

Chapter

13

Urban Patterns



Why do British suburbs look different from American suburbs? Page 481



Why were these buildings blown up? Page 491

KEY ISSUE 1

Why Do Services Cluster Downtown?

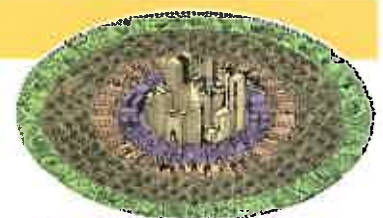


The Center of it All 461

Downtown is the most distinctive area of most cities.

KEY ISSUE 2

Where Are People Distributed Within Urban Areas?



- 1 Central business district
- 2 Zone of transition
- 3 Zone of independent workers' homes
- 4 Zone of better residences
- 5 Commuter's zone

Rings, Wedges, and Nodes 466

Three models help to explain where different groups live within a city.



▲ These two passengers on a New York City bus represent the contrasts and diversity of a large city. The well-dressed woman in front uses her smart phone while the simply dressed woman behind her clutches her walker. When you are in a city, you are more likely than when you are in a small town to sit next to people who are different from you, but do the other passengers smile at you and chat, or do they mind their own business?



KEY ISSUE 3

Why Are Urban Areas Expanding?



Sprawling into Suburbs 476

Cities have spread out far into the countryside, along highway corridors.

KEY ISSUE 4

Why Do Cities Face Challenges?



Decline and Renewal 490

Cities display physical, social, and economic challenges and accomplishments.

Introducing Urban Patterns

When you stand at the corner of Fifth Avenue and 34th Street in New York City, staring up at the Empire State Building, you know that you are in a city (Figure 13-1). When you are standing in an Iowa cornfield, you have no doubt that you are in the country.

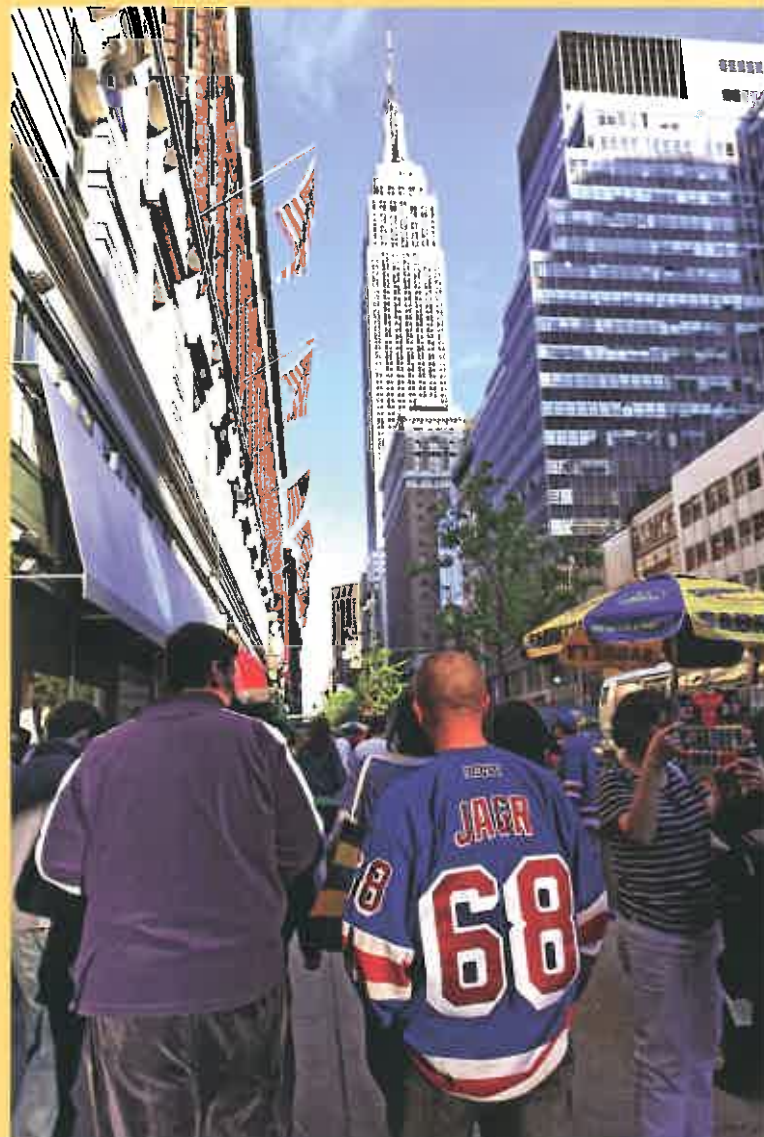
Geographers help explain what makes city and countryside different *places*. In a small town everything may be within easy walking distance, but in a large city your destination may be too far to walk. How would you get somewhere if you didn't have a car, or if the city were too congested to use it? Hitchhiking is dangerous, and you don't have enough money to hire a taxi. What about the bus? Where does it stop? What route does it follow? How much is the fare? Do you have the exact change or a prepaid fare card, as required on most big-city buses?

Chapter 12 and this chapter are both concerned with urban geography, but at different *scales*. The previous chapter examined the distribution of urban settlements at national and global scales. This chapter looks at where people and activities are distributed within urban *space*. Models have been developed to explain why differences occur within urban areas.

In *regions* of developed countries, people are increasingly likely to live in suburbs. This changing structure of cities is a response to conflicting desires. People wish to avoid urban problems, but at the same time, they want convenient *connections* to the city's jobs, shops, culture, and recreation.

- **KEY ISSUE 1** focuses on the downtown of urban areas. Activities downtown are distinctive. We all experience the interplay between *globalization* and *local diversity* of urban settlements when we are downtown. If you were transported to the downtown of another city, you might be able to recognize the city from its skyline. Many downtowns have a collection of high-rise buildings, towers, and landmarks that are identifiable even to people who have never visited them.
- **KEY ISSUE 2** looks at *where* people live within urban areas. A large city is stimulating and agitating, entertaining and frightening, welcoming and cold. A city has something for everyone, but a lot of those things are for people who are different from you. Urban geography helps to sort out the complexities of familiar and unfamiliar patterns in urban areas.

- **KEY ISSUE 3** looks at suburban expansion. If you were transported to a suburban residential neighborhood, you would have difficulty identifying the urban area. Suburban houses, streets, schools, and shopping centers look very much alike from one American city to another.
- **KEY ISSUE 4** looks at distinctive physical, social, and economic geography issues of urban areas. In this section, the causes and consequences of today's evolving urban patterns are examined. Although different internal structures characterize urban areas in the United States and elsewhere, the problems arising from current spatial trends are similar. Geographers describe *why* different types of people live in various places within urban areas.



▲ **FIGURE 13-1** YOU KNOW YOU ARE IN A CITY Staring at the Empire State Building, New York

KEY ISSUE 1

Why Do Services Cluster Downtown?

- CBD Land Uses
- CBDs Outside North America

Downtown is the best-known and the most visually distinctive area of most cities. The downtowns of most North American cities have different features than the downtowns in the rest of the world.

CBD Land Uses

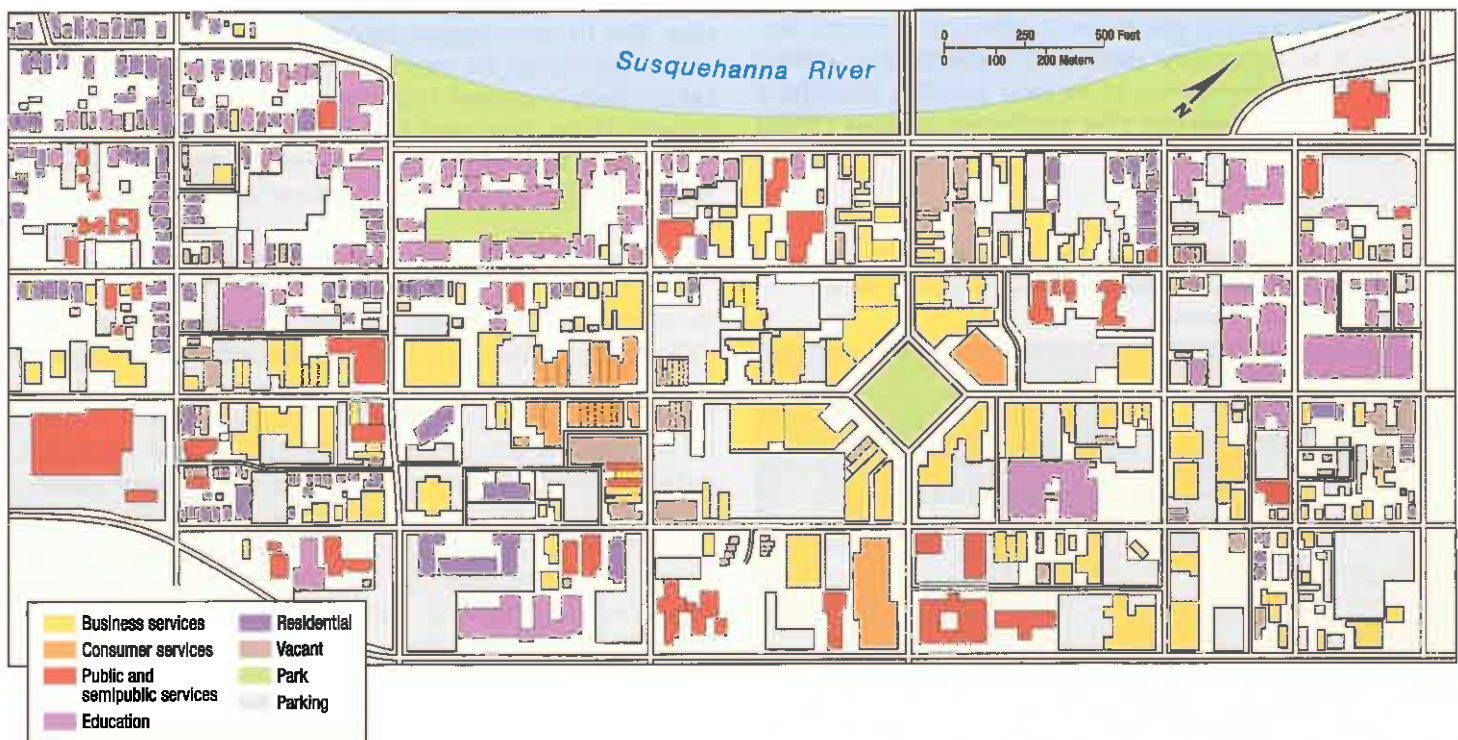
Downtown is known to geographers by the more precise term **central business district (CBD)**. The CBD is compact—less than 1 percent of the urban land area—but contains a large percentage of the public, business, and consumer services (Figure 13-2). Services are attracted to the CBD because of its accessibility. The CBD is the



▲ **FIGURE 13-3 SITE OF WILKES-BARRE'S CBD** Wilkes-Barre was built along the south bank of the Susquehanna River.

easiest part of the city to reach from the rest of the region and is the focal point of the region's transportation network.

The CBD is one of the oldest districts in a city, usually at or near the original site of the settlement. The CBDs of older cities are often situated along a body of water, a principal transportation route prior to the twentieth century (Figure 13-3).



▲ **FIGURE 13-2 CBD OF WILKES-BARRE, PENNSYLVANIA** Wilkes-Barre, a city of 40,000 inhabitants, has a central business district typical of U.S. cities, with a mix of business, consumer, and public services.

PUBLIC SERVICES IN CBDs

Learning Outcome 13.1.1

Describe the three types of services found in a CBD.

Public services typically located in a CBD include city hall, courts, county and state agencies, and libraries (Figure 13-4). These facilities historically clustered downtown, in many cases in substantial structures. Today, many remain in the CBD to facilitate access for people living in all parts of town. Similarly, semipublic services such as places of worship and social service agencies also cluster downtown in handsome historic structures.

Sports facilities and convention centers have been constructed or expanded downtown in many cities. These structures attract a large number of people, including many suburbanites and out-of-towners. Cities place these facilities in the CBD because they hope to stimulate more business for downtown restaurants, bars, and hotels. Cities such as Wilkes-Barre have reclaimed their waterfronts as public park space.

BUSINESS SERVICES IN CBDs

Offices cluster in a CBD for accessibility (Figure 13-5). People in business services such as advertising, banking, finance, journalism, and law particularly depend on proximity to professional colleagues. Lawyers, for example, choose locations near government offices and courts. Services such as temporary secretarial agencies and instant printers locate downtown to be near lawyers, forming a chain of interdependency that continues to draw offices to the center city.

▼ **FIGURE 13-4 PUBLIC SERVICES IN WILKES-BARRE'S CBD** Much of Wilkes-Barre's CBD is devoted to public services, such as the Luzerne County Courthouse.



▲ **FIGURE 13-5 BUSINESS SERVICES IN WILKES-BARRE'S CBD** Downtown buildings house offices for financial and professional services.

Even with the diffusion of modern telecommunications, many professionals still exchange information with colleagues primarily through face-to-face contact. Financial analysts discuss attractive stocks or impending corporate takeovers. Lawyers meet to settle disputes out of court. Offices are centrally located to facilitate rapid communication of fast-breaking news through spatial proximity. Face-to-face contact also helps establish a relationship of trust based on shared professional values.

A central location also helps businesses that employ workers from a variety of neighborhoods. Top executives may live in one neighborhood, junior executives in another, secretaries in another, and custodians in still another. Only a central location is readily accessible to all groups. Firms that need highly specialized employees are more likely to find them in the central area, perhaps currently working for another company downtown.

CONSUMER SERVICES IN CBDs

In the past, three types of retail services clustered in a CBD because they required accessibility to everyone in the region: retailers with a high threshold, those with a high range, and those that served people who worked in the CBD. Changing shopping habits and residential patterns have reduced the importance of retail services in the CBD. Some downtowns have actively encouraged leisure services, such as theaters. In Wilkes-Barre, for example, an abandoned movie theater built in 1938 was converted into the F. M. Kirby Center for the Performing Arts in 1986 (Figure 13-6).

RETAILERS WITH A HIGH THRESHOLD. Retailers with high thresholds, such as department stores, traditionally preferred a CBD location in order to be accessible to many people. Large department stores in the CBD would cluster near one intersection, which was known as the “100 percent corner.” Rents were highest there because that location had the highest accessibility for the most customers.



▲ **FIGURE 13-6 CONSUMER SERVICES IN WILKES-BARRE'S CBD** Kirby Center for the Performing Arts is in downtown Wilkes-Barre.

Most high-threshold shops such as large department stores have closed their downtown branches. CBDs that once boasted three or four stores now have none, or perhaps one struggling survivor. The customers for downtown department stores now consist of downtown office workers, inner-city residents, and tourists. Department stores with high thresholds are now more likely to be in suburban malls.

RETAILERS WITH A HIGH RANGE. High-range retailers are often specialists, with customers who patronize them infrequently. These retailers once preferred CBD locations because their customers were scattered over a wide area. For example, a jewelry or clothing store attracted shoppers from all over the urban area, but each customer visited infrequently. Like those with high thresholds, high-range retailers have moved with department stores to suburban locations.

RETAILERS SERVING DOWNTOWN WORKERS. A third type of retail activity in the CBD serves the many people who work in the CBD and shop during lunch or working hours. These retailers sell office supplies, computers, and clothing or offer shoe repair, rapid photocopying, dry cleaning, and so on. In contrast to the other two types of retailers, shops that appeal to nearby office workers are expanding in the CBD, in part because the number of downtown office workers has increased and in part because downtown offices require more services.

Patrons of downtown shops tend increasingly to be downtown employees who shop during the lunch hour. Thus, although the total volume of sales in downtown areas has been stable, the pattern of demand has changed. Large department stores have difficulty attracting their old customers, whereas smaller shops that cater to the special needs of the downtown labor force are expanding.

ACTIVITIES EXCLUDED FROM CBDs

High rents and land shortage discourage two principal activities in the CBD—industrial and residential.

LACK OF MANUFACTURING IN CBDs. Modern factories require large parcels of land to spread operations among one-story buildings. Suitable land is generally available in suburbs. In the past, inner-city factories and retail establishments relied on waterfront CBDs that were once lined with piers for cargo ships to load and unload and warehouses to store the goods. Today's large oceangoing vessels are unable to maneuver in the tight, shallow waters of the old CBD harbors. Consequently, port activities have moved to more modern facilities downstream.

Port cities have transformed their waterfronts from industry to commercial and recreational activities. Derelict warehouses and rotting piers have been replaced with new offices, shops, parks, and museums. As a result, CBD waterfronts have become major tourist attractions in a number of North American cities, including Boston, Toronto, Baltimore, and San Francisco, as well as in European cities such as Barcelona and London. The cities took the lead in clearing the sites and constructing new parks, docks, walkways, museums, and parking lots. They have also built large convention centers to house professional meetings and trade shows. Private developers have added hotels, restaurants, boutiques, and entertainment centers to accommodate tourists and conventioners.

LACK OF RESIDENTS IN CBDs. Many people used to live in or near the CBD. Poorer people jammed into tiny, overcrowded apartments, and richer people built mansions downtown. In the twentieth century, most residents abandoned downtown living because of a combination of pull and push factors. They were pulled to suburbs that offered larger homes with private yards and modern schools. And they were pushed from CBDs by high rents that business and retail services were willing to pay and by the dirt, crime, congestion, and poverty that they experienced by living downtown.

In the twenty-first century, however, the population of many U.S. CBDs has increased. New apartment buildings and townhouses have been constructed, and abandoned warehouses and outdated office buildings have been converted into residential lofts. Downtown living is especially attractive to people without school-age children, either “empty nesters” whose children have left home or young professionals who have not yet had children. These two groups are attracted by the entertainment, restaurants, museums, and nightlife that are clustered downtown, and they are not worried about the quality of neighborhood schools.

Despite the growth in population in the center of some U.S. cities, some consumer services, such as grocery stores, may still be lacking (see Sustainability and Inequality feature on the next page).

Pause and Reflect 13.1.1

Do you ever spend time in a CBD? If so, for what reasons?

COMPETITION FOR LAND IN THE CBD

Learning Outcome 13.1.2

Explain the three-dimensional nature of a CBD.

A CBD's accessibility produces extreme competition for the limited sites available. As a result, land values are very high in the CBD, and it is too expensive for some activities. In

a rural area a hectare of land might cost several thousand dollars. In a suburb it might run tens of thousands of dollars. In the CBD of a global city like London, if a hectare of land were even available, it would cost more than two hundred million dollars. If this page were a parcel of land in the CBD of London, it would sell for \$1,000.

The intensive demand for space has given the CBD a three-dimensional character, pushing it vertically. Compared to other parts of a city, the CBD uses more space below and above ground level.

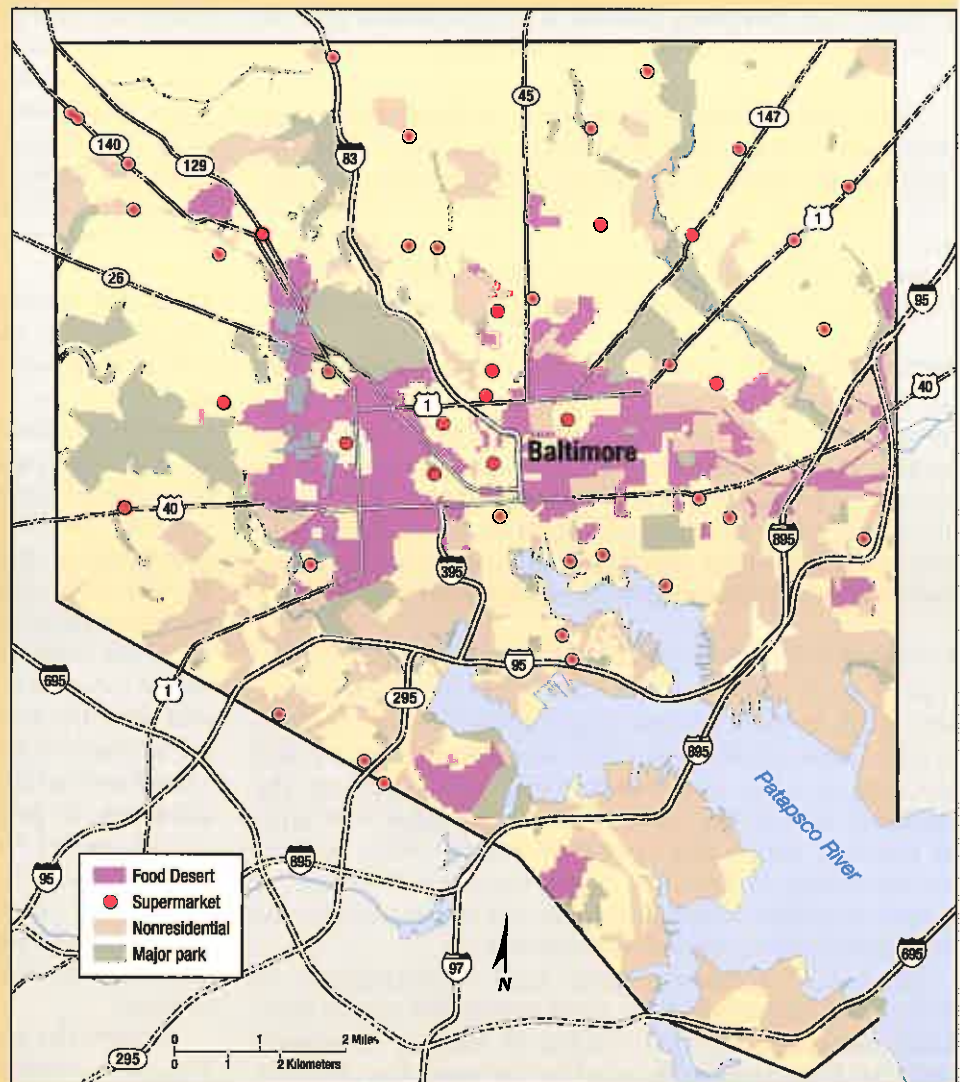
SUSTAINABILITY AND INEQUALITY IN OUR GLOBAL VILLAGE

Identifying Food Deserts

A **food desert** is an area in a developed country where healthy food is difficult to obtain. Food deserts are especially common in low-income inner-city areas.

In Baltimore, the Baltimore Food Policy Initiative is a joint venture of the Johns Hopkins University Center for a Livable Future and several local government agencies. The initiative prepared a food environment map and found that approximately 20 percent of Baltimore's residents lived in a food desert, the percentages were highest for children and for African Americans (Figure 13-7). An area was determined to be a food desert if it met all four of these criteria:

- The distance to the nearest supermarket was more than $\frac{1}{4}$ mile. This distance was chosen as the maximum convenient distance for walking with grocery bags.
- The median household income was at or below 185 percent of the federal poverty level.
- At least 40 percent of the area's households did not have any motor vehicles.
- The average Healthy Food Availability Index score was low for nearby supermarkets and convenience stores. This index was calculated by sending researchers into each market and assessing the availability of fresh and healthy food in the store, using a survey form called the Nutrition Environment Measures Survey developed at the University of Pennsylvania.



▲ FIGURE 13-7 FOOD DESERTS IN BALTIMORE Baltimore's food deserts are clustered in predominantly low-income African American inner-city neighborhoods.



◀ **FIGURE 13-8 UNDERGROUND CBD** Montreal's CBD has an extensive network of underground walkways lined with retail services.

THE UNDERGROUND CBD. A vast underground network exists beneath most CBDs. The typical “underground city” includes garages, loading docks for deliveries to offices and shops, and pipes for water and sewer service. Telephone, electric, TV, and broadband cables run beneath the surface as well because not enough space is available in the CBD for the large number of overhead poles that would be needed for such a dense network, and the wires would be unsightly and hazardous. Subway trains run beneath the streets of large CBDs. And cities in cold-weather climates, such as Minneapolis, Montreal, and Toronto, have built extensive underground pedestrian passages and shops. These underground areas segregate pedestrians from motor vehicles and shield them from harsh winter weather (Figure 13-8).

SKYSCRAPERS. Demand for space in CBDs has also made high-rise structures economically feasible. Downtown skyscrapers give a city one of its most distinctive images and unifying symbols. Suburban houses, shopping malls, and factories look much the same from one city to another, but each city has a unique downtown skyline, resulting from the particular arrangement and architectural styles of its high-rise buildings.

The first skyscrapers were built in Chicago in the 1880s, made possible by several inventions, including the elevator, steel girders, and glass structures because they blocked light and air movement. Artificial lighting, ventilation, central heating, and air-conditioning have helped solve these problems. Most North American and European cities enacted **zoning ordinances** early in the twentieth century in part to control the location and height of skyscrapers.

Skyscrapers are an interesting example of “vertical geography.” The nature of an activity influences which floor it occupies in a typical high-rise:

- Retail services pay high rents for street-level space to entice customers.

- Business services, less dependent on walk-in trade, occupy offices on the middle levels at lower rents.
- Apartments on the upper floors take advantage of lower noise levels and panoramic views.

The one large U.S. CBD without skyscrapers is Washington, D.C., where no building is allowed to be higher than the U.S. Capitol dome. Consequently, offices in downtown Washington rise no more than 13 stories. As a result, the typical Washington office building uses more horizontal space—land area—than in other cities. Thus the city's CBD spreads over a much wider area than those in comparable cities.

Pause and Reflect 13.1.2

The Capitol is the tallest building in the CBD of Washington, D.C. Is Washington's CBD typical of American cities? Why or why not?

CHECK-IN: KEY ISSUE 1

Why Do Services Cluster Downtown?

- ✓ **Business, public, and some consumer services cluster in the CBD.**
- ✓ **The CBD has relatively few manufacturers and residents.**
- ✓ **North American CBDs are characterized by high-rise office buildings, as well as extensive underground services.**
- ✓ **Historic European CBDs have fewer high-rises and more residents and consumer services.**

KEY ISSUE 2

Where Are People Distributed within Urban Areas?

- **Models of Urban Structure**
- **Geographic Application of the Models**
- **Applying the Models Outside North America**

Learning Outcome 13.2.1

Describe the concentric zone, sector, and multiple nuclei models.

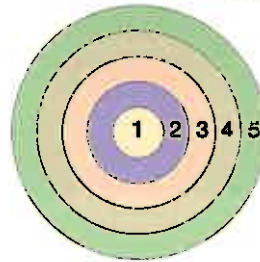
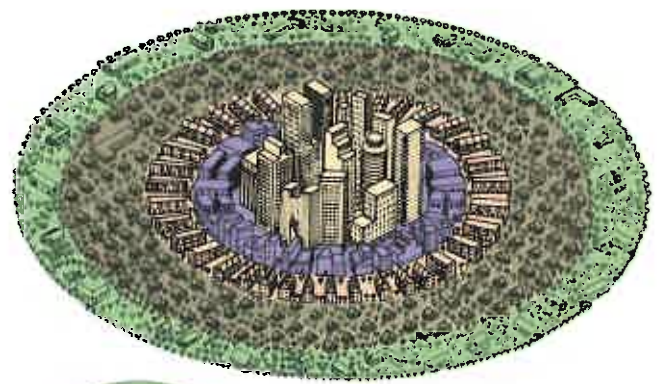
People are not distributed randomly within an urban area. They concentrate in particular neighborhoods, depending on their social characteristics. Geographers describe where people with particular characteristics are likely to live within an urban area, and they offer explanations for why these patterns occur.

Models of Urban Structure

Sociologists, economists, and geographers have developed three models to help explain where different types of people tend to live in an urban area—the concentric zone, sector, and multiple nuclei models. The three models describing the internal social structure of cities were developed in Chicago, a city on a prairie. The three models were later applied to cities elsewhere in the United States and in other countries. Chicago includes a CBD known as the Loop because transportation lines (originally cable cars, now El trains) loop around it. Surrounding the Loop are residential suburbs to the south, west, and north. Except for Lake Michigan to the east, few physical features have interrupted Chicago's growth.

CONCENTRIC ZONE MODEL

The **concentric zone model** was the first model to explain the distribution of different social groups within urban areas (Figure 13-9). It was created in 1923 by sociologist E. W. Burgess. According to the concentric zone model, a city grows outward from a central area in a series of



- | | |
|---|------------------------------------|
| 1 | Central business district |
| 2 | Zone of transition |
| 3 | Zone of independent workers' homes |
| 4 | Zone of better residences |
| 5 | Commuter's zone |

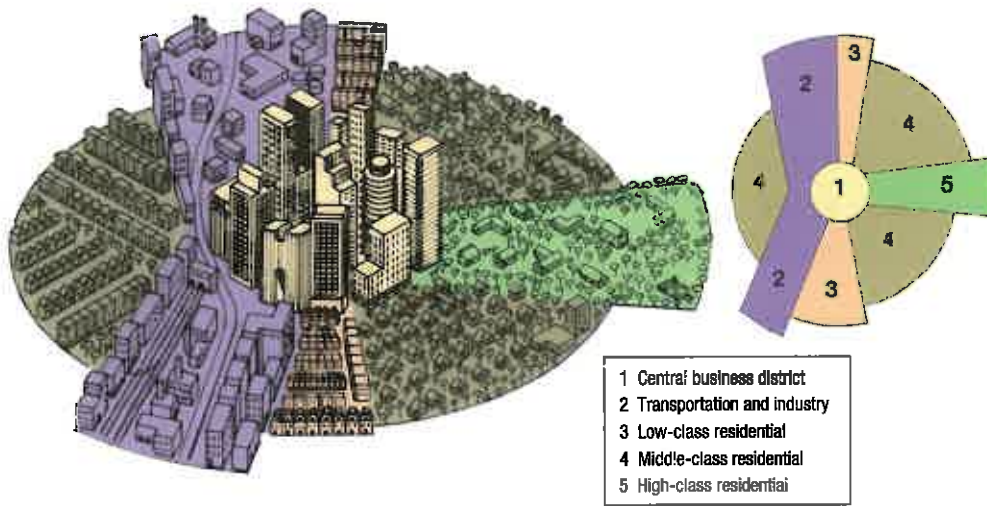
▲ **FIGURE 13-9 CONCENTRIC ZONE MODEL** According to this model, a city grows in a series of rings that surround the central business district.

concentric rings, like the growth rings of a tree. The precise size and width of the rings vary from one city to another, but the same basic types of rings appear in all cities in the same order. Back in the 1920s, Burgess identified five rings:

1. **CBD**, the innermost ring, where nonresidential activities are concentrated.
2. **A zone in transition**, which contains industry and poorer-quality housing. Immigrants to the city first live in this zone in small dwelling units, frequently created by subdividing larger houses into apartments. The zone also contains rooming houses for single individuals.
3. **A zone of working-class homes**, which contains modest older houses occupied by stable, working-class families.
4. **A zone of better residences**, which contains newer and more spacious houses for middle-class families.
5. **A commuters' zone**, beyond the continuous built-up area of the city. Some people who work in the CBD nonetheless choose to live in small villages that have become dormitory towns for commuters.

Pause and Reflect 13.2.1

If you cut down a large tree, the cross-section will appear to be a circle with concentric rings. Which rings of the tree are the newest? Are tree rings a good analogy to the concentric zone model? Why or why not?



▲ **FIGURE 13-10 SECTOR MODEL** According to this model, a city grows in a series of wedges or corridors, which extend out from the central business district.

cities at different times and showed that the highest social-class district usually remained in the same sector, although it moved farther out along that sector over time.

Hoyt and Burgess both claimed that social patterns in Chicago supported their model. According to Burgess, Chicago's CBD was surrounded by a series of rings, broken only by Lake Michigan on the east. Hoyt argued that the best housing in Chicago developed north from the CBD along Lake Michigan, whereas industry located along major rail lines and roads to the south, southwest, and northwest.

SECTOR MODEL

A second theory of urban structure, the **sector model**, was developed in 1939 by land economist Homer Hoyt (Figure 13-10). According to Hoyt, a city develops in a series of sectors, not rings. Certain areas of the city are more attractive for various activities, originally because of an environmental factor or even by mere chance. As a city grows, activities expand outward in a wedge, or sector, from the center.

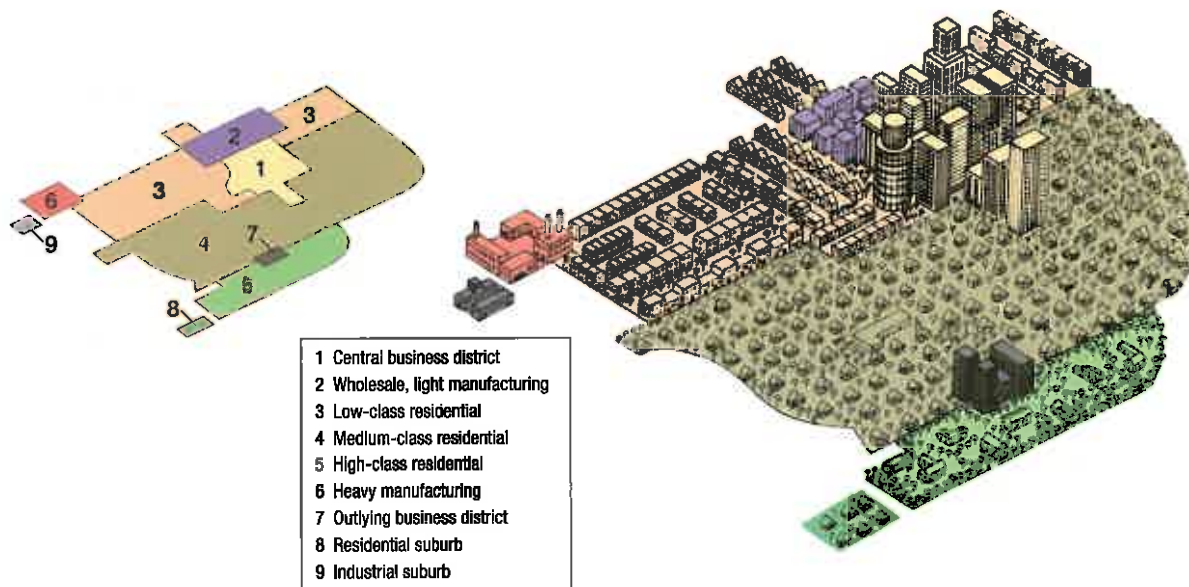
Once a district with high-class housing is established, the most expensive new housing is built on the outer edge of that district, farther out from the center. The best housing is therefore found in a corridor extending from downtown to the outer edge of the city. Industrial and retailing activities develop in other sectors, usually along good transportation lines.

To some extent the sector model is a refinement of the concentric zone model rather than a radical restatement. Hoyt mapped the highest-rent areas for a number of U.S.

MULTIPLE NUCLEI MODEL

Geographers C. D. Harris and E. L. Ullman developed the **multiple nuclei model** in 1945. According to the multiple nuclei model, a city is a complex structure that includes more than one center around which activities revolve (Figure 13-11). Examples of these nodes include a port, a neighborhood business center, a university, an airport, and a park.

The multiple nuclei theory states that some activities are attracted to particular nodes, whereas others try to avoid them. For example, a university node may attract well-educated residents, pizzerias, and bookstores, whereas an airport may attract hotels and warehouses. On the other hand, incompatible land-use activities avoid clustering in the same locations. Heavy industry and high-class housing, for example, rarely exist in the same neighborhood.



◀ **FIGURE 13-11 MULTIPLE NUCLEI MODEL** According to this model, a city consists of a collection of individual nodes, or centers, around which different types of people and activities cluster.

Geographic Applications of the Models

Learning Outcome 13.2.2:
Analyze how the three models help to explain where people live in an urban area.

The three models help us understand where people with different social characteristics tend to live within an urban area. They can also help explain why certain types of people tend to live in particular places. Effective use of the models depends on the availability of data at the scale of individual neighborhoods. In the United States and many other countries, that information comes from the census.

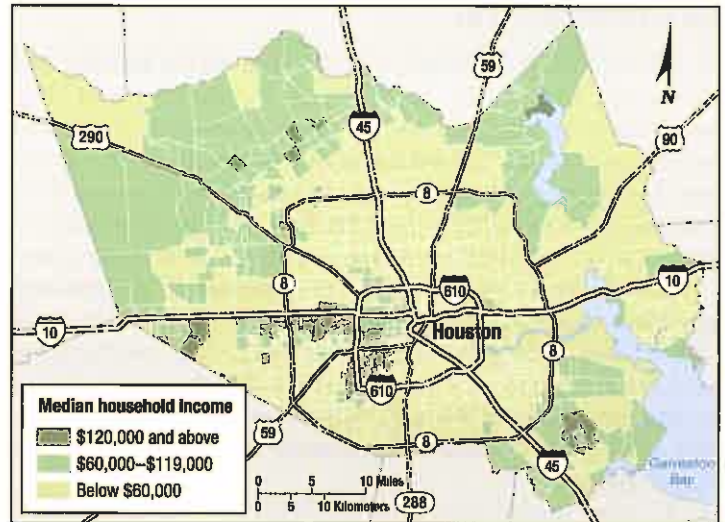
Urban areas in the United States are divided into **census tracts** that each contain approximately 5,000 residents and correspond, where possible, to neighborhood boundaries. Every decade the U.S. Bureau of the Census publishes data summarizing the characteristics of the residents and the housing in each tract. Estimates are also issued annually through the American Fact Finder service of the census's American Community Survey program. Examples of information the census provides include the number of nonwhites, the median income of all families, and the percentage of adults who finished high school. The spatial distribution of any of these social characteristics can be plotted on a map of the community's census tracts. Computers have become invaluable in this task because they permit rapid creation of maps and storage of voluminous data about each census tract. Social scientists can compare the distributions of characteristics and create an overall picture of where various types of people tend to live. This kind of study is known as **social analysis**.

None of the three models taken individually completely explains why different types of people live in distinctive parts of a city. Critics point out that the models are too simple and fail to consider the variety of reasons

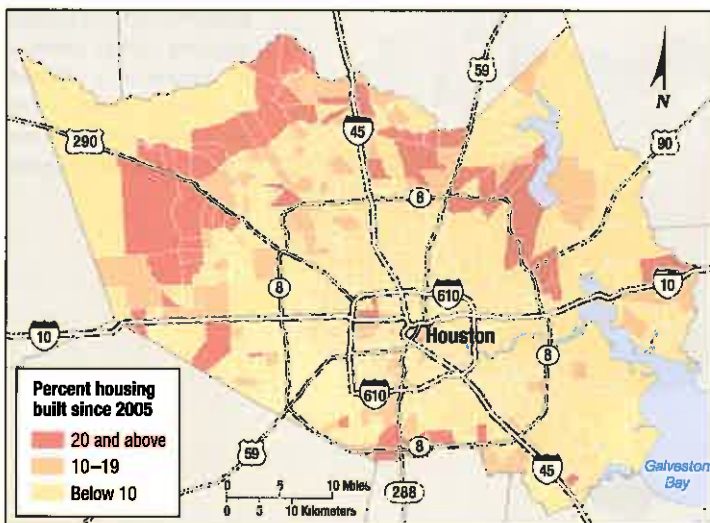
that lead people to select particular residential locations. Because the three models are all based on conditions that existed in U.S. cities between the two world wars, critics also question their relevance to contemporary urban patterns in the United States or in other countries.

But if the models are combined rather than considered independently, they help geographers explain where different types of people live in a city. People tend to reside in certain locations, depending on their particular personal characteristics. This does not mean that everyone with the same characteristics must live in the same neighborhood, but the models say that most people live near others who have similar characteristics:

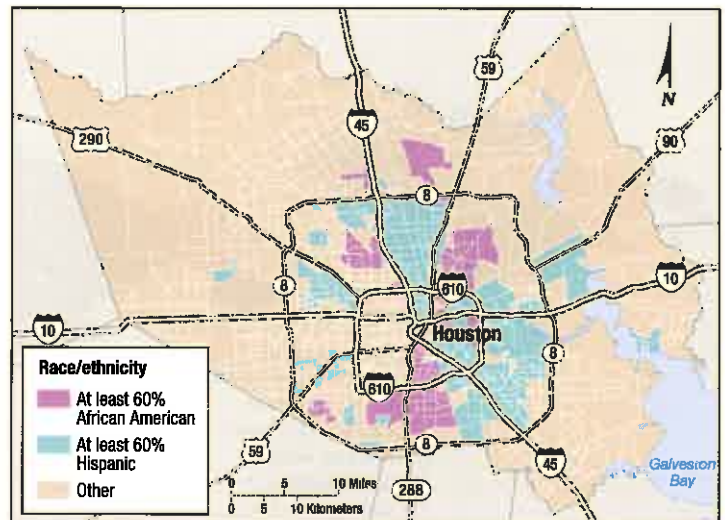
- **Applying the concentric zone model.** Consider two families with the same income and ethnic background. One family lives in a newly constructed home, whereas the other lives in an older one. The family in the newer house is much more likely to live in an outer ring and the family in the older house in an inner ring (Figure 13-12).



▲ FIGURE 13-13 SECTOR MODEL IN HOUSTON Distribution of high-income households. The median household income is the highest in a sector to the west.



▲ FIGURE 13-12 CONCENTRIC ZONES IN HOUSTON Age of housing. Housing is newer in the outer rings of the city than in the inner rings.



▲ FIGURE 13-14 MULTIPLE NUCLEI MODEL IN HOUSTON Distribution of minorities. Hispanics occupy nodes to the north and southeast of downtown, and African Americans occupy nodes to the south and northeast.

- **Applying the sector model.** Given two families who own their homes, the family with the higher income will not live in the same sector of the city as the family with the lower income (Figure 13-13).
- **Applying the multiple nuclei model.** People with the same ethnic or racial background are likely to live near each other (Figure 13-14).

Putting the three models together, we can identify, for example, the neighborhood in which a high-income,

Asian American owner-occupant is most likely to live (see the Contemporary Geographic Tools feature).

Pause and Reflect 13.2.2

What are the five most important PRIZM clusters for your zip code? Google Nielsen Claritas PRIZM or go to www.claritas.com/MyBestSegments/Default.jsp?ID=20.

CONTEMPORARY GEOGRAPHIC TOOLS

Market Segmentation: You Are Where You Live

Marketing geographers identify sectors, rings, and nodes that come closest to matching customers preferred by a retailer. Companies use this information to understand, locate, and reach their customers better and to determine where to put new stores and where advertising should appear.

Segmentation is the process of partitioning markets into groups of potential customers with similar needs and characteristics who are likely to exhibit similar purchasing behavior. A prominent example of geographic segmentation is the Potential Rating Index by Zip Market (PRIZM) clusters created by Nielsen Claritas. As Nielsen Claritas states, “birds of a feather flock together”—in other words, a person is likely to live near people who are similar.

Nielsen Claritas combines two types of geographic information: distribution of the social and economic characteristics of people obtained from the census and the addresses of purchasers of various products obtained from service providers. The variables are organized into 66 clusters that are given picturesque names. For each zip code in the United States, Nielsen Claritas determines the five clusters that are most prevalent. Nielsen Claritas calls this analysis “you are where you live.”

We can compare PRIZM clusters for two zip codes in the Houston area (Figure 13-15). Refer to Figures 13-12, 13-13, and 13-14 to see the close relationship between the Nielsen Claritas PRIZM clusters and the models of urban structure. Zip code 77004 is south of downtown Houston. The five most common clusters (in alphabetical order) are as follows:

- **City Roots:** older low-income ethnic minorities, living in older homes and apartments.
- **Low-Rise Living:** The lowest income of any PRIZM cluster; many are single parents who rent their homes and travel by bus rather than personal car.
- **Multi-Culti Ethnic:** Hispanics with modest incomes.
- **Urban Achievers:** young Hispanics.

- **Urban Elders:** elderly Hispanics.

Compare the above to the five most common PRIZM clusters in zip code 77079 in the western suburbs of Houston:

- **Beltway Boomers:** college-education, affluent, home-owning baby boomers.
- **Executive Suites:** upper-middle class couples with professional jobs.
- **Gray Power:** older couples living in quiet comfort.
- **Pools & Patios:** high-income older couples, with backyard pools.
- **Upper Crust:** very high income couples, especially those with grown children, living an opulent lifestyle.



▲ FIGURE 13-15 NIELSEN CLARITAS PRIZM CLUSTERS Zip code 77004, immediately southeast of downtown Houston, is home to a large percentage of older homes occupied by Hispanics with modest incomes. Zip code 77079, in Houston’s western suburbs, contains a large number of high-income, older college-educated couples.

Applying the Models Outside North America

Learning Outcome 13.2.3

Describe how the three models explain patterns in European cities.

The three models may describe the spatial distribution of social classes in the United States, but American urban areas differ from those elsewhere in the world. These differences do not invalidate the models, but they do point out that social groups in other countries may not have the same reasons for selecting particular neighborhoods within their cities.

CBDs IN EUROPE

Compared to CBDs in the United States, those outside North America are less dominated by skyscrapers for business services. The most prominent structures may be public and semipublic services, such as churches and former royal palaces, situated on the most important public squares, at road junctions, or on hilltops. Parks in the center of European cities often were first laid out as private gardens for aristocratic families and later were opened to the public.

European cities display a legacy of low-rise structures and narrow streets, built as long ago as medieval times. Some European cities try to preserve their historic CBDs by limiting high-rise buildings and the number of cars. Several high-rise offices were built for business services in Paris during the 1970s, including Europe's tallest office building (the 210-meter [688-foot] Tour Montparnasse). The public outcry over this disfigurement of the city's historic skyline was so great that officials reestablished lower height limits (Figure 13-16).

More people live downtown in cities outside North America. As a result, CBDs outside North America contain more consumer services, such as groceries, bakeries, and butchers. However, the 24-hour supermarket is rare outside North America because of shopkeeper preferences, government regulations, and longtime shopping habits. Many CBDs outside North America ban motor vehicles from busy shopping streets, thus emulating one of the most attractive attributes of large shopping malls—pedestrian-only walkways. Shopping streets reserved for pedestrians are widespread in Northern Europe, including in the Netherlands, Germany, and Scandinavia. Rome periodically bans private vehicles from the CBD to reduce pollution and congestion and minimize damage to ancient monuments.

Although constructing large new buildings is difficult, many shops and offices still wish to be in the center of European cities. The alternative to new construction is renovation of older buildings. However, renovation is more expensive and does not always produce enough space to meet



▲ FIGURE 13-16 SKYSCRAPER IN PARIS The Tour Montparnasse, Europe's tallest building, dominates the skyline of Paris. The image illustrates the allocation of much of the land in a European CBD to public services, including the Ecole Militaire (Military Academy), which takes up the entire foreground, and behind it France's Finance Ministry (left) and the United Nations offices (right).

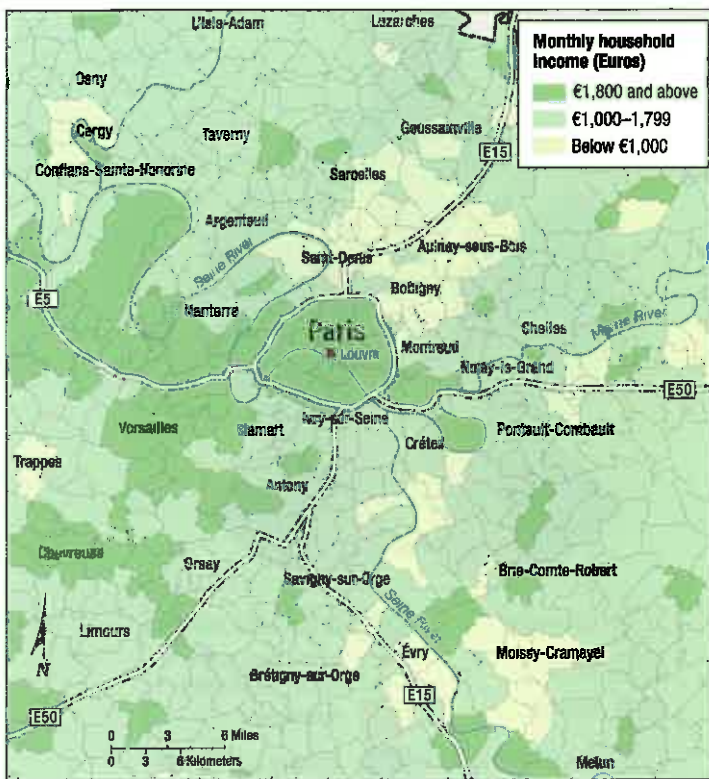
the demand. As a result, rents are much higher in the center of European cities than in U.S. cities of comparable size.

APPLYING THE MODELS IN EUROPE

To some extent, the models look similar in Europe to the way they look in the United States. In Paris, as in U.S. cities, newer housing is in the outer ring, and higher-income people cluster in a sector. These similarities mask important differences.

SECTORS IN EUROPEAN CITIES. In contrast to most U.S. cities, in Europe, wealthy people still live in the inner portions of the upper-class sector, not just in the suburbs. A central location provides proximity to the region's best shops, restaurants, cafés, and cultural facilities. Wealthy people are also attracted by the opportunity to occupy elegant residences in carefully restored, beautiful old buildings (Figure 13-17).

In Paris, for example, the wealthy lived near the royal palace (the Louvre) beginning in the twelfth century and the Palace of Versailles from the sixteenth century until the French Revolution in 1789. The preference of Paris's wealthy to cluster in a southwest sector was reinforced in the nineteenth century during the Industrial Revolution. Factories were built to the south, east, and north, along the Seine and Marne River valleys, and relatively few were built on the southwestern hills. Similar upper-class sectors emerged in the inner areas other European cities, typically on higher elevations and near royal palaces.



▲ **FIGURE 13-17 SECTORS IN PARIS, FRANCE** Wealthier people live in the center and to the southwest sector, often above sidewalk cafés and other consumer services.

CONCENTRIC ZONES IN EUROPEAN CITIES. Unlike in U.S. cities, in European cities such as Paris, most of the newer housing built in the suburbs is high-rise apartment buildings for low-income people and persons of color who have immigrated from Africa or Asia. (see ahead to Figure 13-21)

European officials encouraged the construction of high-density suburbs to help preserve the countryside from development and to avoid the inefficient sprawl that characterizes American suburbs, as discussed in the last section of this chapter. And tourists are attracted to the historic, lively centers of European cities. But these policies have resulted in the clustering of people with social and economic problems in remote suburbs rarely seen by wealthier individuals.

European suburban residents face the prospect of long commutes by public transportation to reach jobs and other downtown amenities. Shops, schools, and other services are worse in the suburbs than in inner neighborhoods; the suburbs are centers for crime, violence, and drug dealing; and people lack the American suburban amenity of large private yards. Many residents of these dreary suburbs are persons of color or recent immigrants from Africa or Asia who face discrimination and prejudice from “native” Europeans.

In the past, low-income people also lived in the center of European cities. Before the invention of electricity

in the nineteenth century, social segregation was vertical: Wealthier people lived on the first or second floors, whereas poorer people occupied the dark, dank basements or climbed many flights of stairs to reach the attics. As the city expanded during the Industrial Revolution, housing for low-income people was constructed in sectors near the factories and away from the wealthy. Today, low-income people are less likely to live in European inner-city neighborhoods. Poor-quality housing has been renovated for wealthy people or demolished and replaced by offices or luxury apartment buildings. Building and zoning codes prohibit anyone from living in basements, and upper floors are attractive to wealthy individuals once elevators are installed.

Pause and Reflect 13.2.3

European cities contain many famous tourist sites, such as the Parthenon in Athens (Figure 12-34) and the Church of the Holy Sepulchre in Jerusalem (Figures 6-14 and 9-48). Are these tourist sites in an inner ring or an outer ring? What do you think explains their location?

APPLYING THE MODELS IN DEVELOPING COUNTRIES

Learning Outcome 13.2.4

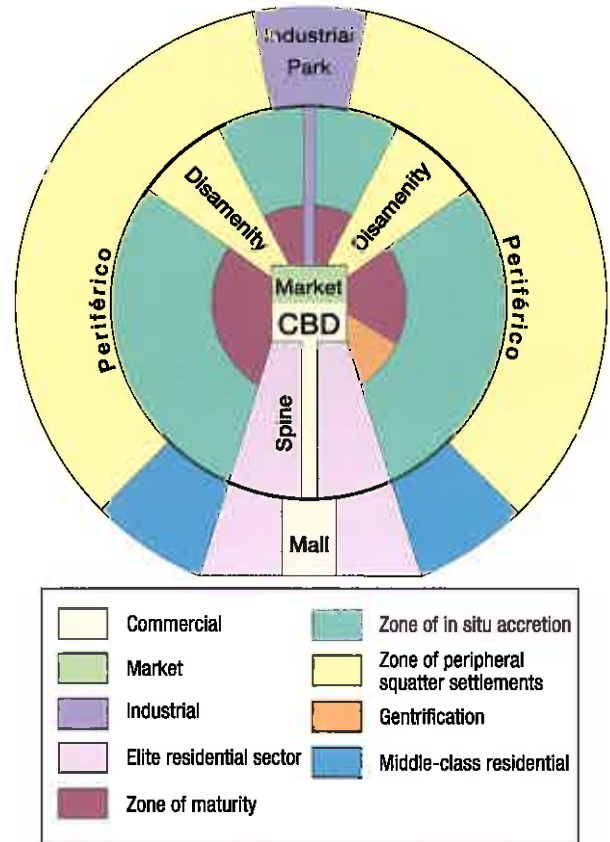
Describe how the three models explain patterns in cities in developing countries.

In developing countries, as in Europe, the poor are accommodated in the suburbs, whereas the wealthy live near the center of a city, as well as in a sector extending from the center.

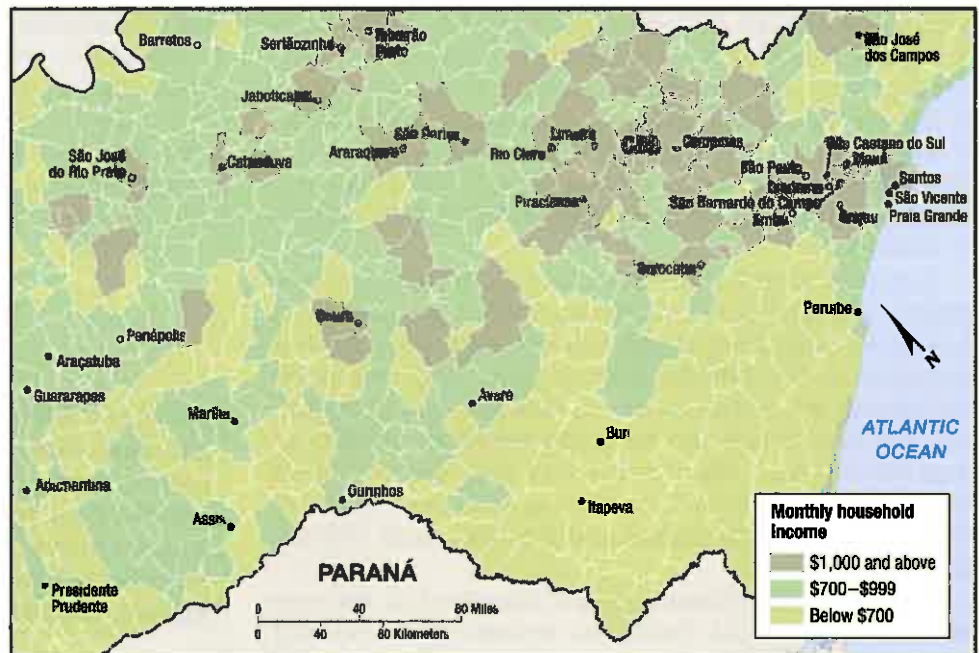
SECTORS IN CITIES OF DEVELOPING COUNTRIES. Geographers Ernest Griffin and Larry Ford show that in Latin American cities, wealthy people push out from the center in a well-defined elite residential sector. The elite sector forms on either side of a narrow spine that contains offices, shops, and amenities attractive to wealthy people, such as restaurants, theaters, parks, and zoos (Figure 13-18). The wealthy are also attracted to the center and spine because services such as water and electricity are more readily available and reliable there than elsewhere (Figure 13-19). Wealthy and middle-class residents avoid living near sectors of “disamenity,” which are land uses that may be noisy or polluting or that cater to low-income residents.

CONCENTRIC ZONES IN CITIES OF DEVELOPING COUNTRIES. Cities in developing countries have zones of the most intensive land uses and highest land values toward the center or along the commercial spine. Surrounding these zones is a ring of less-developed, lower-value land. Within this framework, cities in developing countries are unable to house the rapidly growing number of poor people. Their cities are growing because of overall population increase and migration from rural areas for job opportunities. Because of the housing shortage, a large percentage of poor immigrants to urban areas in developing countries live in squatter settlements.

Squatter settlements are known by a variety of names, including *barriadas* and *favelas* in Latin America, *bidonvilles* in North Africa, *bastees* in India, *gecekondu* in Turkey, *kampongs* in Malaysia, and *barong-barong* in the Philippines. Estimates of the number of people living in squatter settlements vary widely, between 175 million and 1 billion. Squatter settlements have few services because neither the city nor the residents can afford them. The settlements generally lack schools, paved roads, telephones, and sewers. Latrines are usually designated by the settlement’s leaders, and



▲ **FIGURE 13-18 MODEL OF A LATIN AMERICAN CITY** Wealthy people live in the inner city and a sector extending along a commercial spine. (Adapted from Larry R. Ford, “A New and Improved Model of Latin American City Structure,” *Geographical Review* 86 (1996): 438. Used by permission of the publisher.)



▲ **FIGURE 13-19 SECTORS IN SÃO PAULO** The high-income sector extends south from the CBD to the Atlantic Ocean.

water is carried from a central well or dispensed from a truck. Electricity service may be stolen by running a wire from the nearest power line. In the absence of bus service or available private cars, a resident may have to walk two hours to reach a place of employment (Figure 13-20).

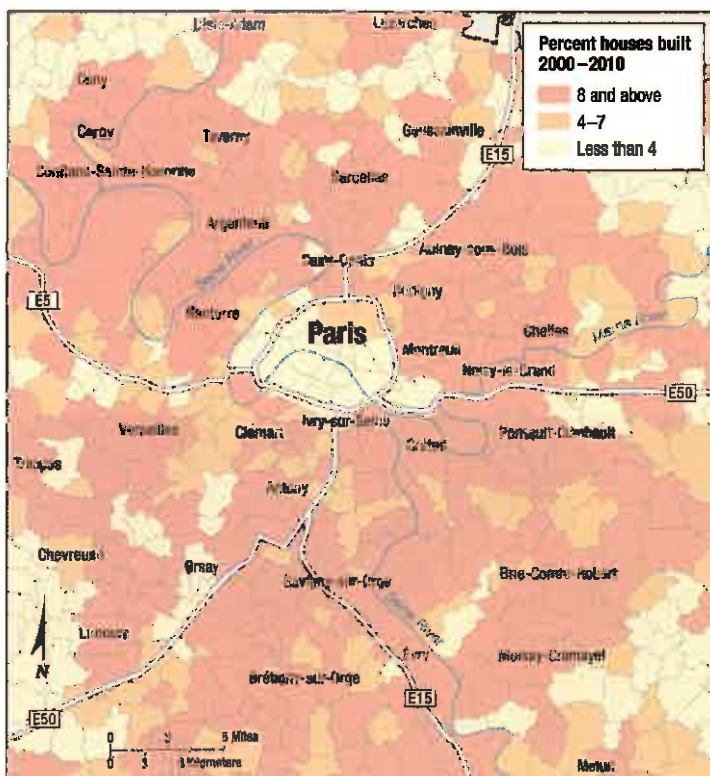
Pause and Reflect 13.2.4

In Google Earth, go to Rua Oscar Freire, São Paulo, Brazil. How does this street in São Paulo's high-income sector compare to the suburban neighborhood in Figure 13-20?



▲ **FIGURE 13-20 SQUATTER SETTLEMENT IN SÃO PAULO** The *favela* in the foreground is in a suburb, and the high-rises in the background are close to downtown.

At first, squatters do little more than camp on the land or sleep in the street. In severe weather, they may take shelter in markets and warehouses. Families then erect primitive shelters with scavenged cardboard, wood boxes, sackcloth, and crushed beverage cans. As they find new bits of material, they add them to their shacks. After a few years they may build a tin roof and partition the space into rooms, and the structure acquires a more permanent appearance.



▲ **FIGURE 13-21 CONCENTRIC ZONES IN PARIS, FRANCE** Newer housing is in the outer rings, but much of it is high-rise apartments for poorer people and immigrants.



STAGES OF CITIES IN DEVELOPING COUNTRIES

Learning Outcome 13.2.5

Describe the history of development of cities in developing countries.

The similarity between cities in Europe and in developing countries is not a coincidence: European colonial policies left a heavy mark on cities in developing countries, many of which have passed through three stages of development—pre-European colonization, the European colonial period, and postcolonial independence. Mexico City provides a good example of these three stages.

PRECOLONIAL CITIES. Few cities existed in Africa, Asia, and Latin America before the Europeans established colonies. Most people lived in rural settlements. In Latin America, some cities were located in interior Mexico and the Andean highlands of northwestern South America. In Africa, cities could be found along the western coast, in Egypt's Nile River valley, and in Islamic empires in the north and east (as well as in Southwest Asia). Cities were also built in South and East Asia, especially in India, China, and Japan.

In Mexico, the Aztecs founded Mexico City—which they called Tenochtitlan—on a hill known as Chapultepec (“the hill of the grasshopper”). When forced by other people to leave the hill, they migrated a few kilometers south, near the present-day site of the University of Mexico, and then in 1325 to a marshy 10-square-kilometer (4-square-mile) island in Lake Texcoco (Figure 13-22).

The node of religious life was the Great Temple. Three causeways with drawbridges linked Tenochtitlan to the mainland and also helped control flooding. An aqueduct brought fresh water from Chapultepec. Most food, merchandise, and building materials crossed from the mainland to the island by canoe, barge, or other type of boat,

and the island was laced with canals to facilitate pickup and delivery of people and goods. Over the next two centuries, the Aztecs conquered the neighboring peoples and extended their control through much of present-day Mexico. As their wealth and power grew, Tenochtitlan grew to a population of a half-million.

COLONIAL CITIES. When Europeans gained control of Africa, Asia, and Latin America, they sometimes expanded existing cities to provide colonial services, such as administration, military command, and international trade, as well as housing for European colonists. Sometimes, existing native towns were either left to one side or demolished because they were totally at variance with European ideas.

Colonial cities followed standardized plans. All Spanish cities in Latin America, for example, were built according to the Laws of the Indies, drafted in 1573. The laws explicitly outlined how colonial cities were to be constructed—a gridiron street plan centered on a church and central plaza, walls around individual houses, and neighborhoods built around central, smaller plazas with parish churches or monasteries. Compared to the existing cities, these European districts typically contain wider streets and public squares, larger houses surrounded by gardens, and much lower density. In contrast, the old quarters have narrow, winding streets, little open space, and cramped residences.

After the Spanish conquered Tenochtitlan in 1521, after a two-year siege, they destroyed the city and dispersed or killed most of the inhabitants. The city, renamed Mexico City, was rebuilt around a main square, called the Zócalo, in the center of the island, on the site of the Aztecs' sacred precinct. The Spanish reconstructed the streets in a grid pattern extending from the Zócalo. A Roman Catholic cathedral was built on the north side of the square, near the site of the demolished Great Temple, and the National Palace was erected on the east side, on the site of the Aztec emperor Moctezuma's destroyed palace (Figure 13-23). The Spanish placed a church and monastery on the site of the Tlatelolco market.

Another example, Fes (Fez), Morocco, consists of two separate and distinct towns—the precolonial city that

▼ **FIGURE 13-22 PRECOLONIAL MEXICO CITY** (left) The Aztec city of Tenochtitlan was built on an island in Lake Texcoco. (right) The center of the city was dominated by the Templo Mayor. The twin shrines on the top of the temple were dedicated to the Aztec god of rain and agriculture (in blue) and to the Aztec god of war (in red).





▲ **FIGURE 13-23 COLONIAL MEXICO CITY** The main square in downtown Mexico City, the Zócalo, was laid out by the Spanish. The Metropolitan Cathedral is at the near end of the square. The National Palace is to the left, and City Hall is facing the square. Excavations at the site of the Templo Mayor are in the lower left.

existed before the French gained control and one built by the French colonialists (Figure 13-24). The precolonial Muslim city was laid out surrounding a mosque. The center also had a bazaar, or marketplace, which served as the commercial core. Government buildings and the homes of wealthy families surrounded the mosque and bazaar. Narrow, winding streets led from the core to other quarters. Families with less wealth and lower status located farther from the core, and recent migrants to the city lived on the edge.

Pause and Reflect 13.2.5

In Google Earth, go to Fes, Morocco, and zoom in on the buildings to see the colonial city. Then go to Fes el Bali, Morocco, and zoom in on the buildings to see the precolonial city. How do the buildings differ? Which has the higher density? Which has more trees and green space?

▼ **FIGURE 13-24 FES, MOROCCO** The precolonial part of Fes, in the foreground, is characterized by narrow, winding streets and high density. The tower in the foreground is the Karaouine Mosque. The colonial city laid out by the French is in the background, separate and distinct from the precolonial city.



CITIES SINCE INDEPENDENCE. Following independence, cities have become the focal points of change in developing countries. Millions of people have migrated to the cities in search of work.

In Mexico City, Emperor Maximilian (1864–1867) designed a 14-lane, tree-lined boulevard patterned after the Champs-Élysées in Paris. The boulevard (now known as the Paseo de la Reforma) extended 3 kilometers southwest from the center to Chapultepec (Figure 13-25). The Reforma between downtown and Chapultepec became the spine of an elite sector. During the late nineteenth century, the wealthy built pretentious palacios (palaces) along it. Physical factors also influenced the movement of wealthy people toward the west, along the Reforma. Because elevation was higher than elsewhere in the city, sewage flowed eastward and northward, away from Chapultepec. In 1903, most of Lake Texcoco was drained by a gigantic canal and tunnel project, allowing the city to expand to the north and east. The dried-up lakebed was a less desirable residential location than the west side because prevailing winds from the northeast stirred up dust storms. As Mexico City's population grew rapidly during the twentieth century, the social patterns inherited from the nineteenth century were reinforced.

CHECK-IN: KEY ISSUE 2

Where Are People Distributed Within Urban Areas?

- ✓ According to the concentric zone model, a city grows by adding rings. The outer rings contain the newer housing.
- ✓ According to the sector model, a city grows along corridors. Some sectors contain higher-income households than others.
- ✓ According to the multiple nuclei model, a city grows through a series of nodes. Different ethnicities cluster around individual nodes.
- ✓ The three models show some similarities and some differences in the patterns within cities of North America and other regions.
- ✓ Cities in developing countries are further influenced by colonial history.

▼ **FIGURE 13-25 INDEPENDENT MEXICO CITY** The Paseo de la Reforma, in the heart of the high-income sector, is traffic-free on Sunday mornings.



KEY ISSUE 3

Why Are Urban Areas Expanding?

- Suburban Expansion
- Suburban Segregation
- Urban Transportation

Learning Outcome 13.3.1

State three definitions of urban settlements.

In 1950, only 20 percent of Americans lived in suburbs compared to 40 percent in cities and 40 percent in small towns and rural areas. In 2000, after a half-century of rapid suburban growth, 50 percent of Americans lived in suburbs compared to only 30 percent in cities and 20 percent in small towns and rural areas.

Suburban Expansion

Until recently in the United States, as cities grew, they expanded by adding peripheral land. Now cities are surrounded by a collection of suburban jurisdictions whose residents prefer to remain legally independent of the large city.

THE PERIPHERAL MODEL

North American urban areas follow what Chauncey Harris (one of the creators of the multiple nuclei model) called the **peripheral model**. According to the peripheral model, an urban area consists of an inner city surrounded by large

▼ **FIGURE 13-26 PERIPHERAL MODEL OF URBAN AREAS** The central city is surrounded by a beltway or ring road. Around the beltway are suburban residential areas and nodes, or edge cities, where consumer and business services and manufacturing cluster. (Adapted from Chauncy D. Harris, "The Nature of Cities and Urban Geography in the Last Half Century." Reprinted with permission from *Urban Geography*, vol. 18, no. 1 (1997), p. 17. © V. H. Winston & Son, Inc., 360 South Ocean Blvd., Palm Beach, FL 33480. All rights reserved.)



suburban residential and business areas tied together by a beltway or ring road (Figure 13-26). Peripheral areas lack the severe physical, social, and economic problems of inner-city neighborhoods. But the peripheral model points to problems of sprawl and segregation that characterize many suburbs.

Around the beltway are nodes of consumer and business services called *edge cities*. Edge cities originated as suburban residences for people who worked in the central city, and then shopping malls were built to be near the residents. Now edge cities contain manufacturing centers spread out over a single story for more efficient operations and office parks where producer services cluster. Specialized nodes emerge in the edge cities—for example, a collection of hotels and warehouses around an airport, a large theme park, a distribution center near the junction of the beltway, and a major long-distance interstate highway.

DEFINING URBAN SETTLEMENTS

Several definitions have been created to characterize cities and their suburbs:

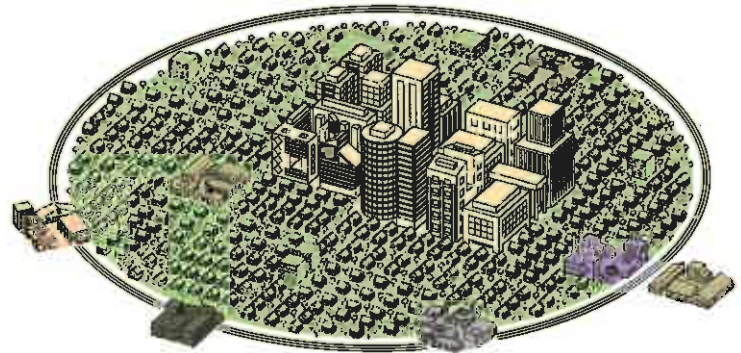
- A city is a legal entity.
- An urban area is a continuously built-up area.
- A metropolitan area is a functional area.

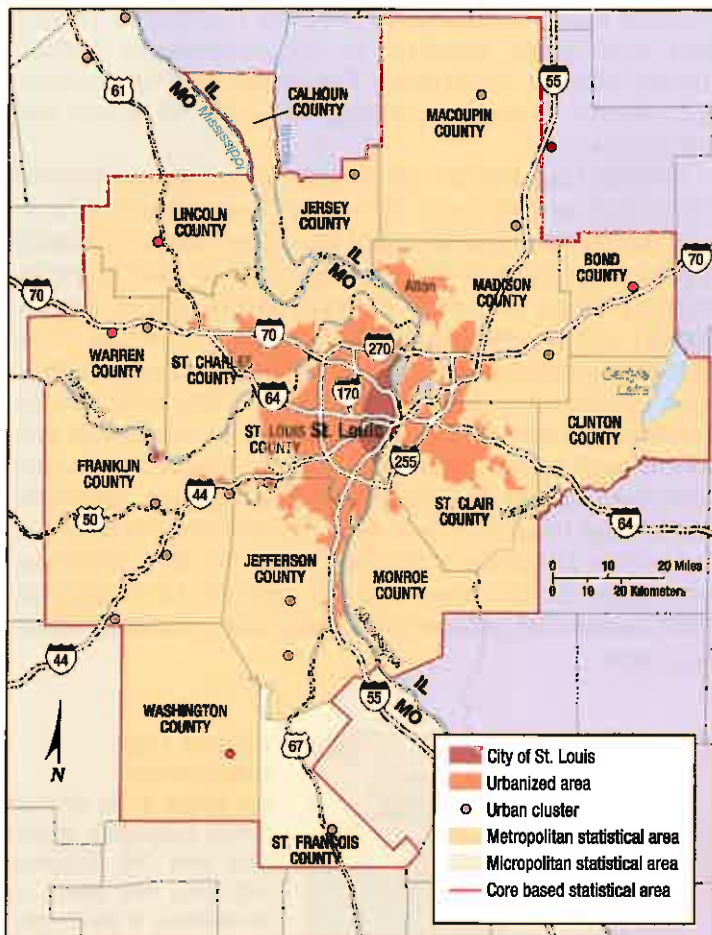
LEGAL DEFINITION OF CITY. The term **city** defines an urban settlement that has been legally incorporated into an independent, self-governing unit (Figure 13-27). In the United States, a city surrounded by suburbs is sometimes called a central city.

Virtually all countries have a local government system that recognizes cities as legal entities with fixed boundaries. A city has locally elected officials, the ability to raise taxes, and responsibility for providing essential services. The boundaries of the city define the geographic area within which the local government has legal authority.

Population has declined since 1950 by more than one-half in the central cities of Buffalo, Cleveland, Detroit, Pittsburgh, and St. Louis, and by at least one-third in more than a dozen other cities. The number of tax-paying middle-class families and industries has invariably declined by much higher percentages in these cities.

URBAN AREA. In the United States, the central city and the surrounding built-up suburbs are called an urban area.





▲ **FIGURE 13-27 DEFINITIONS OF ST LOUIS** The City of St. Louis comprises only 6 percent of the land area and 11 percent of the population of the MSA.

An **urban area** consists of a dense core of census tracts, densely settled suburbs, and low-density land that links the dense suburbs with the core. The census recognizes two types of urban areas:

- An **urbanized area** is an urban area with at least 50,000 inhabitants.
- An **urban cluster** is an urban area with between 2,500 and 50,000 inhabitants.

The census identified 486 urbanized areas and 3,087 urban clusters in the United States in 2010. Approximately 70 percent of the U.S. population lived in one of the 486 urbanized areas, including about 30 percent in central cities and 40 percent in surrounding jurisdictions. Approximately 10 percent of the U.S. population lived in one of the 3,087 urban clusters. The census does not have a precise definition of suburbs, but they can be considered roughly equivalent to the urban clusters and the urbanized areas outside the central cities.

Working with urbanized areas is difficult because few statistics are available about them. Most data in the United States and other countries are collected for cities, counties, and other local government units, but urbanized areas do not correspond to government boundaries. The term *urban area* also has limited applicability because it does not accurately reflect the full influence that an urban settlement has in contemporary society.

METROPOLITAN STATISTICAL AREA. The area of influence of a city extends beyond legal boundaries and adjacent built-up jurisdictions. For example, commuters may travel a long distance to work and shop in the city or built-up suburbs. People in a wide area watch the city's television stations, read the city's newspapers, and support the city's sports teams. Therefore, we need another definition of urban settlement to account for its more extensive zone of influence.

The U.S. Bureau of the Census has created a method of measuring the functional area of a city, known as the **metropolitan statistical area (MSA)**. An MSA includes the following:

- An urbanized area with a population of at least 50,000
- The county within which the city is located
- Adjacent counties with a high population density and a large percentage of residents working in the central city's county (specifically, a county with a density of 25 persons per square mile and at least 50 percent working in the central city's county)

Studies of metropolitan areas in the United States are usually based on information about MSAs. MSAs are widely used because many statistics are published for counties, the basic MSA building block.

The Census Bureau had designated 366 MSAs as of 2012, encompassing 84 percent of the U.S. population. Older studies may refer to SMSAs, or standard metropolitan statistical areas, which the census used before 1983 to designate metropolitan areas in a manner similar to MSAs. An MSA is not a perfect tool for measuring the functional area of a city. One problem is that some MSAs include extensive land area that is not urban. For example, Great Smoky Mountains National Park is partly in the Knoxville, Tennessee, MSA; Sequoia National Park is in the Visalia-Porterville, California, MSA. MSAs comprise some 20 percent of total U.S. land area, compared to only 2 percent for urbanized areas. The urbanized area typically occupies only 10 percent of an MSA land area but contains nearly 90 percent of its population.

The census has also designated smaller urban areas as **micropolitan statistical areas (μ SAs)**. A μ SA includes an urbanized area of between 10,000 and 50,000 inhabitants, the county in which it is found, and adjacent counties tied to the city. The United States had 576 micropolitan statistical areas as of 2012, for the most part found around southern and western communities previously considered rural in character. About 10 percent of Americans live in micropolitan statistical areas. The 366 MSAs and 576 μ SAs together are known as **core based statistical areas (CBSAs)**.

Recognizing that many MSAs and μ SAs have close ties, the census had combined some of them into 128 **combined statistical areas (CSAs)** as of 2012. A CSA is defined as two or more contiguous CBSAs tied together by commuting patterns. The 125 CSAs plus the remaining 187 MSAs and 406 μ SAs not combined into CSAs together are known as **primary census statistical areas (PCSAs)**.

Pause and Reflect 13.3.1

In what metropolitan or micropolitan statistical area do you live? Google [your city and state] statistical area.

OVERLAPPING METROPOLITAN AREAS

Learning Outcome 13.3.2:
Describe how metropolitan areas contain many local governments and overlap with each other.

A county between two central cities may send a large number of commuters to jobs in each. In the northeastern United States, large metropolitan areas are so close together that they now form one continuous urban complex, extending from north of Boston to south of Washington, D.C. Geographer Jean Gottmann named this region **Megalopolis**, a Greek word meaning "great city"; others have called it the Boswash corridor (Figure 13-28).

Other continuous urban complexes exist in the United States—the southern Great Lakes between Chicago and Milwaukee on the west and Pittsburgh on the east, and southern California, from Los Angeles to Tijuana. Among important examples in other developed countries are the

German Ruhr (including the cities of Dortmund, Düsseldorf, and Essen), Randstad in the Netherlands (including the cities of Amsterdam, The Hague, and Rotterdam), and Japan's Tokaido (including the cities of Tokyo and Yokohama).

Within Megalopolis, the downtown areas of individual cities such as Baltimore, New York, and Philadelphia retain distinctive identities, and the urban areas are visibly separated from each other by open space used as parks, military bases, and dairy or truck farms. But at the periphery of the urban areas, the boundaries overlap. Once considered two separate areas, Washington and Baltimore were combined into a single MSA after the 1990 census. Washingtonians visit the Inner Harbor in downtown Baltimore, and Baltimoreans attend major-league hockey and basketball games in downtown Washington. However, combining them into one MSA did not do justice to the distinctive character of the two cities, so the Census Bureau again divided them into two separate MSAs after the 2000 census but grouped them into one combined statistical area.



FIGURE 13-28
MEGALOPOLIS
 Also known as the Boswash corridor, Megalopolis extends more than 700 kilometers (440 miles) from Boston on the northeast to Washington, D.C., on the southwest. Megalopolis contains one-fourth of the U.S. population on 2 percent of the country's total land area.

LOCAL GOVERNMENT FRAGMENTATION

The fragmentation of local government in the United States makes it difficult to solve regional problems of traffic management, solid-waste disposal, and the building of affordable housing. According to the 2002 census, the United States had 87,525 local governments, including 3,034 counties, 19,429 cities, 16,504 townships, 13,506 school districts, and 35,052 special-purpose districts, such as police and fire. The larger metropolitan areas have thousands of local governments, with widely varying levels of wealth (Figure 13-29).

The large number of local government units has led to calls for a metropolitan government that could coordinate—if not replace—the numerous local governments in an urban area. Most U.S. metropolitan areas have a **council of government**, which is a cooperative agency consisting of representatives of the various local governments in the region. The council of government may be empowered to do some overall planning for the area that local governments cannot logically do. Strong metropolitan-wide governments have been established in a few places in North America. Two kinds exist:

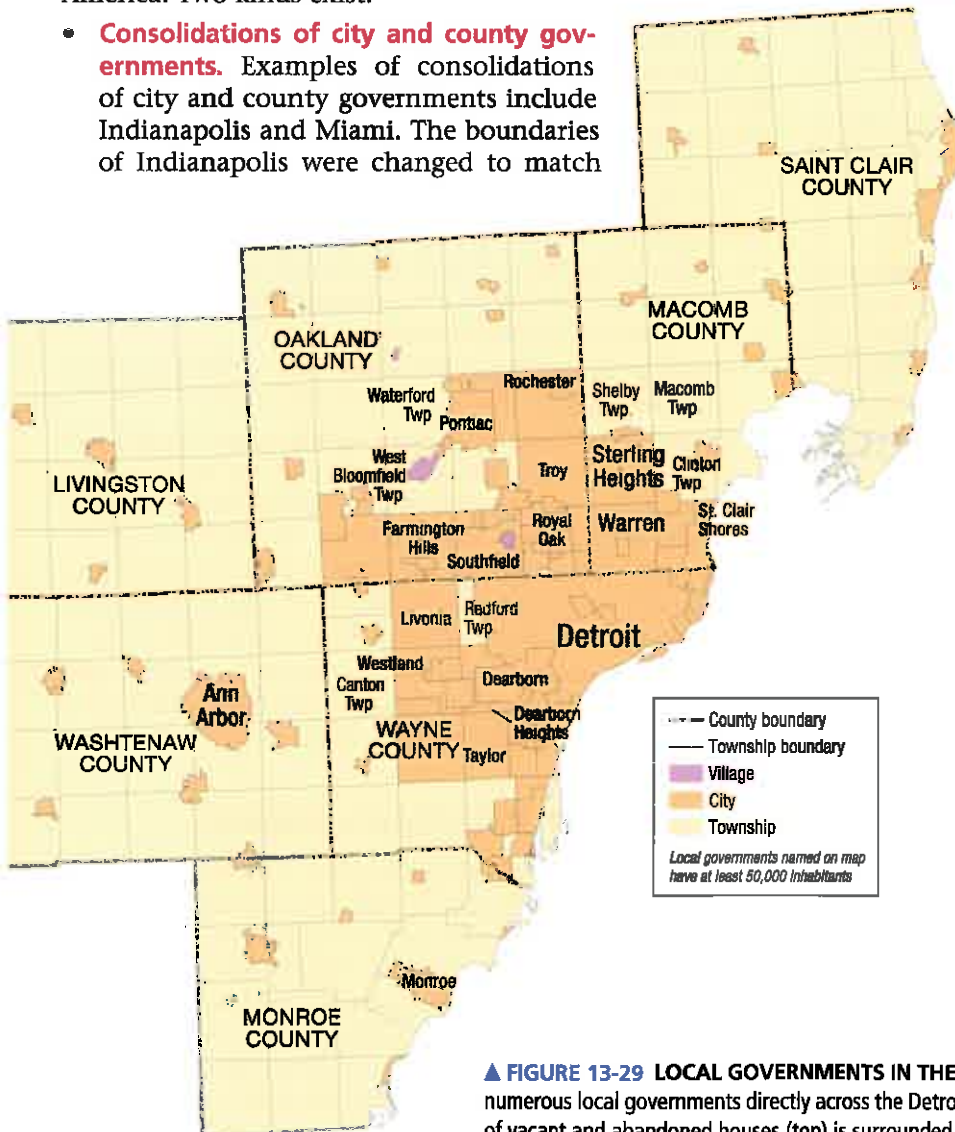
- **Consolidations of city and county governments.** Examples of consolidations of city and county governments include Indianapolis and Miami. The boundaries of Indianapolis were changed to match

those of Marion County, Indiana. Government functions that were handled separately by the city and the county now are combined into a joint operation in the same office building. In Florida, the city of Miami and surrounding Dade County have combined some services, but the city boundaries have not been changed to match those of the county.

- **Federations.** Examples of federations include Toronto and other large Canadian cities. Toronto's metropolitan government was created in 1953, through a federation of 13 municipalities. A two-tier system of government existed until 1998, when the municipalities were amalgamated into a single government.

Pause and Reflect 13.3.2

Canada has a method of delineating urban and metropolitan areas of various sizes. If the Canadian side of Lake Ontario were colored in Figure 13-28, most of it would also be urban. What is the largest city and metropolitan area on the Canadian side of Lake Ontario?



▲ **FIGURE 13-29 LOCAL GOVERNMENTS IN THE DETROIT METROPOLITAN AREA** The map does not include numerous local governments directly across the Detroit River in Canada. The city of Detroit, which has a large number of vacant and abandoned houses (top) is surrounded by wealthy suburbs (bottom).

ANNEXATION

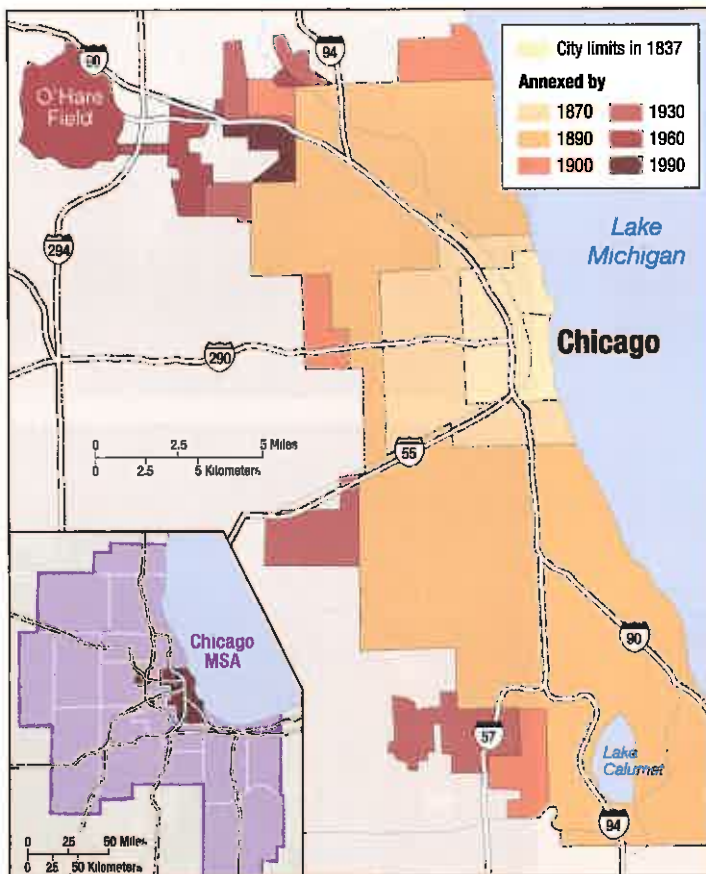
Learning Outcome 13.3.3

Understand historical and contemporary patterns of suburban expansion.

The process of legally adding land area to a city is **annexation**. Rules concerning annexation vary among states. Normally, land can be annexed to a city only if a majority of residents in the affected area vote in favor of the annexation.

Peripheral residents generally desired annexation in the nineteenth century because the city offered better services, such as water supply, sewage disposal, trash pickup, paved streets, public transportation, and police and fire protection. Thus, as U.S. cities grew rapidly in the nineteenth century, the legal boundaries frequently changed to accommodate newly developed areas. For example, the city of Chicago expanded from 26 square kilometers (10 square miles) in 1837 to 492 square kilometers (190 square miles) in 1900 (Figure 13-30).

Today, however, cities are less likely to annex peripheral land because the residents prefer to organize their own services rather than pay city taxes for them. Originally, some of these peripheral jurisdictions were small, isolated towns



▲ **FIGURE 13-30 ANNEXATION IN CHICAGO** During the nineteenth century, the city of Chicago grew rapidly through annexation of peripheral land. Relatively little land was annexed during the twentieth century; the major annexation was on the northwest side, for O'Hare Airport. The inset shows that the city of Chicago covers only a small portion of the Chicago metropolitan statistical area.

that had a tradition of independent local government before being swallowed up by urban growth. Others are newly created communities whose residents wish to live close to the large city but not be legally part of it.

Pause and Reflect 13.3.3

The three largest cities in Ohio are Cincinnati, Cleveland, and Columbus. In 1950, Cincinnati's land area was 72 square miles, Cleveland's was 75 square miles, and Columbus's was 40 square miles. Which of the three cities has increased its land area substantially since 1950? Refer to each city's Wikipedia site to find the current land areas. What might account for the large increase?

DENSITY GRADIENT

As you travel outward from the center of a city, you can watch the decline in the density at which people live (Figure 13-31). Inner-city apartments or row houses may pack as many as 250 dwellings on a hectare of land (100 dwellings per acre). Older suburbs have larger row houses, semidetached houses, and individual houses on small lots, at a density of about 10 houses per hectare (4 houses per acre). A detached house typically sits on a lot of 0.25 to 0.5 hectares (0.6 to 1.2 acres) in new suburbs and a lot of 1 hectare or greater (2.5 acres) on the fringe of the built-up area.

This density change in an urban area is called the **density gradient**. According to the density gradient, the number of houses per unit of land diminishes as distance from the center city increases. Two changes have affected the density gradient in recent years:

- **Fewer people living in the center.** The density gradient thus has a gap in the center, where few live.
- **Fewer differences in density within urban areas.** The number of people living on a hectare of land has decreased in the central residential areas through population decline and abandonment of old housing. At the same time, density has increased on the periphery through construction of apartment and town-house projects and diffusion of suburbs across a larger area.

These two changes flatten the density gradient and reduce the extremes of density between inner and outer areas traditionally found within cities.

THE COST OF SUBURBAN SPRAWL

A flattening of the density gradient for a metropolitan area means that its people and services are spread out over a larger area. U.S. suburbs are characterized by **sprawl**, which is the progressive spread of development over the landscape. When private developers select new housing sites, they seek cheap land that can easily be prepared for construction—land often not contiguous to the existing built-up area (Figure 13-32). Sprawl is also fostered by the desire of many families to own large tracts of land.

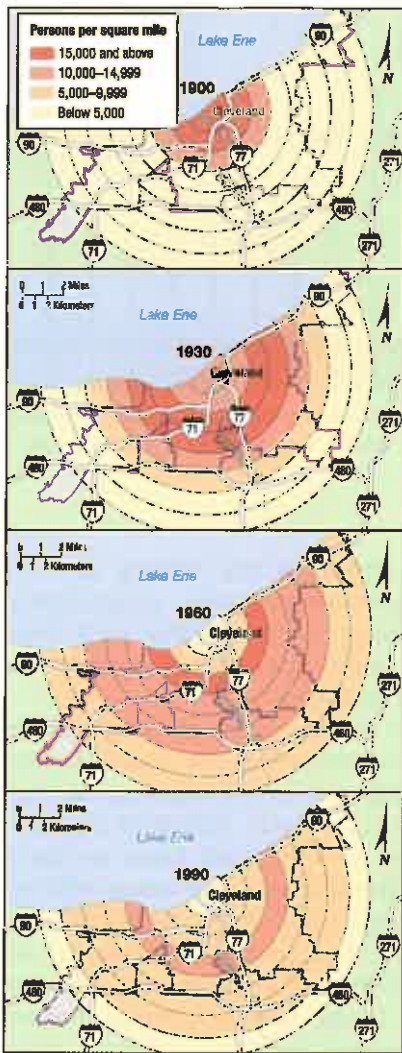


FIGURE 13-31 DENSITY GRADIENT IN CLEVELAND In 1900, the population was highly clustered in and near the central business district (CBD). By 1930 and 1960, the population was spreading, leaving the original core less dense. By 1990, the population was distributed over a much larger area, the variation in the density among different rings was much less, and the area's lowest densities existed in the rings near the CBD. The current boundary of the city of Cleveland is shown. (First three maps adapted from Avery M. Guest, "Population Suburbanization in American Metropolitan Areas, 1940-1970," *Geographical Analysis* 7 (1975): 267-283, table 4. Used by permission of the publisher.)

As long as demand for single-family detached houses remains high, land on the fringe of urban areas will be converted from open space to residential land use. Land is not transformed immediately from farms to housing developments. Instead, developers buy farms for future construction of houses by individual builders. Developers frequently reject land adjacent to built-up areas in favor of detached isolated sites, depending on the price and physical attributes of the alternatives. The peripheries of U.S. cities therefore look like Swiss cheese, with pockets of development and gaps of open space.

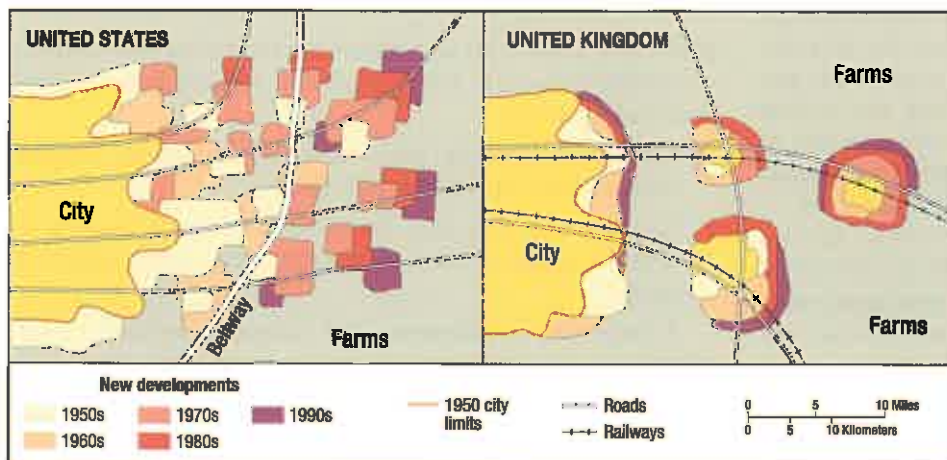
Urban sprawl has some undesirable traits. Roads and utilities must be extended to connect isolated new developments to nearby built-up areas. The cost of these new roads and utilities may be funded by taxes, or the developer may install the services and pass on the cost to new residents through higher home prices. Sprawl also wastes land. Some

prime agricultural land may be lost through construction of isolated housing developments. In the interim, other sites lie fallow while speculators await the most profitable time to build homes on them. In reality, sprawl has little impact on the total farmland in the United States, but it does reduce the ability of city dwellers to get to the country for recreation, and it can affect the supply of local dairy products and vegetables. Low-density suburbs also waste more energy, especially because motor vehicles are required for most trips.

The supply of land for the construction of new housing is more severely restricted in European urban areas than in the United States. Officials attack sprawl by designating areas of mandatory open space. London, Birmingham, and several other British cities are surrounded by greenbelts, or rings of open space. New housing is built either in older suburbs inside the greenbelts or in planned extensions to small towns and new towns beyond the greenbelts. However, restriction of the supply of land on the urban periphery has driven up house prices in Europe.

Several U.S. states have taken strong steps in the past few years to curb sprawl, reduce traffic congestion, and reverse inner-city decline. The goal is to produce a pattern of compact and contiguous development and protect rural land for agriculture, recreation, and wildlife. Legislation and regulations to limit suburban sprawl and preserve farmland has been called **smart growth**. Oregon and Tennessee have defined growth boundaries within which new development must occur. Cities can annex only lands that have been included in the urban growth areas. New Jersey, Rhode Island, and Washington were also early leaders in enacting strong state-level smart-growth initiatives. Maryland's smart-growth law discourages the state from funding new highways and other projects that would extend suburban sprawl and destroy farmland. State money must be spent to "fill in" already urbanized areas.

FIGURE 13-32 SUBURBAN DEVELOPMENT PATTERNS IN THE UNITED KINGDOM AND THE UNITED STATES The United States has much more sprawl than the United Kingdom. In the United Kingdom, new housing is more likely to be concentrated in new towns or planned extensions of existing small towns (right), whereas in the United States, growth occurs in discontinuous developments.



Segregation in the Suburbs

Learning Outcome 13.3.4

Explain two ways in which suburbs are segregated.

Public opinion polls in the United States show people's strong desire for suburban living. In most polls, more than 90 percent of respondents prefer the suburbs to the inner city. It is no surprise then that the suburban population has grown much faster than the overall population in the United States.

Suburbs offer varied attractions—a detached single-family dwelling rather than a row house or an apartment, private land surrounding the house, space to park cars, and a greater opportunity for home ownership. A suburban house provides space and privacy, a daily retreat from the stress of urban living. Families with children are especially attracted to suburbs, which offer more space for play and protection from the high crime rates and heavy traffic that characterize inner-city life. As incomes rose in the twentieth century, first in the United States and more recently in other developed countries, more families were able to afford to buy suburban homes.

The modern residential suburb is segregated in two ways:

- **Segregated social classes.** Housing in a given suburban community is usually built for people of a single social class, with others excluded by virtue of the cost, size, or location of the housing. Segregation by race and ethnicity also persists in some suburbs (see Chapter 7).
- **Segregated land uses.** Residents are separated from commercial and manufacturing activities that are confined to compact, distinct areas.

RESIDENTIAL SEGREGATION

The homogeneous suburb was a twentieth-century phenomenon. Before then, activities and classes in a city were more likely to be separated vertically rather than horizontally. In a typical urban building, shops were on the street level, with the shop owner or another well-to-do family living on one or two floors above the shop. Poorer people lived on the higher levels or in the basement, the least attractive parts of the building. The basement was dark and damp, and before the elevator was invented, the higher levels could be reached only by climbing many flights of stairs. Wealthy families lived in houses with space available in the basement or attic to accommodate servants.

Once cities spread out over much larger areas, the old pattern of vertical separation was replaced by territorial segregation. Large sections of the city were developed with houses of similar interior dimension, lot size, and cost, appealing to people with similar incomes and lifestyles. Zoning ordinances, developed in Europe and North America in the early decades of the twentieth century, encouraged



▲ **FIGURE 13-33 HOUSING SEGREGATION: GATED COMMUNITY** Dana Point, California, a Los Angeles suburb, has a gated community called Lantern Bay.

spatial separation. They prevented the mixing of land uses within the same district. In particular, single-family houses, apartments, industry, and commerce were kept apart because the location of one activity near another was considered unhealthy and inefficient.

The strongest criticism of U.S. residential suburbs is that low-income people and minorities are unable to live in them because of the high cost of the housing and the unfriendliness of established residents. Suburban communities discourage the entry of those with lower incomes and minorities because of fear that property values will decline if the high-status composition of the neighborhood is altered. Legal devices, such as requiring each house to sit on a large lot and the prohibition of apartments, prevent low-income families from living in many suburbs. Fences are built around some housing areas, and visitors must check in at a gate house to enter (Figure 13-33).

Pause and Reflect 13.3.4

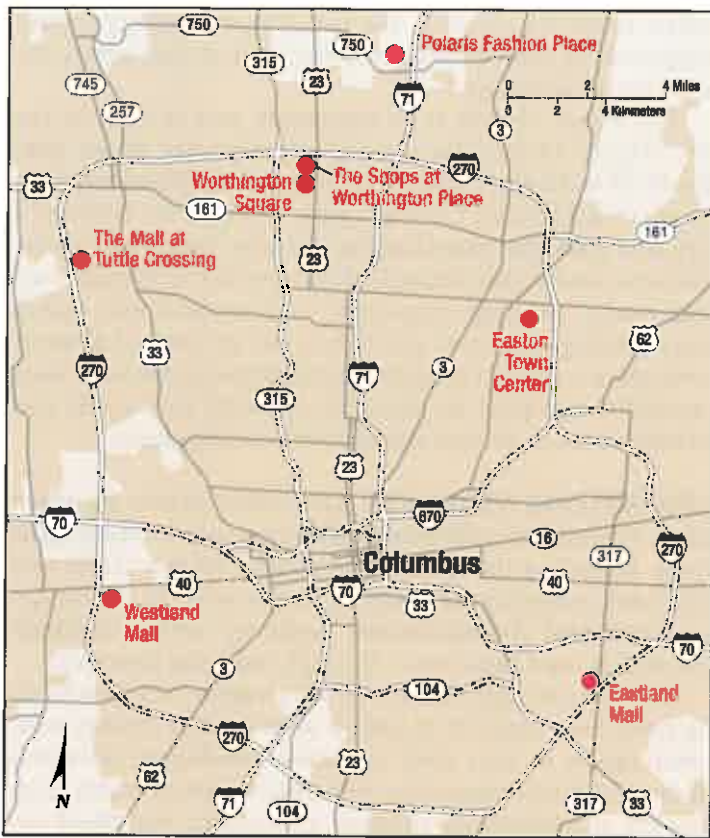
Are you able to walk from your home to consumer services? What do you think explains the spatial pattern of residential and commercial land uses in the area where you live?

SUBURBANIZATION OF BUSINESSES

Many nonresidential activities have moved to the suburbs. A number of factors account for this long-established and continuing trend:

- Consumer services have moved to suburbs because most of their customers live there.
- Business services and manufacturers have moved to suburbs because land is cheaper and more plentiful there.

A large node of business and consumer services in the suburbs of an urban area is known as an **edge city**. Edge cities are planned around freeway exits and are designed to be navigable only in motor vehicles.



▲ **FIGURE 13-34 SHOPPING MALLS NEAR COLUMBUS, OHIO** The malls surround the city near the beltway. (right) Easton Town Center is the largest mall in the Columbus area.

SUBURBANIZATION OF CONSUMER SERVICES. Suburban residential growth has fostered change in traditional retailing patterns (Figure 13-34). Historically, urban residents bought food and other daily necessities at small neighborhood shops in the midst of housing areas and shopped in the CBD for other products. But since the end of World War II, downtown sales have not increased, whereas suburban sales have risen at an annual rate of 5 percent. Downtown sales have stagnated because suburban residents who live far from the CBD don't make the long journey there. At the same time, small corner shops do not exist in the midst of newer residential suburbs. The low density of residential construction discourages people from walking to stores, and restrictive zoning practices often exclude shops from residential areas.

Instead, retailing has been increasingly concentrated in planned suburban shopping malls of varying sizes. Corner shops have been replaced by supermarkets in small shopping centers. Larger malls contain department stores and specialty shops traditionally located only in the CBD. Generous parking lots surround the stores. A shopping mall is built by a developer, who buys the land, builds the structures, and leases space to individual merchants. Typically, a merchant's rent is a percentage of sales revenue.

Shopping malls require as many as 40 hectares (100 acres) of land and are frequently near key road junctions,



such as the interchange of two interstate highways. Some shopping malls are elaborate multilevel structures exceeding 100,000 square meters (1 million square feet), with more than 100 stores arranged along covered walkways, and surrounded by an extensive parking area. The key to a successful large shopping mall is the inclusion of one or more anchors, usually large department stores. Most consumers go to a mall to shop at an anchor and, while there, patronize the smaller shops. In smaller shopping centers, the anchor is frequently a supermarket or discount store.

Malls have become centers for activities in suburban areas that lack other types of community facilities. Retired people go to malls for safe, vigorous walking exercise, or they sit on a bench to watch the passing scene. Teenagers arrive after school to meet their friends. Concerts and exhibitions are frequently set up in malls.

SUBURBANIZATION OF BUSINESS SERVICES AND FACTORIES. Offices that do not require face-to-face contact are increasingly moving to suburbs, where rents are lower than in the CBD. Executives can drive on uncongested roads to their offices from their homes in nearby suburbs and park their cars without charge. For other employees, though, suburban office locations can pose a hardship. Secretaries, custodians, and other lower-status office workers may not have cars, and public transportation may not serve the site. Other office workers might miss the stimulation and animation of a central location, particularly at lunchtime.

Factories and warehouses have migrated to suburbia for more space, cheaper land, and better truck access. Modern factories and warehouses demand more land because they spread their conveyor belts, forklift trucks, loading docks, and machinery over a single level for efficient operation. Suburban locations also facilitate truck shipments by providing good access to main highways and no central city traffic congestion, which is important because industries increasingly receive inputs and distribute products by truck.

Urban Transportation

Learning Outcome 13.3.5

Describe the impact of motor vehicles in urban areas.

People do not travel aimlessly; their trips have a precise point of origin, destination, and purpose. More than half of all trips are work related—commuting between work and home, business travel, or deliveries. Shopping or other personal business and social journeys each account for approximately one-fourth of all trips. Together, all these trips produce congestion in urban areas. Congestion imposes costs on individuals and businesses by delaying arrival at destinations, and the high concentration of slowly moving vehicles produces increased air pollution.

Historically, the growth of suburbs was constrained by poor transportation. People lived in crowded cities because they had to be within walking distance of shops and places of employment. The invention of the railroad in the nineteenth century enabled people to live in suburbs and work in the central city. Cities then built railroads at street level (called trolleys, streetcars, or trams) and underground (subways) to accommodate commuters. Many so-called streetcar suburbs built in the nineteenth century still exist and retain unique visual identities. They consist of houses and shops clustered near a station or former streetcar stop at a much higher density than is found in newer suburbs.

MOTOR VEHICLES

The suburban explosion in the twentieth century relied on motor vehicles rather than railroads, especially in the United States. Rail lines restricted nineteenth-century suburban development to narrow ribbons within walking distance of the stations. Cars and trucks permitted large-scale development of suburbs at greater distances from the center, in the gaps between the rail lines. Motor vehicle drivers have much greater flexibility in their choice of residence than was ever before possible.

Motor vehicle ownership is nearly universal among American households, with the exception of some poor families, older individuals, and people living in the centers of large cities such as New York. More than 95 percent of all trips within U.S. cities are made by car, compared to fewer than 5 percent by bus or rail. Outside the big cities, public transportation service is extremely rare or nonexistent. The U.S. government has encouraged the use of cars and trucks by paying 90 percent of the cost of limited-access, high-speed interstate highways, which stretch for 74,000 kilometers (46,000

miles) across the country. The use of motor vehicles is also supported by policies that keep the price of fuel below the level found in Europe.

The motor vehicle is an important user of land in the city (Figure 13-35). An average city allocates about one-fourth of its land to roads and parking lots. Multilane freeways cut a 23-meter (75-foot) path through the heart of a city, and elaborate interchanges consume even more space. Valuable land in the central city is devoted to parking cars and trucks, although expensive underground and multi-story parking structures can reduce the amount of ground-level space needed. European and Japanese cities have been especially disrupted by attempts to insert new roads and parking areas in or near the medieval central areas.

CONTROLLING VEHICLES. The future health of urban areas depends on relieving traffic congestion. Geographic tools, including the Global Positioning System (GPS) and electronic mapping, are playing central roles in the design of intelligent transportation systems, either through increasing road capacity or through reducing demand.

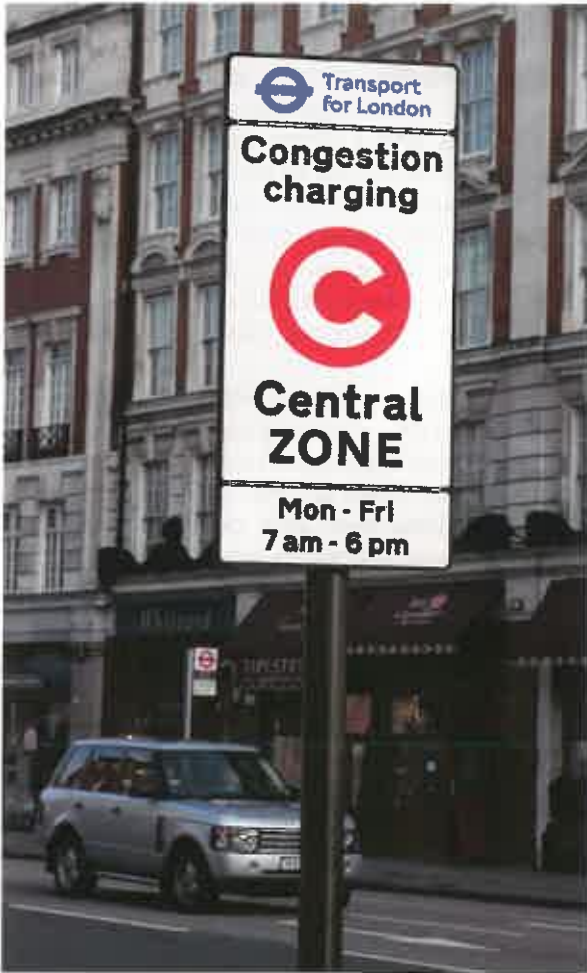
The current generation of innovative techniques to increase road capacity is aimed at providing drivers with information so that they can make intelligent decisions about avoiding congestion. Information about traffic congestion is transmitted through computers, handheld devices, and vehicle monitors. Traffic hot spots are displayed on electronic maps and images, using information collected through sensors in the roadbeds and cameras placed at strategic locations. An individual wishing to know about a particular route can program an electronic device to receive a congestion alert and to suggest alternatives. Radio stations in urban areas broadcast reports to advise motorists of accidents or especially congested highways.

Demand to use congested roads is being reduced in a number of ways:

- **Congestion charges.** In London, motorists must pay a congestion charge of up to £12 (\$18) to drive into

▼ **FIGURE 13-35 URBAN EXPRESSWAY** San Francisco, like most other U.S. cities, had major expressways constructed into the center of the city.





▲ **FIGURE 13-36 LONDON CONGESTION CHARGE** The sign warns motorists that they must pay a charge to drive into Central London at certain times.

the central area between 7 A.M. and 6 P.M. Monday through Friday (Figure 13-36). A similar system exists in Stockholm, where the charge varies depending on the time of day.

- **Tolls.** In Toronto and several California cities, motorists are charged higher tolls to drive on freeways during congested times than at other times. A transponder attached to a vehicle records the time of day it is on the highway. A monthly bill sent to the vehicle's owner reflects the differential tolls.
- **Permits.** In Singapore, to be permitted to drive downtown during the busiest times of the day, a motorist must buy a license and demonstrate ownership of a parking space. The government limits the number of licenses and charges high tolls to drive downtown. Several cities in China intend to require permits to drive in congested areas.



▲ **FIGURE 13-37 DRIVERLESS CAR** Google has developed technology enabling vehicles to be driven by sensors, electronic maps, and cameras.

- **Bans.** Cars have been banned from portions of the central areas of a number of European cities, including Copenhagen, Munich, Vienna, and Zurich.

Future intelligent transportation systems are likely to increase capacity through hands-free driving (Figure 13-37). A motorist will drive to a freeway entrance, where the vehicle will be subjected to a thorough diagnostic (taking a half-second) to ensure that it has enough fuel and is in good operating condition. A menu will offer a choice of predetermined destinations, such as "home" or "office," or a destination can be programmed by hand.

Pause and Reflect 13.3.5

Which methods of easing congestion appear to you to be most likely to be successful?

A release will send the vehicle accelerating automatically on the entrance ramp onto the freeway. Sensors in the bumpers and fenders, attached to radar or GPS, will alert vehicle systems to accelerate, brake, or steer, as needed. With such a system, spacing between vehicles can be as little as 2 meters. While a vehicle is automatically controlled, the "driver" will be able to swivel the seat to a workstation to make phone calls, check e-mail, or surf the Internet; read; watch television; or nap. When the vehicle nears the programmed freeway exit, a tone will warn that the driver will have to take back control. The vehicle will halted on the exit ramp until the driver firmly presses the brake to release the "autodrive" system, much as cruise control is currently disengaged.

PUBLIC TRANSIT

Learning Outcome 13.3.6

State the benefits and limitations of public transportation.

Because few people live within walking distance of their place of employment, urban areas are characterized by extensive commuting. The heaviest flow of commuters is into the CBD in the morning and out of it in the evening.

The intense concentration of people in the CBD during working hours strains transportation systems because a large number of people must reach a small area of land at the same time in the morning and disperse at the same time in the afternoon. As much as 40 percent of all trips made into or out of a CBD occur during four hours of the day—two in the morning and two in the afternoon. **Rush hour**, or peak hour, is the four consecutive 15-minute periods that have the heaviest traffic.

PUBLIC TRANSIT IN THE UNITED STATES. In the United States, public transit is used primarily for rush-hour commuting by workers into and out of the CBD. One-half of trips to work are by public transit in New York; one-third in Boston, San Francisco, and Washington; and one-fourth in Chicago and Philadelphia. But in most other cities, public transit service is minimal or nonexistent.

Despite the obvious advantages of public transportation for commuting, only 5 percent of work trips are by public transit in the United States. Overall, public transit ridership in the United States declined from 23 billion per year in the 1940s to 10 billion in 2011. The average American wastes 14 gallons of gasoline and loses 34 hours per year sitting in traffic jams, according to the Urban Mobility Report prepared by the Texas Transportation Institute. In the United States, the total cost of congestion is valued at \$101 billion per year. But most Americans still prefer to commute by vehicle. Most people overlook these costs because they place higher value on the privacy and flexibility of schedule offered by a car.

Early in the twentieth century, U.S. cities had 50,000 kilometers (30,000 miles) of street railways and trolleys that carried 14 billion passengers a year, but only a few hundred kilometers of track remain. The number of U.S. and Canadian cities with trolley service declined from approximately 50 in 1950 to 8 in the 1960s. General Motors acquired many of the privately owned streetcar companies and replaced the trolleys with buses that the company made. Buses offer more flexible service than do trolleys because they are not restricted to fixed tracks. However, bus ridership in the United States declined from a peak of 11 billion riders annually in the late 1940s to 5 billion in 2011. Commuter railroad service, like trolleys and buses, has also been drastically reduced in most U.S. cities.

RAPID TRANSIT. The one exception to the downward trend in public transit in the United States is rapid transit. It is known to transportation planners as either fixed heavy rail (such as subways) or fixed light rail (such as streetcars). Cities such as Boston and Chicago have attracted new passengers through construction of new subway lines and modernization of existing service (Figure 13-38). Chicago has been a pioneer in the construction of heavy-rail rapid transit lines in the median strips of expressways. Entirely new subway systems have been built in recent years in U.S. cities, including Atlanta, Baltimore, Miami, San Francisco, and Washington.

The federal government has permitted Boston, New York, and other cities to use funds originally allocated for interstate highways to modernize rapid transit service instead. New York's subway cars, once covered with graffiti spray-painted by gang members, have been cleaned so that passengers can ride in a more hospitable environment. As a result of these improvements, subway ridership in the United States increased from 2 billion in 1995 to 3.6 billion in 2011.

The trolley—now known by the more elegant term fixed light-rail transit—was once relegated almost exclusively to a tourist attraction in New Orleans and San Francisco but is making a modest comeback in North America. New trolley lines have been built or are under construction in Baltimore, Buffalo, Calgary, Edmonton, Los Angeles, Portland



▲ **FIGURE 13-38 BOSTON PUBLIC TRANSIT** Boston's subway system, known as "the T," includes heavy rail (top) and light rail (bottom).

(Oregon), Sacramento, St. Louis, San Diego, and San Jose. Ridership in all cities combined was a half-billion in 2011.

California, the state that most symbolizes the automobile-oriented American culture, is the leader in construction of new fixed light-rail transit lines. San Diego has added more kilometers than any other city. One line that runs from the CBD south to the Mexican border has been irreverently dubbed the “Tijuana trolley” because it is heavily used by residents of nearby Tijuana, Mexico. Los Angeles—the city perhaps most associated with the motor vehicle—has planned the most extensive new light-rail system. The city had a rail network exceeding 1,600 kilometers (1,000 miles) as recently as the late 1940s, but the lines were abandoned when freeways were built to accommodate increasing automobile usage. Now Los Angeles wants to entice motorists out of their cars and trucks with new light-rail lines, but construction is very expensive, and the lines serve only a tiny percentage of the region.

The minimal level of public transit service in most U.S. cities means that low-income people may not be able to reach places of employment. Low-income people tend to live in inner-city neighborhoods, but the job opportunities, especially those requiring minimal training and skill in personal services, are in suburban areas not well served by public transportation. Inner-city neighborhoods have high unemployment rates at the same time that suburban firms have difficulty attracting workers. In some cities, governments and employers subsidize vans to carry low-income inner-city residents to suburban jobs.

Pause and Reflect 13.3.6

What strategies are being used at your college or school district to reduce dependency on private motor vehicles?

PUBLIC TRANSIT IN OTHER COUNTRIES. In dozens of major cities around the world, extensive networks of bus, tram, and subway lines have been maintained, and funds for new construction have been provided in recent years (Figure 13-39). Smaller cities have shared the construction boom. In France, new subway lines have been built since the 1970s in Lille, Lyon, and Marseille, and hundreds of kilometers of entirely new tracks have been laid between the country’s major cities to operate a high-speed train known as the TGV (Trains à Grande Vitesse). Growth in the suburbs has stimulated nonresidential construction, including suburban shops, industry, and offices.

Despite modest recent successes, public transit in the United States is caught in a vicious circle because fares do not cover operating costs. As patronage declines and expenses rise, the fares are increased, which drives away passengers and leads to service reduction and still higher fares. Public expenditures to subsidize construction and operating costs have increased, but the United States does not fully recognize that public transportation is a vital utility deserving of subsidy to the degree long assumed by governments in other developed countries, as well as developing countries.



FIGURE 13-39 BRUSSELS, BELGIUM, METRO AND TRAM European cities such as Brussels have invested substantially in improving public transportation in recent years. Brussels provides a good example of a public transport system that integrates heavy rail (Métro) with light rail (trams). Trams initially used Métro tunnels, but the tunnels were large enough to convert to heavy-rail lines as funds became available.

ADVANTAGES OF PUBLIC TRANSIT

Learning Outcome 13.3.7

Describe recent and possible future improvements in vehicles.

In larger cities, public transit is better suited than motor vehicles to moving large numbers of people because each transit traveler takes up far less space. Public transportation is cheaper, less polluting, and more energy efficient than privately operated motor vehicles. It also is particularly suited to rapidly bringing a large number of people into a small area. A bus can accommodate 30 people in the amount of space occupied by one car, whereas a double-track rapid transit line can transport the same number of people as 16 lanes of urban freeway.

Motor vehicles have costs beyond their purchase and operation—including delays imposed on others, increased need for highway maintenance, construction of new highways, and pollution. One-third of the high-priced central land is devoted to streets and parking lots, although multi-story and underground garages also are constructed.

THE CAR OF THE FUTURE

Consumers in developed countries are reluctant to give up their motor vehicles, and demand for vehicles is soaring in developing countries. One of the greatest challenges to reducing pollution and conserving nonrenewable resources is reliance on petroleum as automotive fuel, so carmakers are scrambling to bring alternative-fuel vehicles to the market. The Department of Energy forecasts that around one-half of all new vehicles sold in the United States in 2020 will be powered by an alternative to the conventional gas engine. Alternative technologies include diesel, biofuel, hybrid, electric, and hydrogen.

DIESEL. Diesel engines burn fuel more efficiently, with greater compression, and at a higher temperature than conventional gas engines. Most new vehicles in Europe are diesel powered, where they are valued for zippy acceleration on crowded roads, as well as for high fuel efficiency. Diesels have made limited inroads in the United States, where they were identified with ponderous heavy trucks, poorly performing versions in the 1980s, and generation of more pollutants. Biodiesel fuel mixes petroleum diesel with biodiesel (typically 5 percent), which is produced from vegetable oils or recycled restaurant grease.

HYBRID. Sales of hybrids increased rapidly during the first decade of the twenty-first century, led by Toyota's success with the hybrid Prius. A gasoline engine powers the vehicle at high speeds, and at low speeds, when the gas engine is at its least efficient, an electric motor takes over. Energy that



▲ **FIGURE 13-40 PLUG-IN HYBRID** Chevrolet Volt cars are being recharged outside the factory in Detroit where they are assembled.

would otherwise be wasted in coasting and braking is also captured as electricity and stored until needed.

ETHANOL. Ethanol is fuel made by distilling crops such as sugarcane, corn, and soybeans. Sugarcane is distilled for fuel in Brazil, where most vehicles run on ethanol. In the United States, corn has been the principal crop for ethanol, but this has proved controversial because the amount of fossil fuels needed to grow and distill the corn is comparable to—and possibly greater than—the amount saved in vehicle fuels. Furthermore, growing corn for ethanol diverts corn from the food chain, thereby allegedly causing higher food prices in the United States and globally. More promising is ethanol distilled from cellulosic biomass, such as trees and grasses.

FULL ELECTRIC. A full electric vehicle has no gas engine. When the battery is discharged, the vehicle will not run until the battery is recharged by plugging it into an outlet. Motorists can make trips in a local area and recharge the battery at night. Out-of-town trips are difficult because recharging opportunities are scarce. In large cities, a number of downtown garages and shopping malls have recharging stations, but few exist in rural areas.

PLUG-IN HYBRID. In a plug-in hybrid, the battery supplies the power at all speeds. It can be recharged in one of two ways: While the car is moving, the battery can be recharged by a gas engine or, when it is parked, the car can be recharged by plugging into an electrical outlet (Figure 13-40). The principal limitation of a full electric vehicle has been the short range of the battery before it needs recharging. Using a gas engine to recharge the battery extends the range of the plug-in hybrid to that of a conventional gas engine.

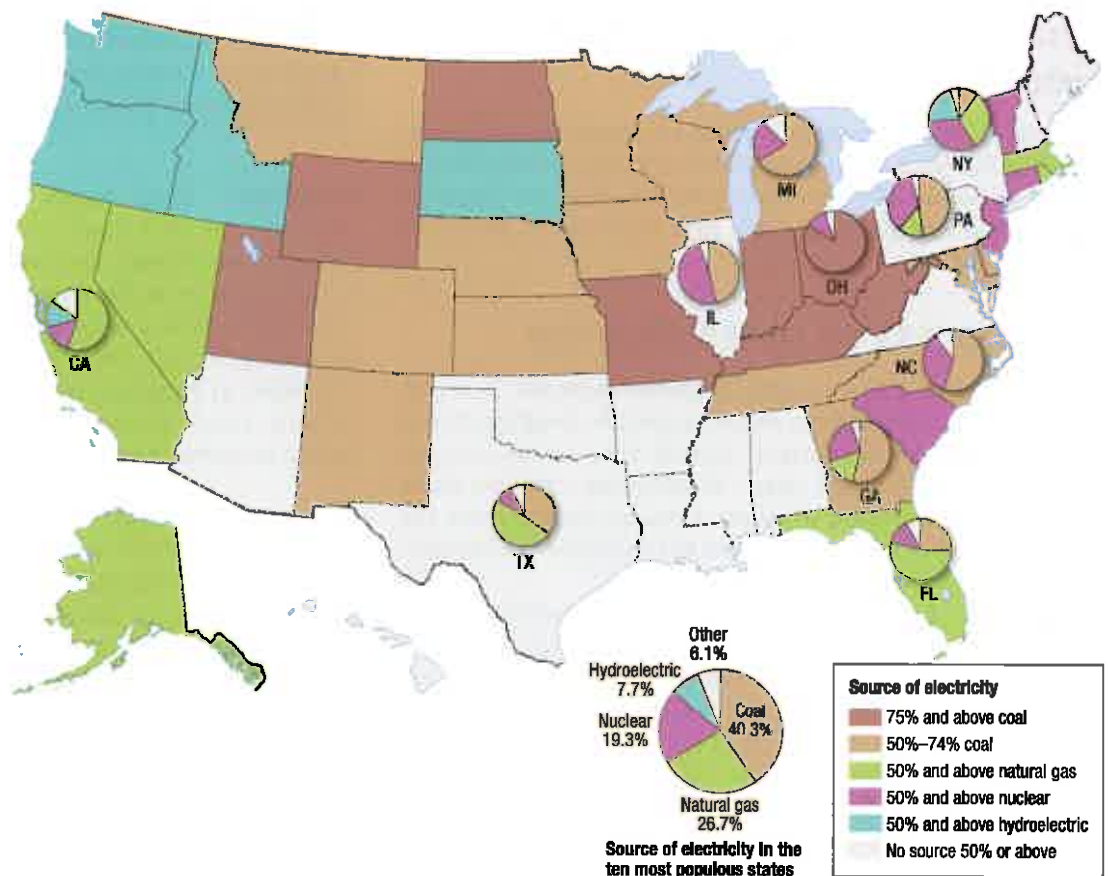
HYDROGEN FUEL CELL. Hydrogen forced through a PEM (polymer electrolyte membrane or proton exchange membrane) combines with oxygen from the air, producing an electric charge. The electricity can then be used to power an electric motor. Fuel cells are now widely used in small vehicles such as forklifts. Fuel cell vehicles are being used in a handful of large East Coast and West Coast cities, where hydrogen fueling stations have been constructed.

Pause and Reflect 13.3.7

Which alternative-fuel vehicles appear most likely to be successful at reducing dependency on fossil fuels? Which appear most successful at improving air pollution?

REGIONAL VARIATIONS IN ELECTRICITY. Electric-powered vehicles require recharging by being plugged into a source of electricity such as an outlet in the garage that ultimately comes from a power plant. Though fossil fuel is not being pumped directly into the tank of the electric-powered vehicle, fossil fuel is consumed to generate the electricity at the power plant. In fact, the United States as a whole generates around 40 percent of its electricity from coal-burning power plants and around 25 percent from natural gas. An electric vehicle does reduce consumption of an increasingly scarce and expensive resource—petroleum. But if the electricity is generated by natural gas, then plugging a vehicle into the electric grid may conserve petroleum at the expense of more rapid depletion of natural gas. If electricity is generated by coal, a plug-in may cause more air pollution.

Electricity is generated differently across the 50 U.S. states. In the Pacific Northwest, where hydroelectric is the leading source of electricity, recharging electric vehicles will have much less impact on air quality than will be the case in the Midwest (Figure 13-41). States that depend on farm production may benefit from increased use of ethanol. Thus, the “greenest” alternative varies by location.



▲ FIGURE 13-41 ELECTRICITY BY U.S. STATE Dependency on nonrenewable and polluting fossil fuels to generate electricity varies widely among states.

CHECK-IN: KEY ISSUE 3

Why Are Urban Areas Expanding?

- ✓ **A city is an incorporated unit of government. An urban area includes a city and surrounding built-up suburbs. A metropolitan area includes an urban area and surrounding counties.**
- ✓ **In the northeastern United States, adjacent metropolitan areas form a continuous urban region called Megalopolis.**
- ✓ **U.S. cities once expanded by annexing surrounding land, but annexation is now less common; instead, cities are surrounded by numerous independent suburban jurisdictions.**
- ✓ **Sprawling suburbs surround U.S. cities; suburban sprawl consumes a lot of land and requires investment in a lot of new roads and utilities.**
- ✓ **Suburbs are segregated by social class and by land use activities.**
- ✓ **Suburban residents are dependent on motor vehicles to get to other places, whereas most cities offer forms of public transit.**

KEY ISSUE 4

Why Do Cities Face Challenges?

- **Changing Urban Physical Geography**
- **Changing Urban Social Geography**
- **Urban Economic Geography Challenges**

Learning Outcome 13.4.1

Describe the processes of deterioration and gentrification in cities.

Most of the land in urban settlements is devoted to housing, where people live. Within U.S. urban areas, the most fundamental spatial distinction is between inner-city residential neighborhoods that surround the CBD and suburban residential neighborhoods on the periphery. Inner cities in the United States contain concentrations of low-income people who face a variety of physical, social, and economic problems very different from those faced by suburban residents.

Changing Urban Physical Geography

The major physical problem faced by inner-city neighborhoods is the poor condition of the housing, most of which was built before 1940. Deteriorated housing can either be demolished and replaced with new housing, or it can be rehabilitated.

THE PROCESS OF DETERIORATION

As the number of low-income residents increases in a city, the territory these residents occupy expands. Neighborhoods can shift from predominantly middle-class to low-income occupants within a few years. Middle-class families move out of a neighborhood to newer housing farther from the center and sell or rent their houses to lower-income families.

FILTERING. Large houses built by wealthy families in the nineteenth century are subdivided by absentee landlords into smaller dwellings for low-income families. This process of subdivision of houses and occupancy by successive waves of lower-income people is known as **filtering**.

Like a car, clothing, or any other object, the better a house is maintained, the longer it will last. Landlords stop maintaining houses when the rent they collect becomes less than the maintenance cost. In such a case, the building soon deteriorates and grows unfit for occupancy. Not even the poorest families will rent the dwelling. At this point in the

filtering process, the owner may abandon the property because the rents that can be collected are less than the costs of taxes and upkeep. Cities have codes that require owners to maintain houses in good condition. But governments that aggressively go after landlords to repair deteriorated properties may in fact hasten abandonment because landlords will not spend money on repairs that they are unable to recoup in rents. Thousands of vacant houses stand in the inner areas of U.S. cities because the landlords have abandoned them.

Detroit, which declined from 1.8 million inhabitants in 1950 to 700,000 in 2010, is trying to figure out how to shut down and close off entire neighborhoods. The city cannot afford to pay for street lights, garbage pickup, and police protection for the entire 360 square kilometers (139 square miles). So it is encouraging the handful of people still living in the most sparsely inhabited neighborhoods to move to other ones.

One hundred years ago, low-income inner-city neighborhoods in the United States teemed with throngs of recent immigrants from Europe. Such neighborhoods that housed perhaps 100,000 a century ago contain fewer than 5,000 inhabitants today. Schools and shops close because they are no longer needed in inner-city neighborhoods with rapidly declining populations. Through the filtering process, many low-income families have moved to less deteriorated houses farther from the center.

Pause and Reflect 13.4.1

Between 50 and 100 square kilometers (20 and 40 square miles) of Detroit's 360 square kilometers (139 square miles) are estimated to be vacant. For what purpose might all that vacant land be used?

REDLINING. Some banks have engaged in **redlining**—drawing lines on a map to identify areas in which they will refuse to loan money. As a result of redlining, families who try to fix up houses in the area have difficulty borrowing money. Although redlining is illegal, enforcement of laws against it is frequently difficult. The Community Reinvestment Act requires U.S. banks to document by census tract where they make loans. A bank must demonstrate that inner-city neighborhoods within its service area receive a fair share of its loans.

PUBLIC HOUSING. During the mid-twentieth century, many substandard inner-city houses were demolished and replaced with **public housing**. In the United States, public housing is reserved for low-income households, who must pay 30 percent of their income for rent. A housing authority, established by the local government, manages the buildings, and the federal government pays the cost of construction and the maintenance, repair, and management that are not covered by rent. In other countries, local governments or nonprofit organization such as charitable groups build and own much of the housing, aided by subsidies from the national government.

Most of the high-rise public-housing projects built in the United States and Europe during the mid-twentieth



▲ **FIGURE 13-41 PUBLIC HOUSING** One of the most notorious public housing projects, Pruitt-Igoe in St. Louis, was constructed during the 1950s and demolished during the 1970s.

century are now considered unsatisfactory environments for families with children. The elevators are frequently broken, juveniles terrorize other people in the hallways, and drug use and crime rates are high. Some observers claim that the high-rise buildings were responsible for the problem because too many low-income families were concentrated into a high-density environment. Because of poor conditions, high-rise public-housing projects have been demolished in many U.S. and European cities (Figure 13-42).

The U.S. government has stopped funding construction of new public housing. A federal program known as Hope VI supports renovation of older public housing, and the Housing Choice Voucher Program helps low-income households pay their rent in private housing. With the overall level of funding much lower, the supply of public housing and other government-subsidized housing in the United States diminished by approximately 1 million units between 1980 and 2000. But during the same period, the number of households that needed low-rent dwellings increased by more than 2 million.

In Britain, the supply of public housing, known as social housing (formerly council estates), has also declined because the government has forced local authorities to sell some of the dwellings to the residents. The British also expanded subsidies to nonprofit housing associations that build housing for groups with special needs, including single mothers, immigrants, disabled people, and elderly people, as well as the poor.

GENTRIFICATION

An alternative to demolishing deteriorated inner-city houses is to renovate them. **Gentrification** is the process by which middle-class people move into deteriorated inner-city neighborhoods and renovate the housing. Most cities have at least one substantially renovated inner-city

neighborhood where middle-class people live. In a few cases, inner-city neighborhoods never deteriorated because the community's social elite maintained them as enclaves of expensive property. In most cases, inner-city neighborhoods have only recently been renovated by the city and by private investors.

Middle-class families are attracted to deteriorated inner-city neighborhoods for several reasons:

- The houses may be larger and more substantially constructed yet less expensive than houses in the suburbs.
- Houses may possess attractive architectural details, such as ornate fireplaces, cornices, high ceilings, and wood trim.
- For people who work downtown, inner-city living eliminates the strain of commuting on crowded freeways or public transit.
- The neighborhoods are near theaters, bars, restaurants, stadiums, and other cultural and recreational facilities.
- Single people and couples without children are not concerned with the quality of inner-city schools.

Because renovating an old inner-city house can be nearly as expensive as buying a new one in the suburbs, cities encourage the process by providing low-cost loans and tax breaks. Public expenditures for renovation have been criticized as subsidies for the middle class at the expense of people with lower incomes, who are forced to move out of the gentrified neighborhoods because the rents in the area suddenly become too high for them (Figure 13-43). Cities try to reduce the hardship on poor families forced to move. U.S. law requires that they be reimbursed both for moving expenses and for rent increases over a four-year period. Western European countries have similar laws. Cities are also renovating old houses specifically for lower-income families through public housing or other programs. By renting renovated houses, a city also helps to disperse low-income families throughout the city instead of concentrating them in large inner-city public-housing projects.

▼ **FIGURE 13-43 GENTRIFICATION** New York's Soho neighborhood gentrified during the late twentieth century.



Changing Urban Social Geography

Learning Outcome 13.4.2

Explain the problems of a permanent underclass and culture of poverty in cities.

Beyond the pockets of gentrified neighborhoods, inner cities contain primarily people with low incomes who face a variety of social problems. Inner-city residents constitute a permanent underclass who live in a culture of poverty.

UNDERCLASS

Inner-city residents are frequently referred to as a permanent **underclass** because they are trapped in an unending cycle of economic and social problems. The underclass suffers from relatively high rates of unemployment, alcoholism, drug addiction, illiteracy, juvenile delinquency, and crime.

The children of the underclass attend deteriorated schools, and affordable housing is increasingly difficult to find. Their neighborhoods lack adequate police and fire protection, shops, hospitals, clinics, and other health-care facilities. The future is especially bleak for the underclass because they are increasingly unable to compete for jobs. Inner-city residents lack the technical skills needed for most jobs because fewer than half complete high school. Despite the importance of education in obtaining employment, many in the underclass live in an atmosphere that ignores good learning habits, such as regular school attendance and completion of homework. The gap between skills demanded by employers and the training possessed by inner-city residents is widening. In the past, people with limited education could become factory workers or filing clerks, but today these jobs require skills in computing and handling electronics. Meanwhile, inner-city residents do not even have access to the remaining low-skilled jobs, such as custodial and fast-food service jobs, because these jobs are increasingly in the distant suburbs.

Some of the underclass are homeless, sleeping in doorways, on heated street grates, and in bus and subway stations (Figure 13-44). The official U.S. government count in 2011 was 636,000 homeless people on any given night. The figure is much higher when it includes people who are sleeping in a car or on a friend's sofa. Most people are homeless because they cannot afford housing and lack a regular source of income. Homelessness may have been sparked by family problems, job loss, or mental illness. Single men constitute two-fifths of the homeless, and the remainder are women and children. Homelessness is an even more serious problem in developing countries. Several hundred thousand people in Kolkata (Calcutta), India, sleep, bathe, and eat on sidewalks and traffic islands.

Pause and Reflect 13.4.2

How might the severe recession that started in 2008 have affected the number of homeless people? Why might the number have changed?

CULTURE OF POVERTY

Inner-city residents are trapped as a permanent underclass because they live in a culture of poverty. Unwed mothers give birth to three-fourths of the babies in U.S. inner-city neighborhoods, and three-fourths of children in the inner city live with only one parent. Because of inadequate child-care services, single mothers may be forced to choose between working to generate income and staying at home to take care of the children.

In principle, government officials would like to see more fathers living with their wives and children, but they provide little incentive for them to do so. Only a small percentage of “deadbeat dads” are tracked down for failing to provide required child-care support. If the husband moves back home, his wife may lose welfare benefits, leaving the couple financially worse off together than apart.

Trapped in a hopeless environment, some inner-city residents turn to drugs. Although drug use is a problem in both the suburbs and rural areas, rates of use in recent years have increased most rapidly in the inner cities. Some drug users obtain money through criminal activities. Gangs form in inner-city neighborhoods to control lucrative drug distribution. Violence erupts when two gangs fight over the boundaries between their drug distribution areas. Most of the murders in Houston in 2011 occurred in low-income minority areas, and most victims, as well as those arrested for murder in Houston, were minorities (refer ahead to Figure 13-47).

Many neighborhoods in the United States are segregated by ethnicity, as discussed in Chapter 7. African

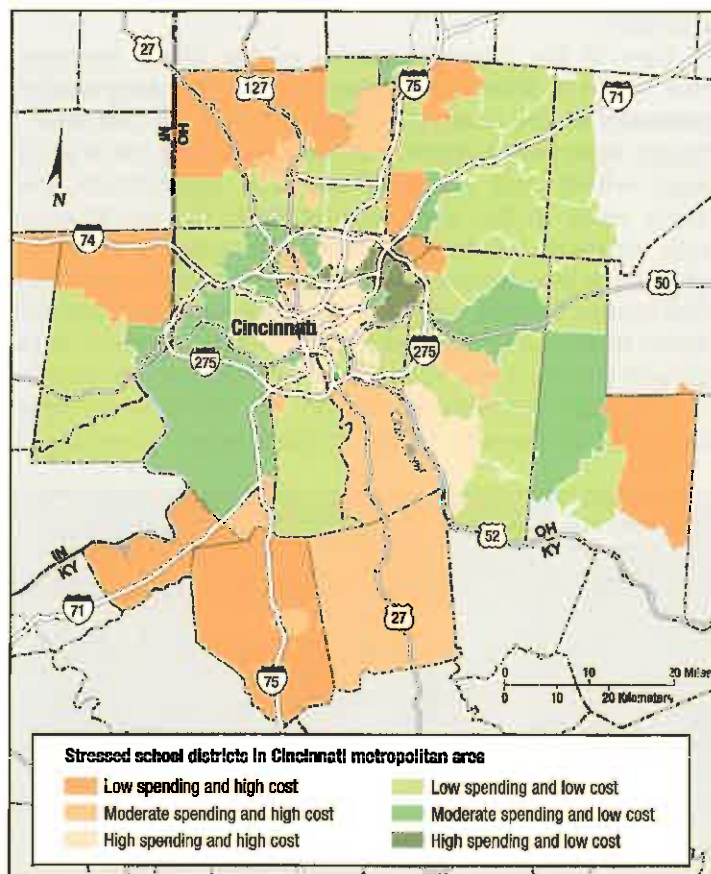
▼ **FIGURE 13-44 HOMELESS** Homeless people live under the I-75 bridge that spans the Ohio River in Cincinnati.



Americans and Hispanics concentrate in one or two large continuous areas of the inner city, whereas whites live in suburbs. Even small cities display strong social distinctions among neighborhoods. A frequently noticed division is between the east and west sides of a city, or between the north and south sides, with one side attracting the higher-income residents and the other left to lower-status and minority families. A family seeking a new residence usually considers only a handful of districts, where the residents' social and financial characteristics match their own. Residential areas designed for wealthy families are developed in scenic, attractive areas, possibly on a hillside or near a water body, whereas flat, dull land closer to industry becomes built up with cheaper housing.

SUBURBAN STRESS

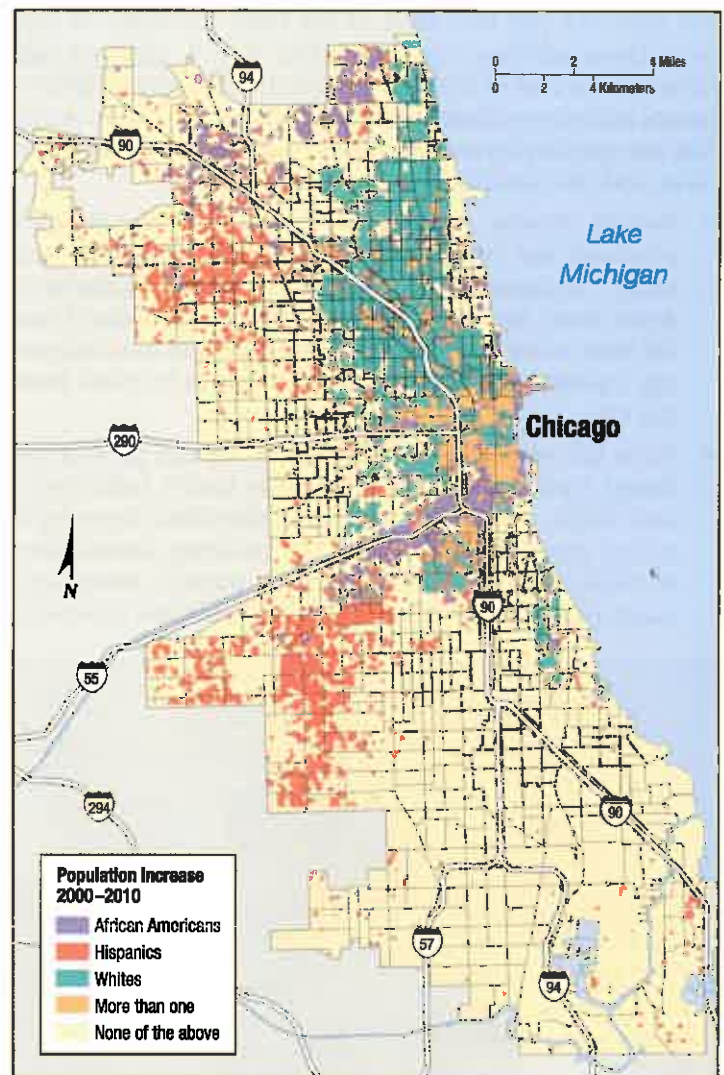
In some metropolitan areas, the inner-city social problems described above are spreading to older suburbs immediately adjacent to the city (Figure 13-45). As portions of



▲ **FIGURE 13-45 SUBURBAN STRESS** In the Cincinnati MSA, the school districts considered high stress are mostly in the suburbs. A high-cost school district has either a rapidly growing or declining enrollment or else a large percentage of students eligible for a free lunch program because of low income.

the inner city are transformed into vibrant communities for higher-income people, inner suburbs become home to lower-income people displaced from gentrifying urban neighborhoods. Meanwhile, middle-class residents move from inner suburbs to newer homes on the periphery. Thus, the inner suburbs are unable to generate revenue to provide for the needs of a poorer population.

In cities where gentrification is especially strong, ethnic patterns are being altered. In Chicago, for example, the white population is increasing in inner-city neighborhoods and declining in the outer-city neighborhoods (Figure 13-46). Conversely, the population of Hispanics is declining in the inner city and increasing in neighborhoods farther from the center.



▲ **FIGURE 13-46 RACIAL CHANGE IN CHICAGO** In Chicago, Hispanics are moving toward the suburbs, whereas whites are moving back into the city, specifically the North Side, where attractive neighborhoods are clustered.

Urban Economic Geography Challenges

Learning Outcome 13.4.3

Describe the difficulties that cities face in paying for services, especially in a recession.

The concentration of low-income residents in inner-city neighborhoods of central cities has produced financial problems. The severe recession in recent years has aggravated those problems.

THE ERODING TAX BASE

Low-income inner-city residents require public services, but they can pay very little of the taxes necessary to support those services. Central cities face a growing gap between the cost of needed services in inner-city neighborhoods and the availability of funds to pay for them. A city has two choices for closing the gap between the cost of services and the funding available from taxes:

- **Reduce services.** For example, a city can close libraries, eliminate bus routes, collect trash less frequently, and delay replacement of outdated school equipment. Aside from the hardship imposed on individuals laid off from work, cutbacks in public services also encourage middle-class residents and industries to move from the city.
- **Raise tax revenues.** For example, a city can provide tax breaks for downtown offices, luxury hotels, restaurants, and shops. Even with generous subsidies, these businesses pay more taxes than the buildings demolished to make way for them, and they provide minimum-wage personal-service jobs for low-income inner-city

residents. But spending public money to increase the downtown tax base can take scarce funds away from projects in inner-city neighborhoods, such as subsidized housing and playgrounds.

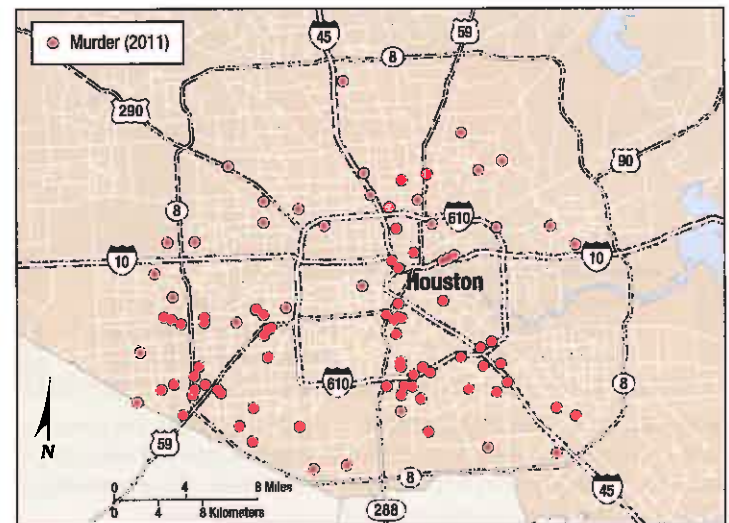
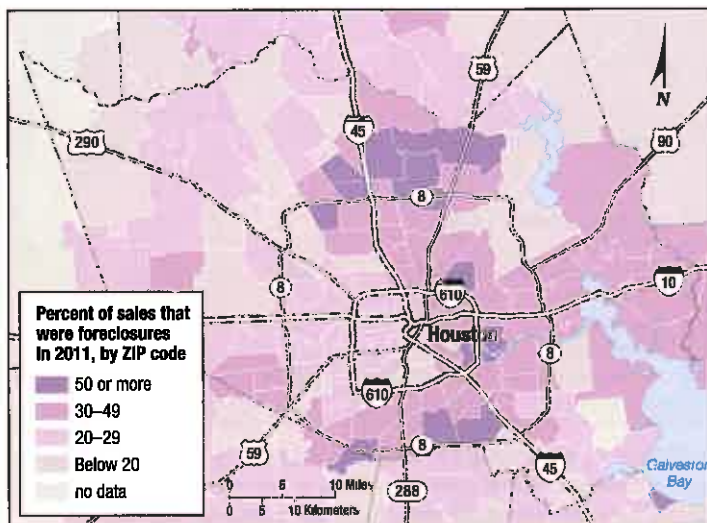
During the mid-twentieth century, inner-city fiscal problems were alleviated by increasing contributions from the federal government. The percentage of the budgets of the 50 largest U.S. cities supplied by the federal government increased from 1 percent in 1950 to 18 percent in 1980. But the percentage shrank substantially afterward, to 6 percent in 1990 and 2000. When adjusted for inflation, federal aid to U.S. cities has declined by two-thirds since the 1980s. To offset a portion of these lost federal funds, some state governments have increased financial assistance to cities.

THE IMPACT OF THE RECESSION

The impact of the severe recession that began in 2008 lingers for many cities. While some sectors of the economy recovered relatively quickly, the financial condition of local governments remains poor for many years following a severe recession.

One of the principal causes of the severe recession that began in 2008 was a collapse in the housing market, primarily in the inner city (Figure 13-47). To purchase a house, most people borrow money by taking out a mortgage, which they repay in monthly installments over many years. In the years leading up to the recent recession, financial institutions sharply increased the number of loans to low-income inner-city households buying their first homes. Despite having poor credit histories, first-time home buyers were approved for mortgages without background checks. These were known as subprime mortgages.

Financial institutions around the world were eager to invest in housing in the United States. Investing in



▲ **FIGURE 13-47 FORECLOSURES AND MURDERS IN HOUSTON** (left) Most of the foreclosures were in areas with high percentages of minorities. (right) Most of the murders in Houston occurred in low-income minority areas, and most victims as well as those arrested for murder in Houston were minorities. Compare with maps of Houston's social areas (Figures 13-12, 13-13, and 13-14).



◀ **FIGURE 13-48 CENTRAL CITY REVIVAL** Chicago's Navy Pier combines retail and leisure services on a former cargo dock.

housing was viewed as providing a higher rate of return at a lower risk than other investment options. Investors reasoned that their loans were safe: House prices had increased rapidly for many years, so even if a few home owners defaulted on their mortgages, investors would still recoup their investment. Inner-city residents were especially targeted for subprime mortgages. As the concentric zone model shows (see Figures 13-9 and 13-12), inner-city residents are more likely to be renters and therefore represent the best opportunity for financial institutions to increase the number of home owners.

When people are unable to repay their loans, lenders can take over the property in what is called a *foreclosure*. In the first year of the recession, 10 percent of all Americans with mortgages were behind in their mortgage payments or were already in foreclosure. Compounding the problem, house prices have fallen in the United States and other developed countries since their peak in 2006. With falling house prices, houses are worth less than in earlier years. In many cases, the amount of the mortgage exceeded the value of the house once prices had fallen (see Figure 9-61).

REVIVING CONSUMER SERVICES IN THE CBD

Some retailing is thriving in CBDs if it is combined with leisure activities. People are willing to make a special trip to a specific destination downtown for unusual shops in a dramatic setting, perhaps a central atrium with a fountain or a view of a harbor. Several North American CBDs have combined new retail services with leisure services:

- Boston has Faneuil Hall Marketplace, which is located in renovated eighteenth-century buildings.
- Baltimore has Harbor Place, which is built in the Inner Harbor, adjacent to waterfront museums, tourist attractions, hotels, and cultural facilities.
- Chicago has Navy Pier, a former cargo dock, which was converted to shops and attractions (Figure 13-48).
- New York has the South Street Seaport, which integrates the old fish market with retailing and recreational activities.

- San Francisco has the Ferry Building, which is a gourmet food center where San Francisco Bay ferries dock.

These downtown malls attract suburban shoppers as well as out-of-town tourists because in addition to shops, they offer unique recreation and entertainment experiences.

Some CBDs have restored their food markets, with individual stalls operated by different merchants. They may have a high range because they attract customers who willingly travel far to find more exotic or higher-quality products. At the same time, inner-city residents may use these markets for their weekly grocery shopping. The challenges of buying food in some urban areas are discussed in the Sustainability and Inequality in Our Global Village feature.

Pause and Reflect 13.4.3

Compare Houston's distributions of murders and foreclosures (Figure 13-47). In what ways are the two distributions similar and different?

CHECK-IN: KEY ISSUE 4

Why Do Cities Face Challenges?

- ✓ Neighborhoods in many cities are suffering from physical deterioration as a result of filtering and redlining.
- ✓ Cities have large numbers of underclass people who live in a culture of poverty characterized by high rates of unemployment, crime, and substance abuse.
- ✓ Cities face economic difficulties that force a choice between raising taxes and reducing services to those in need.

Summary

KEY ISSUE 1

Why Do Services Cluster Downtown?

Services, especially public and business services, cluster in the CBD; some consumer services, especially leisure, are in the CBD.

LEARNING OUTCOME 13.1.1: Describe the three types of services found in a CBD.

- The CBD contains a large percentage of an urban area's public, business, and consumer services.
- Offices cluster in the CBD to take advantage of its accessibility.
- Retail services, as well as manufacturers and residents, are less likely than in the past to be in the CBD.

LEARNING OUTCOME 13.1.2: Explain the three-dimensional nature of a CBD.

- A CBD is characterized by an extensive underground city of services and utilities, as well as high-rise buildings.
- Outside North America, CBDs may have more consumer services and fewer high-rise offices.

THINKING GEOGRAPHICALLY 13.1: Compare the CBDs of Toronto and Detroit. What might account for the differences?

GOOGLE EARTH 13.1: The tallest structure in the CBD of Ghent, Belgium, is Saint Bavo Cathedral, built in the sixteenth century. Fly to Saint Bavo Cathedral, Bisdomplein 1-3, Ghent, Belgium, drag to enter street view, exit street view, turn on 3D, exit street view, and zoom out so that the entire cathedral and its surroundings can be seen. What other buildings are highlighted in 3D in the CBD of Ghent?



Key Terms

Annexation (p. 480) Legally adding land area to a city in the United States.

Census tract (p. 468) An area delineated by the U.S. Bureau of the Census for which statistics are published; in urban areas, census tracts correspond roughly to neighborhoods.

Central business district (CBD) (p. 461) The area of a city where retail and office activities are clustered.

City (p. 476) An urban settlement that has been legally incorporated into an independent, self-governing unit.

Combined statistical area (CSA) (p. 477) In the United States, two or more contiguous core-based statistical areas tied together by commuting patterns.

Concentric zone model (p. 466) A model of the internal structure of cities in which social groups are spatially arranged in a series of rings.

Core based statistical area (CBSA) (p. 477) In the United States, the combination of all metropolitan statistical areas and micropolitan statistical areas.

Council of government (p. 479) A cooperative agency consisting of representatives of local governments in a metropolitan area in the United States.

Density gradient (p. 480) The change in density in an urban area from the center to the periphery.

Edge city (p. 482) A large node of office and retail activities on the edge of an urban area.

KEY ISSUE 2

Where Are People Distributed Within Urban Areas?

Three models help to explain where different groups of people live within urban areas.

LEARNING OUTCOME 13.2.1: Describe the concentric zone, sector, and multiple nuclei models.

- According to the concentric zone model, a city grows outward in rings.
- According to the sector model, a city grows along transportation corridors.
- According to the multiple nuclei model, a city grows around several nodes.

LEARNING OUTCOME 13.2.2: Analyze how the three models help to explain where people live in an urban area.

- According to the concentric zone model, housing is newer in outer rings than in inner rings.
- According to the sector model, wealthier people live in different corridors than do poorer people.
- According to the multiple nuclei model, different ethnic groups cluster around various nodes.

LEARNING OUTCOME 13.2.3: Describe how the three models explain patterns in European cities.

- In other countries, wealthier people live in different sectors than poorer people, and outer rings have newer housing.
- In cities outside North America, lower-income people are more likely to live in outer rings.

LEARNING OUTCOME 13.2.4: Describe how the three models explain patterns in cities in developing countries.

LEARNING OUTCOME 13.2.5: Describe the history of development of cities in developing countries.

- Many cities in developing countries were shaped by colonial powers.
- Since gaining their independence, developing countries have seen cities grow rapidly.

THINKING GEOGRAPHICALLY 13.2: Officials of rapidly growing cities in developing countries discourage the building of houses that do not meet international standards for sanitation and construction methods. Also discouraged are privately owned transportation services because the vehicles generally lack decent tires, brakes, and other safety features. Yet the residents prefer substandard housing to no housing, and they prefer unsafe transportation to no transportation. What would be the advantages and problems for a city if health and safety standards for housing, transportation, and other services were relaxed?



GOOGLE EARTH 13.2: Sectors, nodes, and rings can be seen in a Google Earth image of Chicago. North is to the right in the image. The large white structure along the lakefront is McCormick Place convention center. Is this an example of a sector, node, or ring? The series of large buildings along the river to the top left and top right are factories and warehouses. Are these examples of sectors, nodes, or rings? The structures to the far left and far right of the image are houses, whereas the buildings closer to the CBD are apartment towers. Are these examples of sectors, nodes, or rings?

Filtering (p. 490) A process of change in the use of a house, from single-family owner occupancy to abandonment.

Food desert (p. 464) An area in a developed country where healthy food is difficult to obtain.

Gentrification (p. 491) A process of converting an urban neighborhood from a predominantly low-income, renter-occupied area to a predominantly middle-class, owner-occupied area.

Greenbelt (p. 481) A ring of land maintained as parks, agriculture, or other types of open space to limit the sprawl of an urban area.

Megalopolis (p. 478) A continuous urban complex in the northeastern United States.

Multiple nuclei model (p. 467) A model of the internal structure of cities in which social groups are arranged around a collection of nodes of activities.

KEY ISSUE 3

Why Are Urban Areas Expanding?

Urban growth has been primarily focused on suburbs that surround older cities.

LEARNING OUTCOME 13.3.1: State three definitions of urban settlements.

- A city is a legally incorporated entity that encompasses the older portion of the urban area.
- An urban area includes the city and built-up suburbs.
- A metropolitan area includes the city, built-up suburbs, and counties that are tied to the city.

LEARNING OUTCOME 13.3.2: Describe how metropolitan areas contain many local governments and overlap with each other.

- In some regions, adjacent metropolitan areas overlap with each, creating large contiguous urban complexes.
- The United States has nearly 90,000 local governments, making it difficult to address urban problems.

LEARNING OUTCOME 13.3.3: I identify historical and contemporary patterns of suburban expansion.

- In the past, cities expanded their land area to encompass outlying areas, but now they are surrounded by independent suburban jurisdictions.
- Suburban sprawl has been documented to be costly.

LEARNING OUTCOME 13.3.4: Explain two ways in which suburbs are segregated.

- Suburbs are segregated according to social class and land uses.

LEARNING OUTCOME 13.3.5: Describe the impact of motor vehicles in urban areas.

- Motor vehicles take up a lot of space in cities, including streets, freeways, and parking areas.
- Some cities control the number of vehicles that can enter the center of the city.

LEARNING OUTCOME 13.3.6: State benefits and limitations of public transportation.

- Public transit, such as subways and buses, are more suited than private cars to move large numbers of people into and out of the CBD.
- New investment in public transit has occurred in a number of U.S. cities, though less extensively than in other countries.

LEARNING OUTCOME 13.3.7: Describe recent and possible future improvements in vehicles.

- Vehicles that are more fuel efficient and less polluting are likely to become more widely available in the future.

THINKING GEOGRAPHICALLY 13.3: Draw a sketch of your community or neighborhood. In accordance with Kevin Lynch's *The Image of the City*, place five types of information on the map: districts (homogeneous areas), edges (boundaries that separate districts), paths (lines of communication), nodes (central points of interaction), and landmarks (prominent objects on the landscape). How clear an image does your community have for you?

GOOGLE EARTH 13.3: Public transit in Brussels. A #7 tram enters a tunnel near Diamant station. Is this an example of light rail or heavy rail?



Peripheral model (p. 476) A model of North American urban areas consisting of an inner city surrounded by large suburban residential and business areas tied together by a beltway or ring road.

Primary census statistical area (PCSA) (p. 477) In the United States, all of the combined statistical areas plus all of the remaining metropolitan statistical areas and micropolitan statistical areas.

Public housing (p. 490) Housing owned by the government, in the United States, it is rented to residents with low incomes, and the rents are set at 30 percent of the families' incomes.

Redlining (p. 490) A process by which banks draw lines on a map and refuse to lend money to purchase or improve property within the boundaries.

Rush hour (p. 486) The four consecutive 15-minute periods in the morning and evening with the heaviest volumes of traffic.

Sector model (p. 467) A model of the internal structure of cities in which social groups are arranged around a series of sectors, or wedges, radiating out from the central business district.

Smart growth (p. 481) Legislation and regulations to limit suburban sprawl and preserve farmland.

Social area analysis (p. 468) Statistical analysis used to identify where people of similar living standards, ethnic background, and lifestyle live within an urban area.

Sprawl (p. 480) Development of new housing sites at relatively low density and at locations that are not contiguous to the existing built-up area.

Squatter settlement (p. 472) An area within a city in a less developed country in which people illegally establish residences on land they do not own or rent and erect homemade structures.

KEY ISSUE 4

Why Do Cities Face Challenges?

Cities face physical, social, and economic difficulties, but some improvements have also occurred.

LEARNING OUTCOME 13.4.1: Describe the processes of deterioration and gentrification in cities.

- The older housing in the inner city can deteriorate through processes of filtering and redlining.
- Massive public housing projects were once constructed for poor people, but many of them have been demolished.
- Some cities have experienced gentrification, in which higher-income people move in and renovate previously deteriorated neighborhoods.

LEARNING OUTCOME 13.4.2: Explain the problems of a permanent underclass and culture of poverty in cities.

- Inner cities have concentrations of very poor people, considered to belong to an underclass, some of whom are homeless.
- A culture of poverty traps some poor people in the inner cities.

LEARNING OUTCOME 13.4.3: Describe the difficulties that cities face in paying for services, especially in a recession.

- Cities are faced with the choice of reducing services or raising taxes to pay for needed services.
- The severe recession that started in 2008 continues to hurt the economic condition of cities.
- Some cities have seen a revival of retail services downtown.

THINKING GEOGRAPHICALLY 13.4: Jane Jacobs wrote in *Death and Life of Great American Cities* that an attractive urban environment is one that is animated with an intermingling of a variety of people and activities, such as found in many New York City neighborhoods. What are the attractions and drawbacks to living in such environments?

GOOGLE EARTH 13.4: City meets country in the United Kingdom. Harlow, a New Town built primarily during the 1950s and 1960s, shows the sharp boundary between a high-density residential suburb and the countryside. How does this landscape differ from the outer edge of a typical U.S. suburb?



Underclass (p. 492) A group in society prevented from participating in the material benefits of a more developed society because of a variety of social and economic characteristics.

Urban area (p. 477) A dense core of census tracts, densely settled suburbs, and low-density land that links the dense suburbs with the core.

Urban cluster (p. 477) In the United States, an urban area with between 2,500 and 50,000 inhabitants.

Urbanized area (p. 477) In the United States, an urban area with at least 50,000 inhabitants.

Zoning ordinance (p. 465) A law that limits the permitted uses of land and maximum density of development in a community.

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AFTERWORD

CAREERS IN GEOGRAPHY

Where do you see yourself working in 5 or 10 years after graduation? You could be a retail geographer, analyzing customer behavior for a major department store. You could conduct research on land cover, vegetation structure, and snow cover in Alaska. You could be a social science analyst, evaluating redistricting plans to ensure that they do not disenfranchise voters. Or you could lead a team of experts at one of the world's largest retailers in specific dimensions of sustainable business practices.

What do all these careers have in common? In each case, enterprising individuals have found creative ways to apply the core concepts and skills of geography. An increasing number of students recognize that geographic education is practical as well as stimulating. Employment opportunities are expanding for students trained in geography, especially in geospatial technologies, teaching, government service, and business.

Geospatial Technologies

In the past 20 years, the field of geospatial technologies has been making rapid advances, thanks to developments in computer software, computer science, and geographic information systems (GIS), including remote-sensing technologies. Today jobs that make use of geospatial technologies and GIS can be found in such private and public sector areas as environmental consulting, software development, air navigation services, spatial database management for mapping companies (Figure A-1), location analysis for retail businesses



▲ **FIGURE AF-1** GOOGLE EARTH A Google Earth image of Paris is displayed on a wall-sized monitor in Google's Berlin, Germany, office.

and real estate, corporate transportation and logistics departments, criminology, archaeology, resource management, and infrastructure management, to name just a few.

Teaching

More than 100 universities in the United States and Canada offer doctorate or master's degrees in geography. A career as a geography teacher is promising because schools throughout North America are expanding their geography curriculum. Educators increasingly recognize geography's role in teaching students about global diversity (Figure AF-2). AP Human Geography is the fastest-growing AP discipline in U.S. high schools.

Some university geography departments have emphasized outstanding teaching, whereas others are concerned primarily with scholarship and research. The Association of American Geographers includes several dozen specialty groups, organized around research themes, including agricultural, industrial, medical, and transportation geography.

Government Service

Geographers contribute their knowledge of the location of activities, the patterns underlying the distribution of various activities, and the interpretation of data from maps and satellite imagery to local, state, and national governments. Employment opportunities with cities, states, provinces, and other units of local government are typically found in departments of planning, transportation, parks and recreation, economic development, housing, zoning, or other similarly titled government agencies. Geographers may be hired to conduct studies of local economic, social, and physical patterns; to prepare information through maps and reports; and to help plan the community's future.

Many federal government agencies also employ geographers:

- The Department of Agriculture hires geographers for the Forest Service and Natural Resources Conservation Service to enhance environmental quality.
- The Department of Commerce hires geographers for the Bureau of the Census to study changing population trends and for the Economic Development Administration to promote rural development.
- The Department of Defense hires geographers for the Defense Intelligence Agency and the