

Industry and Manufacturing

Learning Outcomes

After reading, studying, and discussing the chapter, students should be able to:

Learning Outcome 11.1.1: Describe the locations of the principal industrial regions.

Learning Outcome 11.2.1: Identify the two types of situation factors and explain why some industries locate near inputs.

Learning Outcome 11.2.2: Explain why some industries locate near markets.

Learning Outcome 11.2.3: Explain why industries use different types of transportation.

Learning Outcome 11.2.4: Describe how the optimal location for steel production has changed.

Learning Outcome 11.2.5: Explain the distribution of motor vehicle production.

Learning Outcome 11.2.6: List the three types of site factors.

Learning Outcome 11.2.7: Explain the distribution of textile and apparel production.

Learning Outcome 11.3.1: Describe the causes and effects of global warming and damage to the ozone layer.

Learning Outcome 11.3.2: Describe the causes and effects of regional and local-scale air pollution and solid waste pollution.

Learning Outcome 11.3.3: Compare and contrast point and nonpoint sources of water pollution.

Learning Outcome 11.4.1: Explain reasons for changing distribution of industry within the United States.

Learning Outcome 11.4.2: Explain reasons for the emergence of new industrial regions.

Learning Outcome 11.4.3: Explain reasons for renewed attraction of traditional industrial regions.

Chapter Outline

Geographers are interested in studying industry because the choice of location of an industry is fundamentally about spatial relationships among raw materials, markets, and site factors.

Key Issue 1: Where Is Industry Distributed?

Industrial Revolution The **Industrial Revolution** was a series of improvements in industrial technology that transformed the process of manufacturing goods. Prior to the Industrial Revolution, people made household tools and agricultural equipment in their own homes or obtained them in the local village. Home-based manufacturing was known as the **cottage industry** system.

Several inventions transformed the way in which goods were manufactured, beginning with the steam engine. The revolution in industrial technology created an unprecedented expansion in productivity, resulting in substantially higher standards of living. The Industrial Revolution resulted in new social, economic, and political inventions, not just traditional ones. The changes involved a gradual diffusion of new ideas and techniques over decades rather than an instantaneous revolution.

Industrial Regions Industry is concentrated in Europe, North America, and East Asia. European industrial areas tend to be located in regions with abundant energy, raw materials such as iron ore, and labor concentrations. North American industrial areas are located in a band from the Great Lakes to the East Coast and the California Coast. East Asia's industrial areas are in China along the coast and in Japan.

Key Issue 2: Why Are Situation and Site Factors Important?

Nonmetallic Minerals In weight, more than 90 percent of minerals that humans use are nonmetallic, but metallic minerals are important for economic activities and carry relatively high value. Building stones, gemstones, and fertilizers are examples of nonmetallic minerals that humans commonly use.

Metallic Minerals Metallic minerals have properties that are especially valuable for fashioning machinery, vehicles, and other essential elements of contemporary society. Many metals are capable of combining with other metals to form alloys with distinctive properties important for industry. A **ferrous** alloy contains iron and a **nonferrous** one does not. Iron is extracted from iron ore, by far the world's most widely used ore.

Bulk-Gaining Industries A **bulk-gaining industry** makes something that gains volume or weight during production. To minimize transport costs, a bulk-gaining industry needs to locate near where the product is sold. A prominent example of a bulk gaining industry is the fabrication of parts and machinery from steel and other metals. For example, steelmakers have traditionally located near raw materials; steel fabricators have traditionally located near the markets. Beverage bottlers also locate near large markets to cut down on the cost of shipping.

Single-Market Manufacturers Are specialized manufacturers with only one or two customers. The optimal location for these factories is often close proximity to the customers. An example of a single-market manufacturer is a producer of buttons, zippers, clips, pins, or other specialized components attached to clothing. The makers of parts for motor vehicles are another example of specialized

manufacturers with only one or two customers. Proximity to the assembly plant is increasingly important for parts producers because of the diffusion of “**just-in-time**” delivery.

Perishable Products To deliver their products to consumers as rapidly as possible, perishable-product industries must be located near their markets. Because few people want stale bread or sour milk, food producers such as bakers and milk bottlers must locate near their customers to assure rapid delivery. The daily newspaper is an example of a product other than food that is highly perishable because it contains dated information. Newspaper publishers must locate near the markets to minimize transportation costs. People demand their newspaper as soon after it’s printing as possible.

Ship, Rail, Truck, or Air? Shipping costs are variable depending on the mode of transport used. Inputs and products are transported in one of four ways: via ship, rail, truck, or air. Firms seek the lowest-cost mode of transport, but which of the four alternatives is cheapest changes with the distance that goods are being sent. Long-distance shipping is the least expensive shipping option. Industries which use a number of different shipping modes tend to locate at **break-of-bulk points**, where it is easy to repackage products and change the shipping method.

Containerization has facilitated transfer of packages between modes. Containers may be packed into a rail car, transferred quickly to a container ship to cross the ocean and unloaded into trucks at the other end. Large ships have been specially built to accommodate large numbers of rectangular boxlike containers. Regardless of transportation mode, costs rises each time inputs or products are transferred from one mode to another. For example, workers must unload goods from a truck and then reload them onto a plane.

Copper: Proximity to Inputs or Markets? Copper production involves several steps. Mining copper ore is a **bulk reducing industry** because the heavy, bulky ore that is extracted from the mines is mostly waste. The second step in copper production is the concentration mills that grind the ore into fine particles that produce copper concentrate that is only 25 percent copper. Copper smelters then remove more impurities. As a bulk reducing industry, copper concentration mills and smelters are built near the mines to minimize transportation costs. Since so much waste has already been disposed of, proximity to the mines is a less critical factor in determining the location of the refineries.

Steel: Changing Inputs The two principal inputs in steel production are iron ore and coal. Because of the need for large quantities of bulky, heavy iron ore and coal, steelmaking traditionally clustered near sources of the two key raw materials. Within the United States, the distribution of steel production has changed several times because of changing inputs. Steel mills were highly clustered near the southern Great Lakes, especially Lake Erie and Lake Michigan. These areas were close to the bulky coal and iron ore to minimize transportation costs.

The increasing importance of proximity to markets is demonstrated by the recent growth of steel minimills. Rather than iron ore and coal, the main input into minimill production is scrap metal. Minimills, are less expensive to operate than traditional steel mills and they can locate near their markets because their main input—scrap metal—is widely available. World steel production is declining in developed countries and increasing in developing countries. Overall world steel production doubled between 1980 and 2010, with the biggest increase in production taking place in China.

Motor Vehicles: Changing Markets Carmakers manufacture vehicles at final assembly plants, using thousands of parts supplied by independent companies. Three-fourths of vehicles sold in North America are assembled in North America. Similarly, most vehicles sold in Europe are assembled in Europe, most vehicles sold in Japan are assembled in Japan, and most vehicles sold in China are manufactured in China. Carmakers' assembly plants account for only around 30 percent of the value of the vehicles that bear their names. Independent parts makers supply the other 70 percent of the value.

Many parts makers are examples of single-market manufacturers because they ship most of their products to one or perhaps a handful of assembly plants. Motor vehicle seats, for example, are invariably manufactured within an hour of the final assembly plant. A seat is an especially large and bulky object and carmakers do not want to waste valuable space in their assembly plants by piling up an inventory of them. On the other hand, some parts do not need to be manufactured close to the customer. Some locate in countries that have relatively low labor costs.

Labor Minimizing labor costs is important for some industries and the variation of labor costs around the world is large. A **labor-intensive industry** is an industry in which wages and other compensation paid to employees constitutes a high percentage of expenses. The reverse case, an industry with a much lower-than-average percentage of expenditures on labor, is considered capital intensive. A labor intensive industry is not the same as a high-wage industry. Labor-intensive is measured as a percentage, whereas high-wage is measured in dollars. Motor vehicle workers are paid much higher hourly wages than textile workers, yet the textile industry is labor intensive and the auto industry is not.

Capital The U.S. motor-vehicle industry concentrated in Michigan early in the twentieth century largely because that region's financial institutions were more willing than eastern banks to lend money to the industry's pioneers. High-tech industries have been risky propositions—roughly two-thirds of them fail—but Silicon Valley financial institutions have continued to lend money to engineers who have good ideas so that they can buy the software, communications, and networks they need to get started. The ability to borrow money has become a critical factor in the distribution of industry in developing countries.

Land Contemporary factories operate most efficiently when laid out in one-story buildings. Raw materials are typically delivered at one end and moved through the factory in conveyors or forklift trucks. The land needed to build one-story factories is now more likely to be available in suburban and rural locations. With trucks now responsible for transporting most inputs and products, proximity to major highways is important for factories. Especially attractive is the proximity to the junction of a long-distance route and the beltway, or ring road that encircles most cities.

Textiles and Apparel: Changing Inputs Production of textiles (woven fabrics) and **apparel** (clothing) is a prominent example of an industry that generally requires less-skilled, low-cost workers. Spinning, weaving, and sewing are all labor intensive compared to other industries, but the importance of labor varies somewhat among them. Textile and apparel production involves three principle steps: spinning, weaving, and assembly.

Key Issue 3: Why Does Industry Cause Pollution?

Global-Scale Air Pollution Earth is warmed by sunlight that passes through the atmosphere, strikes the surface, and is converted into heat. When the heat tries to pass back through the atmosphere to space, some gets through and some gets trapped. A concentration of trace gasses in the atmosphere can block or delay the return of some of the heat leaving the surface heading for space, thereby raising Earth's temperature. When fossil fuels are burned, one of the trace gasses, carbon dioxide, is discharged into the atmosphere. The anticipated increase in Earth's temperature, caused by carbon dioxide trapping some of the radiation emitted by the surface, is called the **greenhouse effect**.

The stratosphere contains a concentration of **ozone** gas. The ozone layer absorbs dangerous ultraviolet rays from the Sun. Were it not for the ozone in the stratosphere, ultraviolet rays would damage plants, cause skin cancer, and disrupt food chains. Earth's protective ozone layer is threatened by pollutants called **chlorofluorocarbons**.

Regional-Scale Air Pollution Air pollution may damage a region's vegetation and water supply through acid deposition. Acid precipitation damages lakes, killing fish and plants. On land, concentrations of acid in the soil can injure plants by depriving them of nutrients and can harm worms and insects. Buildings and monuments made of marble and limestone have suffered corrosion from acid rain. Geographers are particularly interested in the effects of acid precipitation because the worst damage is not experienced at the same location as the emission of the pollutants.

Local-Scale Air Pollution Air pollution is especially severe in places where emission sources are concentrated, such as urban areas. The air above urban areas may be polluted because a large number of factories, motor vehicles, and other polluters emit residuals in a concentrated area. Urban air pollution has three basic components: carbon monoxide, hydrocarbons, and particulates. Progress in controlling urban air pollution has had mixed results.

Sanitary Landfill Using a sanitary landfill is by far the most common strategy for disposal of solid waste in the United States. Thousands of small-town "dumps" have been closed and replaced by a small number of large regional ones. Given the shortage of landfills, alternatives have been sought to dispose of solid waste. A rapidly growing alternative is incineration. Burning releases some toxins into the air and some toxins also remain in ash. Thus solving one pollution problem may increase another.

Hazardous Waste Disposing of hazardous waste is especially difficult. Hazardous waste includes heavy metals (including mercury, cadmium, and zinc), PCB oils from electrical equipment, cyanides, strong solvents, acids, and caustics. These may be unwanted by-products generated in manufacturing or waste to be discarded after usage. If poisonous industrial residuals are not carefully placed in protective containers, the chemicals may leach into the soil and contaminate groundwater or escape into the atmosphere.

Water Pollution Sources Pollution enters a body of water at a specific location is called **point-source pollution**. Point-source water pollution originates from a specific point, such as a pipe from a wastewater treatment plants. The two main point sources of pollution are manufacturers and municipal sewer systems. **Nonpoint-source pollution** comes from a large, diffuse area. Nonpoint sources usually pollute

in greater quantities and are much harder to control than point sources of pollution. The principle nonpoint source is agriculture. Fertilizers and pesticides spread on fields are carried to rivers and lakes by irrigation systems and natural runoff.

Impact of Water Pollution on Aquatic Life Polluted water can harm aquatic life. Aquatic plants and animals consume oxygen and so does the decomposing organic waste that humans dump in the water. If too much waste is discharged into water, the water becomes oxygen starved and the fish die. Many factories and power plants use water for cooling and then discharge the warm water back into the river or lake. Fish adapted to cold water, such as salmon or trout, might not be able to survive the warmer water.

Key Issue 4: Why Are Situation and Site Factors Changing?

Shifts within the United States The northeastern United States lost 6 million jobs in manufacturing between 1950 and 2009. Industrial growth in the South since the 1930s has been stimulated in part by government policies to reduce historical disparities. The Tennessee Valley Authority brought electricity to much of the rural South, and roads were constructed in previously inaccessible sections of the Appalachians, the Piedmont, and Ozarks. Steel, textiles, tobacco products, and furniture industries have become dispersed through smaller communities in the South, many in search of a labor force willing to work for less pay than the North. The textile industry is an example of an industry that used to be concentrated in the Northeast and is now mostly found in the South.

The principle lure for many manufacturers to locate in the South has been **right-to-work laws**. A right-to-work law requires a factory to maintain a so-called “open shop” and prohibits a “closed shop”. In a “closed shop” a company and union agree that everyone must join a union to work in the factory. The percentage of workers who are union members is much lower in the South than elsewhere in the United States. More importantly, the region has been especially attractive for companies working hard to keep out the unions altogether.

Interregional Shifts in Europe Manufacturing has diffused from traditional industrial centers in northwestern Europe towards Southern and Eastern Europe. Several European countries situated east of Germany and west of Russia have become major centers of industrial investment since the fall of communism in the early 1990s. These countries offer manufactures an attractive combination of two important site and situation factors: labor and market proximity. The workers offer manufacturers good value for money; they are less skilled but much cheaper than in Western Europe and they are more skilled than workers in Asia and Latin America. The region is also close to the wealthy markets of Western Europe.

Outsourcing Transnational corporations have been especially aggressive in using low-cost labor in developing countries. Despite the greater transportation cost, transnational can profitably transfer some work to developing countries, given their substantially lower wages compared to those in developed countries. Transnational corporations allocate production to low-wage countries through **outsourcing**, which is turning over much of the responsibility for production to independent suppliers. Outsourcing contrasts with the approach typical of traditional mass production, called **vertical integration**, in which a company controls all phases of a highly complex production process.

Mexico and NAFTA The North American Free Trade Agreement (NAFTA), effective in 1994, eliminated barriers to moving goods among Mexico, Canada, and the United States. Because it is the nearest low-wage country to the United States, Mexico attracts labor-intensive industries that also need proximity to the U.S. market. Plants in Mexico near the U.S. border are known as **maquiladoras**, from the Spanish verb *maquillar*, which means “to receive payment for grinding or processing corn.” Under U.S. and Mexican laws, companies receive tax breaks if they ship materials from the United States, assemble the components at a maquiladora plant in Mexico, and export the finished product back to the United States.

Bric and Brics Much of the world’s future growth in manufacturing is expected to locate outside the principle industrial regions described earlier. The financial analysis firm Goldman Sachs coined the acronym BRIC to indicate the countries it expects to dominate global manufacturing during the twenty-first century: Brazil, Russia, India, and China. The four BRIC countries together currently control one-fourth of the world’s land area and contain 3 billion of the world’s 7 billion inhabitants. Their economies rank second (China), seventh (Brazil), ninth (Russia), and eleventh (India) in the world.

Proximity to Skilled Labor Traditionally, factories assigned each worker one specific task to perform repeatedly. Some geographers call this approach **Fordist** production because the Ford Motor Company was one of the first companies to organize its production this way early in the twentieth century. Most workers did not need education or skills to do their jobs. Many industries now follow a lean, or flexible, production approach. The term post-Fordist production is sometimes used to describe lean production in contrasts with Fordist production.

Just-in-Time Delivery As the name implies, just-in-time is shipment of parts and materials to arrive at a factory moments before they are needed. Under just-in-time, parts and materials arrive at a factory frequently, in many cases daily or even hourly. Just-in-time delivery reduces the money that a manufacturer must tie up in wasteful inventory. In fact, the percentage of the U.S. economy tied up in inventory has been cut in half during the past three decades. Manufacturers can also reduce the size of the factory because space does not have to be wasted on piling up a mountain of inventory.

Introducing the Chapter

The chapter enters on a dark note: the loss of manufacturing jobs in the United States at the dawn of the twenty-first century. It’s a fine place to start for many of our students, and a great way to make what might otherwise be perceived as a boring subject matter very relevant. A similar approach to the outsourcing of service jobs can be used to introduce Chapter 12.

Icebreaker: Rivers and Cities

This exercise can also be used for Chapter 13, Urban Patterns.

Using an online mapping service challenge the students:

Can you name a major North American city that is not located on a river or with access to the ocean?

Las Vegas will invariably come up. Use the opportunity to discuss why Las Vegas is located where it is. Most other examples are on the ocean, on a river, or both. Enter the city name into the search tool to demonstrate this.

Next ask the following:

Can you think of any other cities in the world?

Again, students will be hard pressed to find a city of significant size that is not served by a river, the ocean, or both.

The availability of efficient transport (not to mention water supply) is fundamental to a city with industrial output at any appreciable scale.

Challenges to Comprehension

Other “Industries”

Similar to the confusion over the meaning of “state”, students may have heard “industry” used in more general terms than the text’s strict definition. For clarity, simply explain that industry applies only to manufactured goods of some sort, and does not include the following “industries”:

- The recreation industry
- The restaurant industry
- The hospitality industry
- The travel industry

Site vs. Situation

Students usually grasp the reasons for an industry locating close to inputs vs. close to markets—but then they forget these reasons for industrial location as soon as they learn about site factors, or confuse the two.

The review questions below may help students distinguish between these issues: Sometimes site factors are so overwhelming that situation factors are ignored, and vice versa. In other cases a combination of site and situation factors may be at play.

Assignments

Review/ Reflection Questions

- Name some industries local to our town. Identify and explain the situation and site factors involved in each industry’s location.
- Now pick an industry and describe how its closing would affect the town’s economy. Would the jobs lost in the closing be the only effects? Explain.
- Give an example, not from the text, of an industry that is likely to locate closer to inputs, and explain.

- Give an example, not from the text, of an industry that is likely to locate closer to markets, and explain.
- If industrial location is chosen according to situation factors in order to minimize transportation costs, explain why many industries are locating in Southeast Asia and shipping goods to markets in North America.
- Given current trends in the movement and growth of industry, is industry likely to remain important as a source of employment in our country? Why or why not?

Industry Assignment

Americans are the number one consumers of goods on the face of the planet. We accumulate so much “stuff” that we fill up our garages, attics, and even rent storage units to house our excess.

The purpose of this activity is to illustrate how the items in your house reflect the globalization of economic production. Based on the idea of spatially fixed and spatially varied costs, corporations will search for the lowest production costs in order to increase profits. Increasingly, the cost of labor is the driving force in the migration of production centers to less developed countries. Keeping production costs low allows producers to sell goods at affordable costs to more developed countries and still realize a profit.

Instructions

1. Select 30 items in your home (electronics, appliances, clothing, furniture, etc.) and list the item, a general category (electronics, clothing, etc.), and where each was produced.
2. Analyze the data you’ve collected. Where was most of your stuff produced? Is there a correlation between the types of items and the location of their production? Are there any results you did not expect? Is there a relationship between the costs of goods and the production location? How much of your stuff was made in the United States? Does quality influence the location of production? Does the type of item influence the location of production?
3. Write up a description of how the items in your home reflect the globalization of economic production. Look at the countries that come up in your chart and refer to Chapters 9 and 11 in your textbook to find helpful information (for example, maquiladoras, Wal-Mart, and so forth).
4. Fill in the map illustrating the flow of goods into your home. Add up the number of times that products in your household were manufactured in a particular country. Write the number on or next to that country. If a country did not produce any goods in your household, leave it blank.

TURN IN THE FOLLOWING:

1. Minimum 2-page written analysis of your items related to topics covered in text and class. **Must be typed and double spaced.**
2. The filled out map.
3. List of 30 items. Describe what the item is and what country it was manufactured in. This can be handwritten (please be neat).

Thinking Geographically Questions

11.1: *What are the principal manufacturers in your community or area? How have they been affected by increasing global competition?*

I live in Los Angeles County and we produce more furniture and apparel (clothing) than any other county in the United States. We are the second leading county in airplane manufacturing. Apparel production has mostly been outsourced to Asia, so the fact that we are the leading county in the United States in apparel production probably does not mean much in the great scheme of things. Furniture is fragile and bulky to transport, so Los Angeles County is probably not too affected by outsourcing from Asia. I know there is an area in North Carolina that makes a lot of furniture, but most of that is probably sold on the East Coast of the United States. Most of the airplanes being flown in the United States are still being made in the United States, so being the second leading county in the United States in airplane manufacturing is somewhat significant.

11.2: *To induce Kia to build its U.S. production facility in Georgia, the state spent \$36 million to buy the site; \$25 million to prepare the site, including grading; \$30 million to provide road improvements, including an interchange off I-85; \$6 million to build a rail spur; \$20 million to construct a training center, \$6 million to operate the center for five years; \$6 million to develop a training course; \$76 million in tax credits, \$14 million in sales tax exemptions; and \$41 million in training equipment. Did Georgia overpay to win the Kia factory? Explain.*

I don't think that Georgia overpaid to win a Kia factory. The Kia factory itself will provide probably a couple hundred good paying jobs. All the industries that will agglomerate around the Kia factory (a seat manufacturer, a glass manufacturer, a wheel manufacturer, delivery companies) provide thousands of good paying jobs. Thousands of jobs will also be created that provide services to the workers of the factories and their families. That's why when General Motors closed their huge factory in Flint, Michigan, the whole city fell off an economic cliff. Businesses closed and unemployment skyrocketed. Flint has not recovered since the closing of the GM plant and probably never will. Factories don't just employ the people that work there, they pretty much employ the whole community.

11.3: *What are the major polluters in your community?*

Los Angeles has the worst air quality in the United States. It is horrendous some days. Los Angeles has very little public transportation, so almost everybody drives their own vehicle. That is why Los Angeles is well known for its traffic. Automobiles are the major polluters. Industry in California is extremely regulated (some would say overregulated) and produces very little pollution. Many factories that used to be in Los Angeles have moved out of the state or out of the country. The 8 million vehicles in Los Angeles are responsible for our smog.

11.4: *What have been the benefits and costs to Canada, Mexico, and the United States as the result of NAFTA?*

Mexico benefited from foreign investment, job creation, tax receipts, and new technology that occurred because of NAFTA. Many factories (called maquiladoras) have been built near the United States/Mexico border, and they have provided decent paying jobs for many Mexicans. NAFTA has unfortunately negatively affected farmers in the state of Chiapas because they have to somehow compete with heavily government subsidized corn coming from U.S. states like Iowa and Illinois. A pig, for example, can be raised and sold for 20 percent less in Iowa than it would cost to raise and sell a pig in Mexico, so this has negatively affected people that raise livestock as well. NAFTA has benefited some, but negatively affected others in Mexico. NAFTA has benefited some people and negatively affected others in the United States and Canada as well.

Pause and Reflect Questions

11.1.1: *How did energy sources change during the Industrial Revolution, and why were these changes important to the revolution's success?*

Previous to the Industrial Revolution, wood was the main fuel source. During the Industrial Revolution coal replaced wood and was a more affective fuel source because it burned hotter. The intense heat produced by coal made the steam engine possible. The intense heat produced by coal could melt iron ore and this created cast iron and steel.

11.2.1: *North America is the leading source of which minerals?*

North America is the leading producer of sulfur, calcium, potassium, molybdenum, and nickel.

11.2.2: *Why isn't wine bottled near the market, like beer and soft drinks?*

Wine is not produced in the same way as beer and soft drinks. I don't believe you can just mix water with the syrup to produce wine. There is also less demand for wine than beer and soft drinks, so having numerous wine bottlers around the country would probably not be economically feasible.

11.2.3: *What is an example of a product purchased by consumers that is made of copper?*

Almost all electrical wiring is made of copper.

11.2.4: *Although Pittsburgh's football team is named "Steelers," based on Figure 11-15, what city's team might be more appropriately given this nickname?*

Gary, Indiana, is the nation's largest steel producing area today. Gary is basically an extension of Chicago, so Chicago could rename their sports teams the "Steelers."

11.2.5: *Why is the percentage of steel in vehicles declining, while is the percentage of aluminum and plastic is increasing?*

People want better fuel economy more than ever these days. Steel is heavy and aluminum and plastic are light. Lighter cars usually have better miles per gallon.

11.2.6: *Labor accounts for around 5 percent of the cost of manufacturing a car. Does this mean that motor vehicle manufacturing is a labor-intensive industry? Explain.*

Car manufacturing is not a labor intense industry. A labor intense industry is an industry in which wages and other compensation paid to employees constitutes a high percentage of expenses.

11.2.7: *Check the labels on the clothes you are wearing. Where were they made?*

My shirt is made in India and my pants are made in China.

11.3.1: *Google “What replaced CFCs”? What gas is now most commonly used as a coolant instead of CFCs?*

Hydrochlorofluorocarbons have replaced CFCs. Hydrochlorofluorocarbons are much better for the ozone layer than CFCs.

11.3.2: *What environmental features can be seen in Mexico City on a clear day but not during smog periods? What is their role in the city’s air pollution problem?*

You cannot see the mountains surrounding Mexico City on a smoggy day. The surrounding mountains do not let the polluted air in the Valley of Mexico dissipate. We have a similar situation in Los Angeles. You can’t see our local mountains on a smoggy day and those mountains do not let the polluted air leave the Los Angeles Basin.

11.3.3: *How might sustainable agriculture practices, as discussed in Chapter 10, help to improve water quality?*

Less pesticides and fertilizers are used in sustainable agriculture. This has improved the local water quality near farms that use sustainable agricultural practices. Pesticides and fertilizers can turn rivers and lakes into biological deserts.

11.4.1: *Laws to curb unions have been enacted or proposed in several U.S. states in the past few years. What are the arguments in favor of and against restricting unions?*

Unions are good for the employees, but they hurt business overall. Many foreign companies will not start a business in a state that does not have right-to-work laws. Most foreign companies do not want to be stuck in litigation hearings with union representatives and lawyers trying to negotiate new labor contracts.

It is counterproductive to the business. Between 1996 and 2006, auto related manufacturing jobs fell by 34 percent in Michigan (closed shop state) and auto-related manufacturing jobs in Kentucky (open shop state) increased by 152 percent during that period.

11.4.2: *Can you identify any products in your house that were made in Mexico?*

My car was made in Mexico. I bought a Nissan Versa a few years ago and was surprised to find out it was made in Mexico. Living in Southern California, I probably own quite a few household items made in Mexico. I just bought avocados and mangos at the grocery store the other day and noticed they were grown in Mexico.

11.4.3: *Why might weather conditions encourage companies to locate factories in the U.S. South rather than the North?*

With many car manufacturers using just-in-time delivery, it would be advantageous for them to locate in areas that don't have the possibility of blizzards and heavy snow. If the highways adjacent to the factory get shut down due to ice or snow, production at the factory ceases. The factory will have to wait until the weather improves to begin operating.

Google Earth Questions

GOOGLE EARTH 11.1: *Coalbrookdale, England, is considered the birthplace of the Industrial Revolution, because a factory here was the first to produce high-quality iron using coal. What structure, visible in 3D, was the first in the world to be made of cast iron?*

The Iron Bridge.

GOOGLE EARTH 11.2: *The largest steel works in the United States, the US Steel complex at Gary, Indiana, sits at the south end of Lake Michigan. How many modes of transport delivering raw materials to the plant can you see?*

Trucks and trains.

GOOGLE EARTH 11.3: *The world's largest electronics manufacturer, FoxConn, has a large complex in Longhua, Shenzhen, China. How many different FoxConn buildings are labeled in Longhua?*

10.

GOOGLE EARTH 11.4: *If you fly to Ciudad Acuna, Mexico, several maquiladora plants can be seen on the northern edge of the city, near the U.S. border, along the Rio Grande River (Rio Bravo in Spanish). What is the distance from the maquiladora complex to the nearest border crossing?*

Approximately 1.8 kilometers.

Resources

Roger and Me

This 1989 film chronicles the effects of GM plant closures in Flint, Michigan, as the job losses ripple throughout the city, resulting in economic depression. Students might be assigned the film as an out-of-class paper project or shown part of the film in class.

The Urban Game

The Urban Game, developed by Larry Treadwell of Ft. Lauderdale (Florida) High School, provided students with a hands-on stimulation of the development and industrialization of urban areas in the first 100 years of the industrial revolution. A full round of the game will take students about 1½ to two hours, but stages may be combined to speed the process.

Consider modifying the game into an assignment or breaking the class into small groups to accomplish the activity.

www.thecaveonline.com/APEH/TheUrbanGame.htm

Office of the United States Trade Representative

The Office of the U.S. Trade Representative serves as a bulldog for American trade policy. This website promotes U.S. trade policy, defending everything from the North American Free Trade Agreement to development through trade:

www.ustr.gov/

U.S. Department of Labor Bureau of Labor Statistics

This website provides enough statistics on labor and industry to last a lifetime, including detailed statistics on labor, job markets, inflation, productivity, unemployment, and much more.

www.bis.gov/

Connections between Chapters

Back to Chapters 9 and 10

Industry and agriculture are not closely related. However, when agricultural workers leave their farms to work in industries, the country's food supply may be changed as factory workers can no longer grow their own food. This relates to a country's attempts to develop, referring back to Chapter 9.

Forward to Chapter 12

As industrial employment declines continue, job losses are usually made up in the service sector. However, some services are now being outsourced to off-shore locations. This issue serves as the case study for Chapter.