a higher percentage of taller buildings. Most are apartment buildings, so population densities are higher in Europe's suburbs than in North America's. International immigration creates ethnic diversity in the suburbs, and this diversity often reflects the colonial heritage of the country. For example, suburban London includes a large number of South Asians and their descendants, and suburban Paris includes many people of North African heritage.

TALL BUILDINGS IN THE UNITED STATES AND EUROPE				
City Population	Height of Tallest Building (in feet)		Height of Tenth Tallest Building (in feet)	
	United States	Europe	United States	Europe
2 million to 3 million	Chicago: 1,451	Paris: 689	Chicago: 850	Paris: 574
3 million to 4 million	Los Angeles: 1,018	Madrid: 817	Los Angeles: 699	Madrid: 377
8 million to 9 million	New York: 1,776	London: 1,016	New York: 952	London: 590

African Cities

Large cities were rare in most of Africa until the 19th century, when Europeans colonized the continent. But in recent decades, urban areas in Africa have grown rapidly. New cities have been built next to or on top of existing ones. These new cities can include several identifiable regions:

- The **traditional CBD**, which existed before European colonization, has small shops clustered along narrow, twisting streets. It includes the formal economy: permanent stores that hire workers with full-time jobs at set wages and that comply with local regulations.
- The **colonial CBD** has broad, straight avenues and large homes, parks, and administrative centers.
- The **informal economy zone** thrives with curbside, car-side, and stall-based businesses that often hire people temporarily and do not follow all regulations: This zone also includes **periodic markets**, where small-scale merchants congregate weekly or yearly, to sell their goods.
- A zone of mining and manufacturing also exists in many cities.
- Residential zones are often based on ethnicity. These mirror the multi-ethnic makeup of African countries.
- The periphery of cities often consists of **informal settlements**, densely populated areas built without coordinated planning and without sufficient public services for electricity, water, and sewage.

The growth of informal settlements often results from the rapid influx of migrants into cities who simply reside wherever they can find space, creating **squatter settlements**. One of the largest squatter settlements in the world is Kibera, on the western edge of Nairobi, Kenya. As do Latin American favelas, these communities face problems with drugs, crime, and disease.

Middle Eastern and Islamic Cities

Cities shaped by the spread of Islam are common in the Middle East, North Africa, parts of Spain and East Africa, and a few locations in Southeast Asia. The dominant feature of these cities is a central mosque that includes one or more tall and highly visible minarets. The principal mosque in the center of an Islamic city is usually surrounded by a complex of structures to serve the public, such as schools for children and soup kitchens for the poor. As cities grew, additional mosques were added in outlying neighborhoods.

Many Islamic cities were built with a defensive **citadel**, a fort designed to protect the city, with its related palace and barracks for soldiers. Walls with gates and towers were typical in earlier times and they, or their remnants, still survive in many modern Islamic cities. Major roads run from the gates to the center, and along these roads are traditional outdoor markets or covered bazaars, called **suqs**. These markets often exhibit spatial differentiation with more expensive shops and luxury items



found near the center of town and bulkier, less valuable materials for sale near the wall and gates.

Residential neighborhoods often reflect the differences in ethnicity, tribe, or branch of Islam. The organization and architecture found in these neighborhoods often have three features:

- Streets and alleys are often twisting, and dead-end streets are common.
- Homes have central courtyards rather than yards in front or back.
- Windows are small and located above eye level.

The above features create shady areas, which suggests they might be cultural adaptations to the sun and heat of the Middle East. They also create privacy, which suggests that they express an important value within Islam.

Southeast Asian Cities

The **McGee Model** describes the land use in many of the larger cities in Southeast Asia. The focus of the modern city is often a former colonial port zone. This export-oriented zone shares commercial uses similar to the CBD in North American cities. Additionally, these cities might include a government zone. If the city is a national or regional capital, it might have a commercial zone dominated by foreign merchants and ambassadors. A belt of market gardening surrounds and supplies the typical Southeast Asian city.

Cities of Southeast Asia have a history of Chinese immigration and commercial interest that dates back a few centuries. As a result of this immigration, many cities include a secondary commercial zone dominated by Chinese businesses. As the importance of industry in Southeast Asia has risen in the last few decades, industrial parks and regions of manufacturing have emerged on the peripheries of some cities.

Local Regulations on Land Use

People want to use land in ways that can conflict. For example, most homeowners want a place that is quiet at night so they can sleep. However, a factory owner might want to continue production, which can be noisy, around the clock. To balance competing desires, cities and counties use **zoning ordinances**, regulations that define how property in specific geographic regions can be used. The three general zoning categories are residential (where people live), commercial (where people sell goods and services), and industrial (where people make things).

Municipal governments use zoning ordinances as a tool of **urban planning**, a process of promoting growth and controlling change in land use. Zoning laws can result in very clear land-use segregation. However, not all cities have zoning ordinances, and many include some unzoned areas.

Residential Zones

Those areas of a city devoted to where people live rather than to commercial or industrial functions are **residential zones**. Ordinances for these zones often set limits on the density and size of houses in specific zones. For this reason, some residential neighborhoods contain only large homes on spacious lots, while other zones are composed of smaller homes on small lots, and still others contain apartment buildings.

Zoning can create various types of neighborhoods that appeal to people with various housing needs and lifestyles. However, it can also be used to prevent socioeconomic diversity or ethnic diversity in a neighborhood.

In North America, residential areas surrounding the CBD are known as the inner city. This residential zone has the highest population density and is dominated by apartment buildings and townhomes. As one moves farther from the inner city, population density declines along with the type and density of housing units. This variation is known as the **residential density gradient**.

Suburbs are often characterized by single-family detached houses. More than half of all Americans now live in suburbs. Many suburbs are noticeably homogenous in terms of housing size and style. However, in recent years, homeowners have been tearing down existing homes and building new ones that are much larger. These new homes, known as McMansions, do not always conform to the style of other homes in the neighborhood.

Changes in Urban and Suburban Areas

Neighborhoods undergo transformations over time as existing residents move out and new ones move in. Through a process known as **filtering**, houses pass from one social group to another. This usually occurs as the wealthiest residents move to new homes and people with less wealth move into the homes they leave. This creates a ripple effect down the social scale. The filter process might include the changing use of a house. For example, a home built for a single family might be subdivided for use by two or more families or replaced with apartments.

Filtering can become most noticeable when a neighborhood that is an ethnic enclave changes from one group to another. The term **invasion and succession** refers to the process by which one social or ethnic group gradually replaces another through filtering.

The rise of **gated communities** is another example of change in suburbs and occasionally in cities. These neighborhoods are planned in order to control access and aesthetics within the community. They are fenced (or even walled) in with a limited number of streets going in and out. Security guards and cameras are sometimes found at the entrances. The landscaping, housing styles, and other visual elements of the community are strictly regulated.

Another change involves the availability of businesses. Suburban residents have always been able to find shops for food and necessities in

their neighborhoods. Recent decades have seen marked growth in the size and number of stores:

- Strip malls and shopping malls have become common.
- **Big-box retail** stores have been successful.
- Offices and business services have moved to the suburbs.

All of these changes are part of the **suburbanization of business**, the movement of commerce out of cities to suburbs where rents are cheaper and commutes for employees are shorter. As a result, many cities have faced declines in job opportunities, consumer choices, and services.

Residential Land Use Outside North America

Outside of the United States and Canada, the residential density gradient does not usually run from higher to lower the farther one goes from the CBD. Instead, population density tends to increase in the suburbs even though land is more plentiful. In Europe, as explained earlier, the centers of cities contain many historic structures, and population densities are fairly low. The suburbs on the edges of the central cities contain multistory apartment complexes and have very high population densities.

In Latin America the peripheral areas of cities may contain suburbs typical of the United States, with single-family houses and low densities, and also suburbs similar to Europe with high-rise apartments. In addition, very densely settled squatter settlements, or favelas, are where the poorest residents live. Gated communities are increasingly common in Latin America as the region develops. Because of their popularity with wealthy urban elites, these security-minded neighborhoods are emerging in residential areas in all regions of the world today.

Political Organization of Cities

A city is also a political entity. The term **municipal** refers to the local government, or the services provided by the government, of a city or town. For example, a mayor and city council make up the core of the municipal government, and a local water supply is the municipal water supply. **Municipality** refers to a local entity that is all under the same jurisdiction. In essence, a municipality is one way of referring to the political and legal aspect of a city.

Annexation and Incorporation

As cities have grown in the past two centuries, they have expanded in physical extent, pushing their boundaries farther from the original core. When these settled areas move beyond the legal boundaries of the city, the inhabitants may be left without political representation or services from the city. The process of adding land to a city's legally defined territory is known as **annexation**. Annexation generally requires a vote by residents in the affected areas.

Sometimes, residents living beyond the legal boundaries of the city do not desire to become part of the central city. In such cases, residents may choose the option of **incorporation**, the act of legally joining together to form a new city. One reason is that the newly created municipality is smaller and political representation is more "local" than if the residents had opted for annexation. Of course, many such peripheral municipalities are cities only in terms of legal and political considerations. They may lack a real CBD and continue to function as **bedroom communities**, or commuter suburbs, within the larger metro area.

Patterns of Municipal Government

Over time, and due to population growth, urban expansion, and incorporation, metropolitan areas become a jigsaw of interlocking municipalities. Each of these has its own local government with the responsibility to provide local services. Coordination of regional issues, such as the development of roads and other infrastructure, can be difficult.

One solution to the problem of this legal fragmentation is the **consolidation** of city and county governments. When this occurs, certain elements of government are handled jointly, across numerous separate municipalities, while other elements of local government continue to be handled by individual municipalities.

Additionally, many cities have created **special districts** that attempt to solve a specific need, such as for public transportation, over a larger region. For example, Colorado has created a regional transportation district, or authority, that includes Denver and surrounding areas to facilitate mass transit for the multiple communities in the region.

Some populated regions do not fall within the legal boundary of any city or municipality. These are known as **unincorporated areas**. Usually a nearby municipality provides their services and administration, through some higher division of civil government such as a county, borough, parish, or province. Over time, these areas may consider annexation by an existing city or incorporation as their own city.

Population Data in Urban Areas

The Constitution requires that the federal government conduct a nationwide census every ten years for the purpose of establishing Congressional districts. But the data collected in this census, as well as in smaller data-gathering projects, also provide a picture of where people live, their incomes, family sizes, and other details. That information is valuable to researchers and businesses trying to identify goods and services that people desire.

U.S. census data is available at many scales. Urban areas in many countries are divided into **census tracts**, contiguous geographic regions that function as the building blocks of a census. In the United States a census tract typically consists of between 4,000 and 12,000 people. Each tract is subdivided into

block groups, and each block group is further subdivided into blocks. A **census block** in a densely populated urban area may be very small, consisting of a single block bounded by four streets. In suburban and rural areas, because of their lower population densities, a census block typically covers a larger area.

GEOGRAPHIC CATEGORIES IN THE CENSUS			
Category	2010 Census	Increase over the 2000 Census	Average Number of People in the 2010 Census
Population	308,745,538	9.7%	-----
Census Tracts	73,057	11.8%	4,226 people/tract
Block Groups	217,740	4.3%	1,418 people/group
Blocks	11,078,297	35.0%	28 people/block

Source: Bureau of the Census.

City governments also collect qualitative data. This type of data comes from surveys and field studies conducted in the urban area. Questions and study topics gather information about how individuals and communities feel about urban growth, zoning changes, local government, crime rates, and anything else that may affect the lives of people living in the city. These qualitative and quantitative data can be used in **social area analysis** in order to gain an overall understanding of the lives and characteristics of people living within urban areas.

GEOGRAPHIC PERSPECTIVES: WHERE THE WEALTHY CHOOSE TO LIVE

One basic geographic decision that every person makes is where to live. Since they have more money than others, wealthy people have more options. The choices they make reflect what people in that culture value. In turn, these choices shape the spatial distribution of public services.

Different Places, Different Choices

In Europe and Canada, wealthy people have traditionally chosen to concentrate in central cities. They have always valued having a short commute to their place of work, as well as easy access to concerts, plays, museums, and other forms of entertainment.

In contrast, in the United States, wealthy citizens have been more likely to choose to live in suburbs. The attractions of spacious homes, large yards, and clean air have outweighed the longer commute to work. Smart growth approaches have transformed large swaths of sprawled suburbia into lively, walkable, and wealthy neighborhoods.

The Impact of Choices

The distribution of wealth, by area, affects the distribution of political power. The strong core of wealthy residents in central cities in Europe and Canada has created political pressure on governments to provide excellent public transit and other public services to these areas. In U.S. cities, without as many wealthy people, the pressure for those services has been less—but pressure to provide suburban rail lines and freeways has been greater.

Geographers study how changes in work and public policy affect choices about where people live. As more people work at home, they worry less about a long commute to an office. And as more people fly for work, living near an airport becomes a bigger benefit. For these reasons, more wealthy people in Europe and Canada are moving to the suburbs.

At the same time, stricter pollution regulations have cleaned up the air and water in central cities, making them more desirable places to live. Since families are smaller today, the desire for a large house and yard is less important than it once was. For these reasons, more wealthy people in the United States are moving downtown, and these areas are increasing their political power.

KEY TERMS

functional zonation	shantytowns	urban planning
central business district (CBD)	favelas	filtering
concentric zone model	barrios	invasion and succession
zone of transition	disamenity zones	gated communities
Burgess Model	traditional CBD	big-box retail
sector model	colonial CBD	suburbanization of business
Hoyt's model	informal economy zone	municipal
Chauncy Harris	periodic markets	municipality
Edward Ullman	informal settlements	annexation
multiple-nuclei model	squatter settlements	incorporation
peripheral model	mosque	bedroom communities
galactic city model	citadel	urban planning
edge cities	suqs	consolidation
Griffen-Ford Model	McGee Model	special districts
spine	residential zones	unincorporated areas
mall	residential density gradient	census tracts
periférico	zoning ordinances	census block
		social area analysis