

UNIT 2

What Is Economics?

Economics is the study of the consumption, production, distribution, and exchange of goods and services. Economics helps us understand how a variety of resources—natural, biological, human, and capital—impacts the production of the goods and services that people want. The location and availability of these resources determine in part where certain products are produced and what they cost.

Economics examines the reasons countries throughout the world have become increasingly more interdependent as they work to maintain a favorable economy. Increased international trade in goods, services, and capital is a characteristic of our global economy.

Economics also focuses on individuals as people try to make and use their money wisely. Personal finance, including such topics as budgeting, banking, and credit, is an important economic concept.

Finally, decision making is an important part of economics. Producers constantly face decisions about what and how much to produce given limited resources and markets. Consumers constantly face decisions about what to buy given limited funds and unlimited needs and wants. Examining choices and consequences is necessary in order to make informed decisions.

In this unit, you will

- develop an understanding of economic principles, including scarcity and choice, productivity, markets and prices, supply and demand, competition, the role of government, international trade factors, and consumer decisions in a global economy.
- examine economic principles in different periods of history.
- work individually and collaboratively to analyze how economic principles affect your daily life.
- examine the importance of financial planning.

As you study the next two chapters, more specific objectives will provide you with opportunities to apply these economic concepts.



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CHAPTER 3

The Economy of West Virginia

CHAPTER PREVIEW

TERMS

economics, goods, services, producer, consumer, natural resource, human resource, capital resource, scarcity, trade-off, supply, demand, profit, traditional economy, command economy, market economy, nonrenewable resource, renewable resource, mineral resources, rock salt, brine, biological resources, industry, conservation, subsistence farmer, cash crop, bituminous, raw material, interstate commerce

PEOPLE

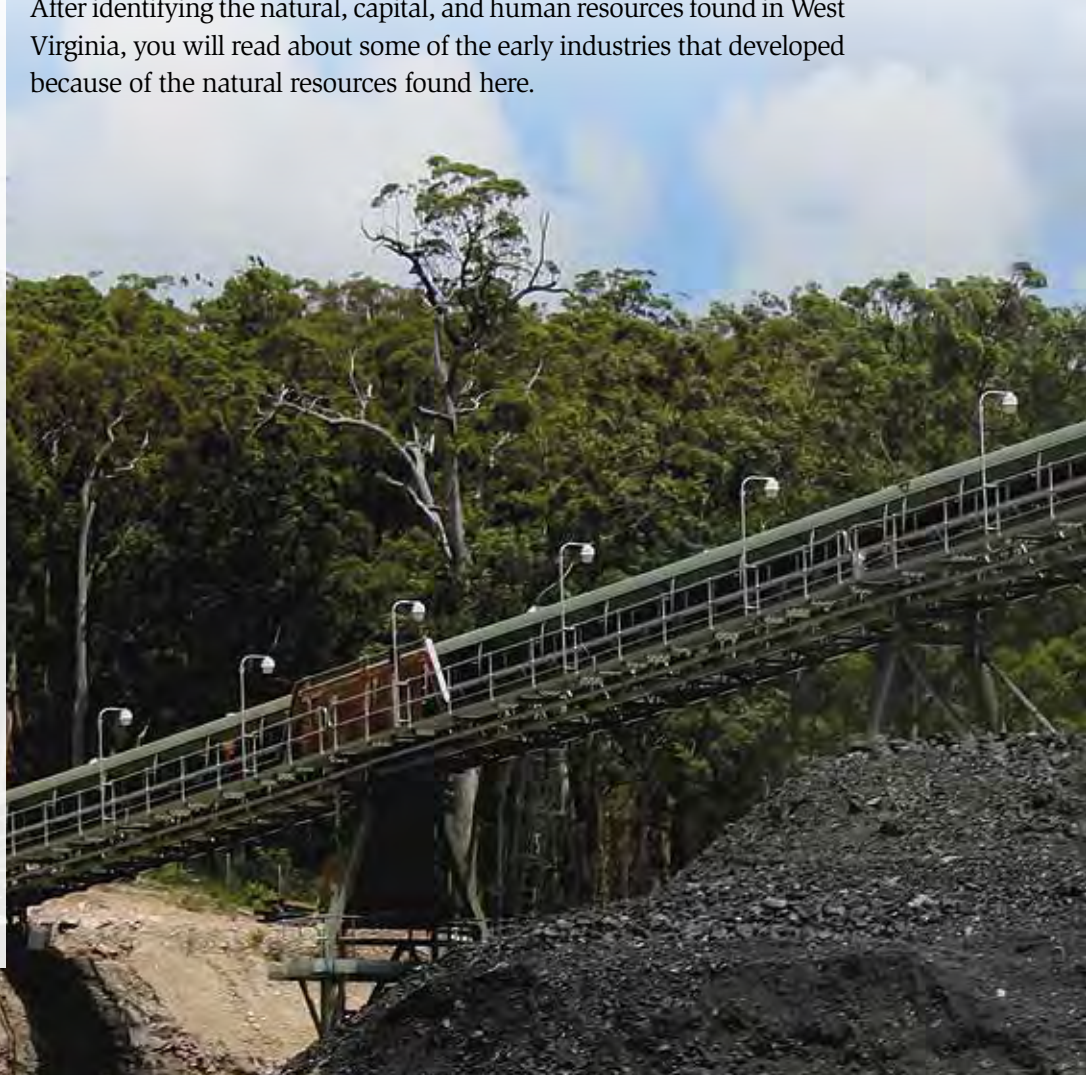
Elisha Brooks, Joseph and David Ruffner, Peter Tarr, Ernest T. Weir, Thomas W. Grimes, William and John Rathbone, William J. Blenko, Michael J. Owens

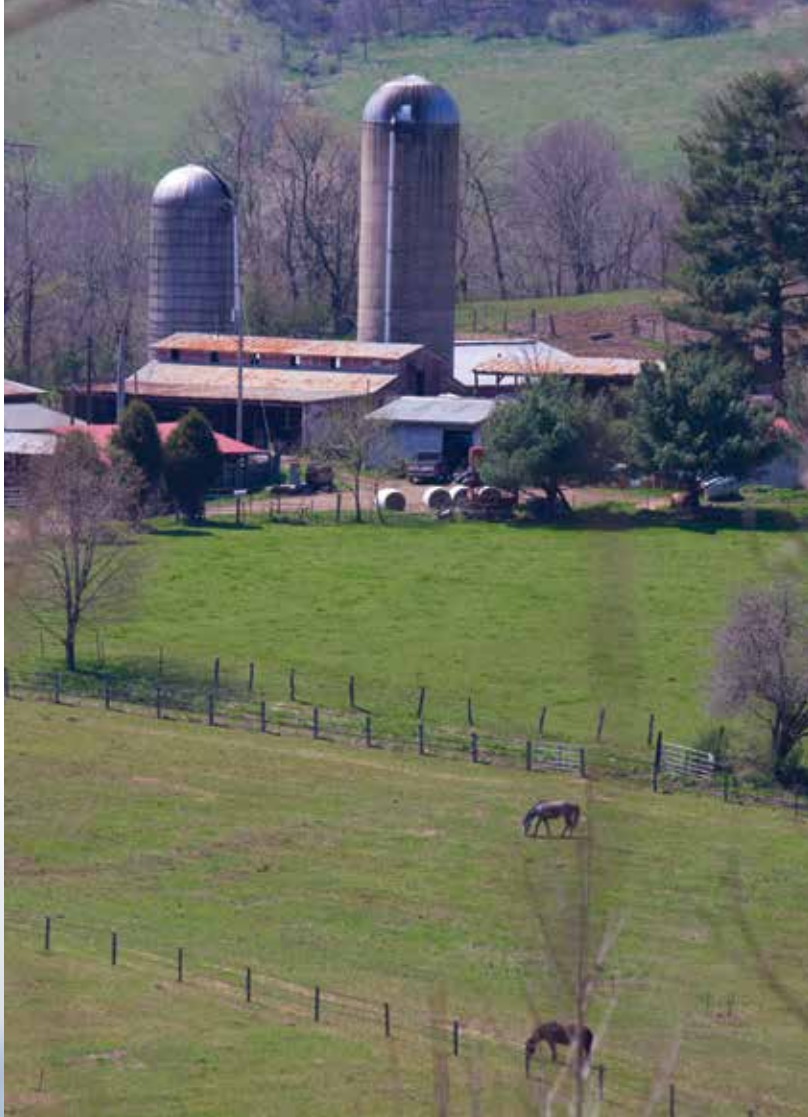
PLACES

Malden, Bulltown, Wheeling, Weirton, Burning Springs, Clendenin

Our study of economics begins with some basic terms. An examination of the resources needed in the production and distribution of goods and services illustrates the role that limited resources play in the amount of a product produced as well as its cost. The availability of resources—both natural and human—also affects which industries develop.

In this chapter, you will learn basic economic terms. You will then apply your understanding of these terms to a real-life economic situation. After identifying the natural, capital, and human resources found in West Virginia, you will read about some of the early industries that developed because of the natural resources found here.





Bottom: West Virginia is one of the world's largest coal-producing areas. **Left:** The average size of farms in West Virginia is just under 160 acres.





SIGNS of the TIMES

WEST VIRGINIA VITAL STATISTICS

AGRICULTURAL INDUSTRY

23,200 farms in 2017
95 percent of the farms are family owned
Total farmland is 3.7 million acres

COAL INDUSTRY

Ranks 2nd nationally
Marshall County was the largest producer of coal in 2016

SALT INDUSTRY

Ranks 9th nationally
An artisanal salt (gourmet sea salt) industry was revived in Malden in 2013

OIL AND NATURAL GAS INDUSTRY

Ranked 17th nationally in the production of crude oil in 2017
Ranked 7th nationally in the production of natural gas in 2018
Has 28 trillion cubic feet of natural gas in reserve
Wetzel County generated the largest amount of gas property tax (\$15,375,578) in 2017

SAND, GRAVEL, AND STONE INDUSTRY

Millville Quarry is the largest crushed stone operation
Ranks 25th nationally in the production of crushed stone

TIMBER INDUSTRY

Ranks 3rd nationally among most heavily forested states
Produces more than 700 million board feet of lumber annually

LOCATION

West Virginia's Potomac Section leads the state in agriculture production
Coal is mostly found in the Allegheny Highlands and Allegheny Plateau regions
Wyoming County consistently is a leader in producing natural gas
Most of the state's sand, gravel, and stone are found along the Ohio River

Making Decisions

DEFINING THE SKILL

Decision making can be defined as choosing between two or more alternatives. The decision-making process contains the following steps:

1. Identify the problem or the choice to be made.
2. List the possible solutions (alternatives).
3. Evaluate the pros and cons of each alternative.
4. Make a decision.
5. Justify your choice.

PRACTICING THE SKILL

You are asked to make decisions every day. Those decisions may range from choosing what to eat to deciding how to spend your money. Copy the decision-making organizer that follows onto a separate sheet of paper. Then, think about a decision you must make, such as what to wear to school tomorrow or what to do on the weekend. Write the problem you are solving on the organizer. Then, write three actions that you might take. Write pros and cons for each proposed action. Finally, based on the pros and cons, make a decision and record the decision on the last line of the organizer.

Decision Making

| | | |
|------------------|---------------|---------------|
| Problem: | | |
| Alternative 1 | Alternative 2 | Alternative 3 |
| Pros: | Pros: | Pros: |
| Cons: | Cons: | Cons: |
| Decision: | | |

Basic Economic Concepts

As you read, look for

- how people satisfy their needs and wants;
- the four basic economic questions;
- types of economic systems;
- terms: **goods, services, producer, consumer, natural resource, human resource, capital resource, scarcity, trade-off, supply, demand, profit, traditional economy, command economy, market economy.**

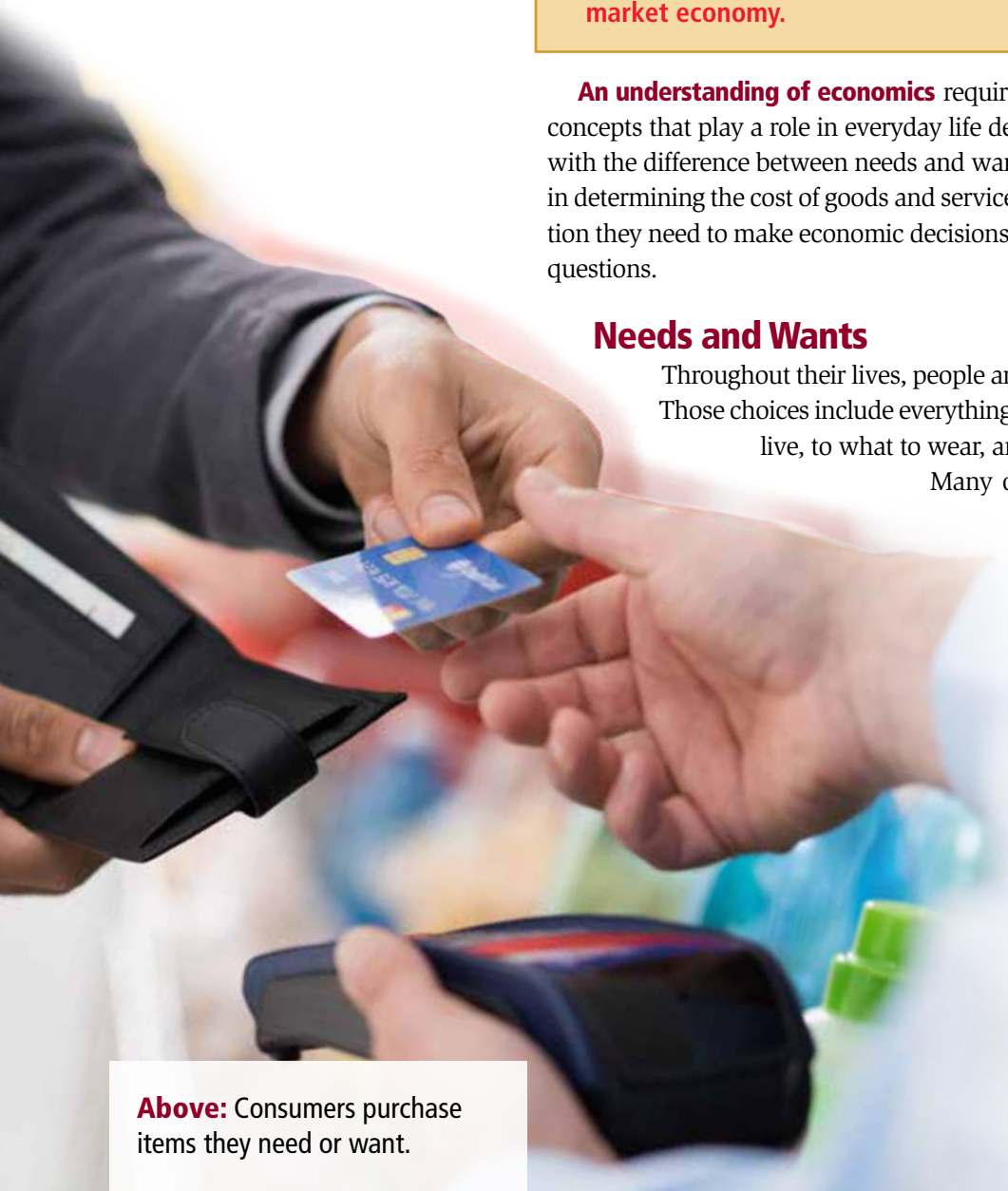
An understanding of economics requires an understanding of basic concepts that play a role in everyday life decisions. These concepts start with the difference between needs and wants and the role scarcity plays in determining the cost of goods and services. Producers get the information they need to make economic decisions by answering four economic questions.

Needs and Wants

Throughout their lives, people are faced with making choices. Those choices include everything from what to eat, to where to live, to what to wear, and whether to do homework.

Many of these choices are affected by decisions about needs and wants.

All people throughout the world have the same basic *needs*—food, clothing, and shelter. But people’s *wants*—things that they would like to have to make their lives more comfortable—are almost unlimited. People usually want more things than they need.



Above: Consumers purchase items they need or want.



Top: An apple is an example of a good. **Below:** A hairdresser performs a service.

To satisfy their needs and wants, people buy goods and services. **Goods** are tangible (touchable) things such as food, clothing, cars, video games, and smartphones. **Services**, on the other hand, are activities people do for a fee. Examples of services include car repairs, house painting, concerts, and babysitting.

Someone or some group must provide thousands, even millions, of goods and services to meet people's needs and wants. The person or business that makes the goods or provides the services is known as a **producer**. Producers make automobiles, toys, clothing, and food products. Producers also cut hair, provide health care, and give legal advice. A person who purchases a product or service is known as a **consumer**. You are a consumer when you pay for a haircut or buy a cell phone.



Focus on Technology

LITERACY SKILL: CITING EVIDENCE

Use an acceptable format to cite copyrighted material.

TECHNOLOGY TOOL: WORD PROCESSING

Cite sources of copyrighted material in papers, projects, and multimedia presentations.

Use a variety of search engines to find information (history, economic impact, number of employees, etc.) about one of the businesses in your county. Use the information obtained to write a short report. Cite the sources that were used to gather the information in a Works Cited page at the end of the report.



Resources and Scarcity

There are three types of resources—natural, human, and capital—needed to produce goods and services. **Natural resources** come from nature; they are part of the natural environment and include water, trees, and minerals. **Human resources** are the people who produce goods or provide services. **Capital resources** are the money or property—factories, tools, bridges, machines, and other items—used to produce goods and services. Examples of capital resources in West Virginia are chemical plants, coal mining equipment, office buildings, copy machines, and information systems. Transportation systems—bridges, highways, and airports—are also capital resources.

Although the needs and wants of consumers are unlimited, the resources required to satisfy them may not be. Any resource may at times be limited. As a result, the limited resource affects what and how much of a product can be produced. When this happens, the product or service is said to be scarce. This **scarcity** affects the price of an item; prices are generally higher on products or services that are limited. For example, if you want to purchase a ticket to a sold-out concert or buy a limited-edition piece of glassware, you might have to pay a higher price.



Top: Tickets for a concert can be a scarce item. **Bottom:** Equipment, a capital resource, is used to provide goods and services.



Making Choices

Scarcity has a major effect on a country's economy by forcing both consumers and producers to make difficult choices. To make the best choice as a consumer, you should think about the goal you want to accomplish and how the decision you make will affect that goal. You should identify all the possible alternatives and weigh the advantages and disadvantages of each. Then, you can make the best choice based on the information you have. Producers go through the same process.

Trade-Offs

Some choices involve trade-offs. A **trade-off** occurs when you give up one thing in order to achieve a more desirable outcome. A trade-off is something like a compromise. Sometimes an either/or choice is not the best choice. In that case, a trade-off may be preferable.

For example, after high school, you can either get a job or go to college. Suppose you want to go to college, but you don't have the money to satisfy this want. You might choose to take a part-time job and enroll in a local community college. You decide that the alternative of limiting your choices to either going to college or working is not really best for you. Therefore, you combine your options to get what you want and need.



Supply and Demand

The production and sale of goods and services are influenced by supply and demand. **Supply** is the quantity of a good or service offered for sale. Producers regulate supply by deciding how much of a good or service to offer for sale. **Demand**, on the other hand, is the quantity of a good or service consumers are willing and able to buy.

Generally, consumers buy more goods or services when the price of those items is low; they buy fewer items at higher prices. Producers, on the other hand, make more of a particular item to sell if the price they can charge is high; they make fewer of those items if the price is low. For example, if the price of a video game is \$1, no one would produce them because, at that price, producers could not make a profit. (A **profit** is the amount left after costs are subtracted from the price.) Producers would prefer to sell a video game for \$100 and make a high profit. However, that too is not likely to happen since consumers would not buy them at that price.

In the American economy, producers and consumers reach a balance between supply and demand. The price has to be high enough for producers to be willing to supply the goods or services and low enough for consumers to demand (or buy) them.



Opposite Page, Top: People of all ages must make choices every day. **Opposite Page, Bottom:** Some choose to find a job to help pay for school. **Left:** Production of bottles is driven by the demand for the product.

Below: Candy sales are popular fund-raisers, but the seller must have the capital resources to buy the candy to resell. **Opposite Page:** Having a car wash could be a good fund-raiser if the organization has enough human resources.

Basic Economic Questions

Every economy functions by answering four basic economic questions: (1) what to produce, (2) how to produce, (3) how much to produce, and (4) for whom to produce.

People often join together in an economic group to meet their needs and wants. For example, suppose a class in Logan County wants to take a field trip to Charleston, and they want to pay for the trip themselves. The class has to make a decision about how to make the money they need to satisfy their want. They start by answering the first of the four economic questions: What will they produce? After much discussion, the class narrows the choices to having a candy sale or a car wash.

To help them decide which fund-raiser is best, the students examine the resources that they have. If they choose a candy sale, they need money (a capital resource) to buy candy to resell. However, they don't have much money. Although they have limited capital resources, they do have adequate human resources. The thirty students (a human resource) in the class can provide the labor needed for a car wash. Based on their available resources, the class decides to have a car wash. They now know that what they are going to produce is a service.

After deciding what to produce, the students must decide how to do it. When will they have the car wash? Where will they have it? What will the work schedule be? What supplies will they need? How will they wash each car? When they have answered these questions, they will have a plan that answers the second economic question: How will they produce their service?

To address the third question—How much can they produce?—the students consider such things as time and resources.

Because they have a limited amount of time and a limited number of students, they cannot wash an unlimited number of cars. Their community also has a limited number of people who might want a car wash. The students must consider the economic concept of scarcity as they decide how much to produce.

To answer the fourth economic question—

For whom are they producing?—the students need to know



more about their consumers. Who might pay for a car wash? What consumers will they target? Do they choose a location with heavy traffic and count on attracting people who pass by? Do they advertise the car wash in advance and perhaps attract more people?

Now suppose that, as they are finalizing their plans, the students learn that other factors may influence their economic decisions. They learn that a club from another school is having a car wash across the street on the same day. Since they have competition, their teacher tells them they must consider the impact of supply and demand.

The supply of car washes is now two instead of one. How will this affect the demand for their car wash? Their teacher reminds them that demand means how many people will want to get a car wash from them. What happens when consumers have two car washes to choose from? Are there enough available consumers for both car washes to succeed?

How can they plan for this competition? Will they have to offer a lower price than the other group to attract consumers? What if the other group responds with an even lower price?

As you can see, planning a simple fund-raiser—like a car wash— involves applying all the economic concepts that were introduced in this section of the chapter. By answering the four economic questions, the students in Logan County followed the same process as the decision makers at large corporations like Ford or Sony as well as the owners of small, local businesses.



| TRADITIONAL ECONOMY | COMMAND ECONOMY | MARKET ECONOMY | MIXED ECONOMY |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> • Most basic and ancient economy • Economic decisions made based on beliefs, customs, and traditions • Often revolves around farming • Does not generate large surpluses • Found in rural areas of second- and third-world countries | <ul style="list-style-type: none"> • Controlled by a dominant, central power, e.g., government • Valuable resources controlled by the government • Less flexible and slower to react to economic change • Mostly found in communist countries, e.g., North Korea | <ul style="list-style-type: none"> • No government involvement in pure market economy • No pure market economies exist • In non-pure market economies <ul style="list-style-type: none"> - economy regulated by people and the law of supply and demand - provides free markets - provides opportunities for individual wealth and power | <ul style="list-style-type: none"> • Combines command and market ideas • The people control the economy with strong government regulation • Most industries privately owned, but some public utilities are still under government control |

Figure 3.1

Types of Economies

Economic Systems

A person who studies the economy is called an *economist*. Economists have identified three basic kinds of economies—traditional, command, and market. An economy, however, may also function as a combination of these three. The economies basically differ in who answers or what influences the answers to the four basic economic questions.

In a **traditional economy**, customs, habits, and beliefs determine how the four basic economic questions are answered. If the class in Logan County has a candy sale because all the classes for the last twenty years have had candy sales, their economy may be defined as traditional. They follow custom and answer the economic questions the way earlier classes have. They may even say it is a school tradition to have a candy sale.

In a **command economy**, the government controls the economy and answers the four basic economic questions. If the students have a car wash because the principal says this is the only kind of fund-raiser they can have, they are operating in a command economy. In this case, the principal is like a government, making the decisions to answer the economic questions. One positive effect of having the principal involved in the decision making is that he or she can take advantage of the power and authority of the position. The principal could even have a conversation with the principal at the other school, which could result in an agreement to hold the car washes on different weekends. This is similar to the process governments use to control competition in a command economy.

something extra!



The work of Scottish philosopher Adam Smith (1723-1790) helped to create the modern discipline of economics.

In a **market economy**, individuals answer the four basic economic questions based on supply and demand. This economic system is also known as *free enterprise* and is based on private ownership and the freedom of individuals to make economic choices. This is the economic system of the United States. If the students are allowed to answer the questions about their car wash themselves, they have a market economy. To be successful in such a market economy, the students must answer the four economic questions carefully, making informed decisions based on the information they gather.

Background: The fund-raising decisions of the students in a school can be driven by three different economic systems – traditional, command, or market.

Reviewing the Section

Reviewing the Content

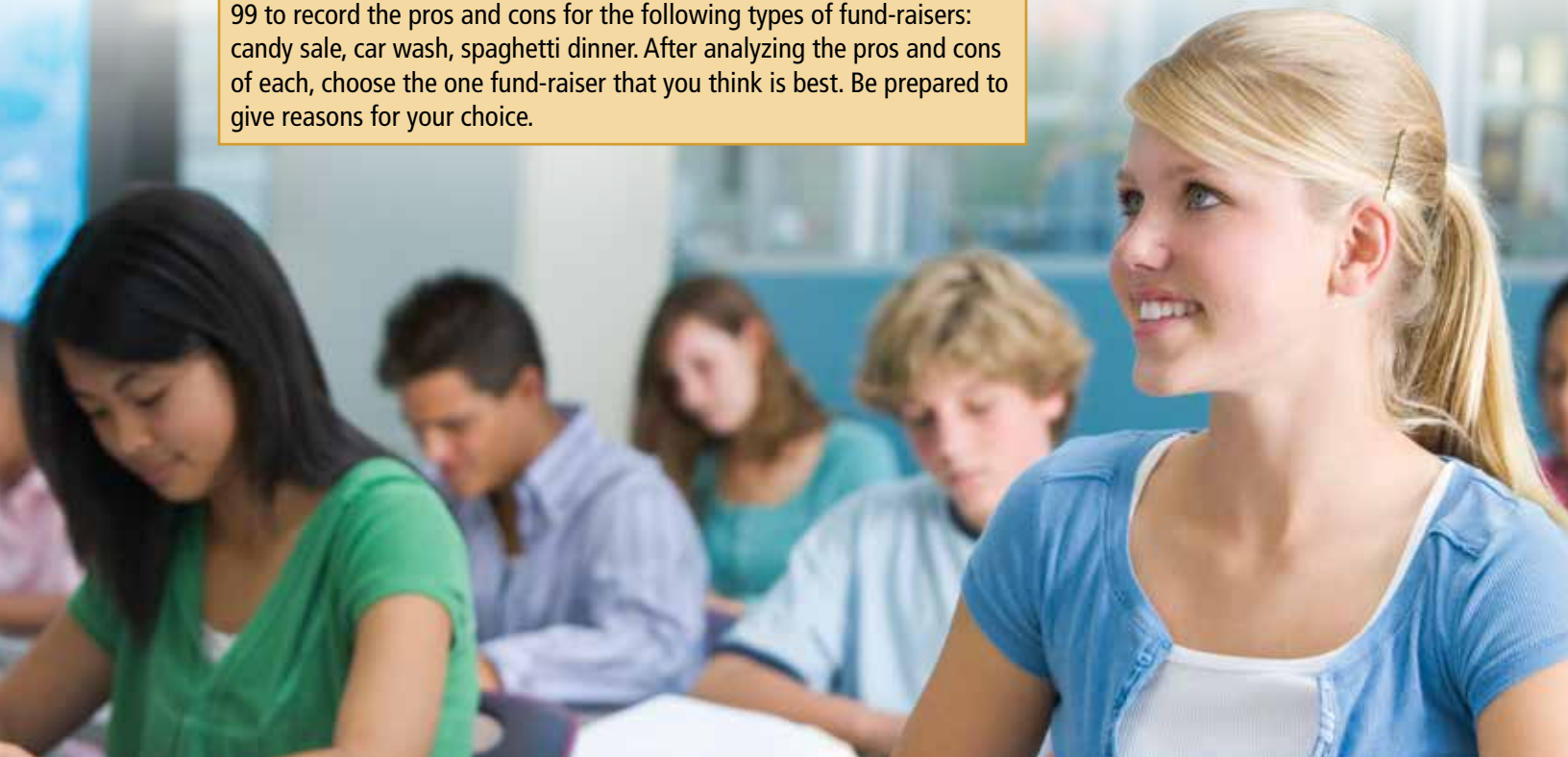
1. What influences the cost of an item?
2. Which economic concept do you think most affects economic decisions?
3. What is the first economic question a producer must answer?

Using the Content

Pretend that you are planning a yard sale. Create a newspaper ad to advertise your sale to your consumers. Be sure the ad addresses your target market.

Extending the Literacy Skill

Pretend that you are going to have a fund-raiser to earn money for a field trip. Your class is trying to decide which type of fund-raiser will bring in the most money. Use a decision-making organizer like the one on page 99 to record the pros and cons for the following types of fund-raisers: candy sale, car wash, spaghetti dinner. After analyzing the pros and cons of each, choose the one fund-raiser that you think is best. Be prepared to give reasons for your choice.



West Virginia's Resources

As you read, look for

- the types of resources needed to produce goods and services;
- examples of nonrenewable and renewable resources;
- terms: **nonrenewable resource, renewable resource, mineral resources, rock salt, brine, biological resources.**



An economic system uses human resources, capital resources, and natural resources to produce goods and services. Capital and human resources refer to money, equipment, material, and labor. If any of these resources are limited, production and consumption are limited as well. Natural resources are either **nonrenewable** (they cannot be replaced by nature once they are used) or **renewable** (they can replace themselves over time). The availability of natural resources affects what can be produced and, thus, what can be consumed.

Above: Coal is an important natural resource in West Virginia.

Natural Resources

West Virginia's natural resources are gifts of nature. They include air, water, soil, and minerals. Natural resources are the base for a variety of economic activities that are unique to certain geographic regions of the state. The rich limestone-based soil in the eastern panhandle of the Potomac Section supports a large agricultural, poultry, and livestock economy. The Allegheny Highlands region is the location of major wood-related industries. Minerals such as coal, limestone, sand, shale, and clay have encouraged the growth of industry there as well. The Allegheny Plateau region, like the Allegheny Highlands, contains coal, oil, and natural gas. Finally, the economy of the Ohio River Valley region is affected by the Ohio River as well as minerals like oil and natural gas.

Water

Water is abundant throughout West Virginia. The state's lakes, rivers, and rainfall provide enough water for commercial and private use. Waterways also provide transportation and recreation in all areas of the state.

Soil

Farming has always played an important role in West Virginia's economy. The composition of soil affects what agricultural products can be grown. Much of West Virginia's soil is shallow, clay-based, and acidic. Limestone bedrock (the solid rock below the soil) helps to neutralize the natural acidity of the soil and makes it more productive. The soil near floodplains tends to be more fertile.

Bottom: The limestone in the eastern panhandle makes the soil fertile and good for agriculture.

Below: Waterways are used to transport goods.





Map 3.1

West Virginia's Coal-Producing Counties

Map Skill: Is coal produced in the eastern panhandle?

Mineral Resources

Mineral resources are nonrenewable, inorganic substances that were formed by Earth's geological processes. Coal, salt, oil, natural gas, and sand/gravel and stone are mineral resources that have played a role in the development of the state's industry. Today, some of the minerals are not as economically important as they were in the nineteenth century.

Coal

Coal was first discovered in western Virginia in 1742. Today, West Virginia is one of the world's largest coal-producing areas. Coal is found in 53 of the state's 55 counties; only Jefferson and Hardy Counties have no coal. Although 53 counties have coal, it is mined in only 28 of those counties.



something
extra!

Only the state of Wyoming produces more coal than West Virginia.

In 2016, the state produced 80 million tons of coal, the lowest amount since the 1920s. West Virginia's production was 11 percent of the coal produced nationally.

Salt

Salt was first processed in western Virginia by Native Americans. The Indians followed bison and deer to the *salt licks*, places where animals go to lick rock or earth covered with salt. The Indians also got the white substance from the salt licks. Sometimes the Indians used the salt in trade as a form of money.

In the twenty-first century, West Virginia remains a large producer of salt in the United States, producing between 600,000 and 1,000,000 tons of salt a year. West Virginia has two types of salt deposits. The northern region of the state contains **rock salt**, solid masses of salt found deep below Earth's surface. The best part of the state for recovering rock salt is along the Ohio River from Hancock County to Pleasants County. The rock salt deposits found there influenced Pittsburgh Plate Glass, Allied Chemical Corporation, and Food Machinery Corporation to locate in the northern part of the state.

Below: West Virginia is one of the world's largest coal-producing areas. **Inset:** West Virginia ranks 9th nationally in the production of salt.





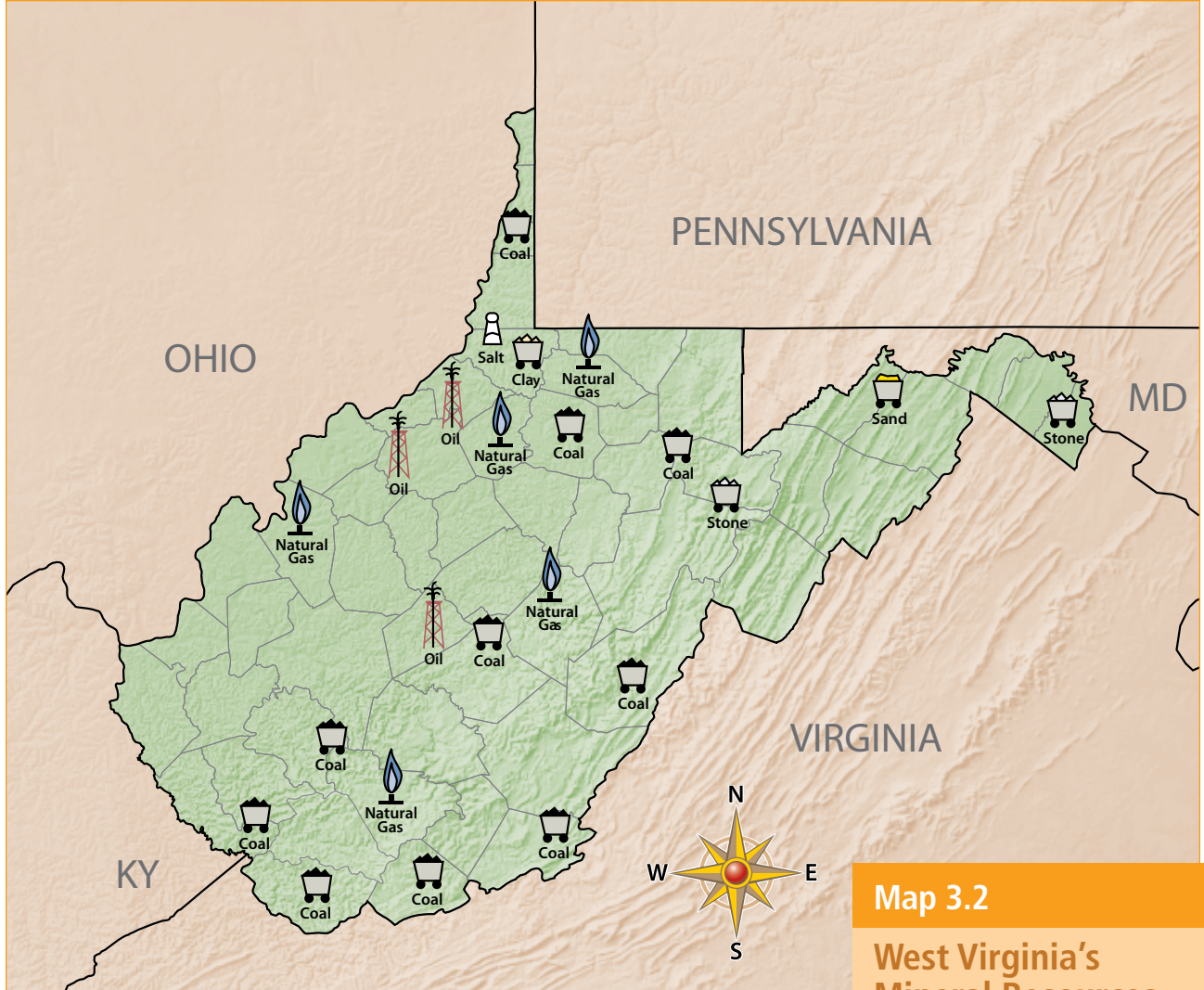
The central area of the state contains **brine** (a mixture of salt and water). Most West Virginia salt is produced by *solution mining*. Wells are drilled down to what is known as the “salt zone.” Then, fresh water is pumped into the well. The water dissolves the salt and is then pumped back to the surface through a nearby well. The salt from the brine is used to produce soda ash, chlorine, hydrochloric acid, bleaching powder, and other chemicals. According to the West Virginia Geological and Economic Survey, the state has enough salt resources to supply the nation’s needs for two thousand years. At least twenty-seven counties in the state can produce brine.

Oil and Natural Gas

Oil and natural gas are the second most important minerals in the state. Long before the arrival of Europeans, Native Americans may have used the “burning springs” and outflows of petroleum on the Little Kanawha, Kanawha, and Big Sandy Rivers as fuel.

Forty-nine of the state’s counties produce oil and natural gas. West Virginia oil amounts to less than 1 percent of the total output in the United States, but the state has estimated oil reserves of several million barrels. About 30 percent of the oil that is produced in West Virginia becomes lubricating oil, while 70 percent is made into wax and gasoline products. The only oil refinery in West Virginia is located in Newell, in the northern panhandle. Because there are no pipelines in the state to carry oil, barges are used to transport this resource.





Map 3.2
West Virginia's Mineral Resources
Map Skill: In what area of the state do most of the coal resources lie?

West Virginia ranked 7th nationally in the production of natural gas in 2017. Natural gas is found in 53 of the state's 55 counties; only Berkeley and Jefferson Counties do not have deposits of natural gas. In 2016, the leading natural gas-producing counties in the state were Doddridge, Wetzell, Marshall, Ritchie, Harrison, and Tyler.

Geological surveys indicate that several trillion cubic feet of natural gas are still untapped in the state. West Virginia is crossed by several thousand miles of interstate and intrastate pipelines that move gas from the state's more than 40,000 wells. Newer pipelines have been built to move the gas from the Marcellus Shale to markets in the Northeast, Midwest, and Gulf Coast.

Industry is the largest consumer of West Virginia's natural gas, and about one-half of the state's households use natural gas as their main energy source. During the winter months, West Virginia is a major supplier of natural gas to states throughout the northeastern United States.



Opposite Page, Top: West Virginia's chemical industry uses natural gas both as a fuel and as the "feedstock" for numerous products. **Left:** Many households use natural gas.



Sand/Gravel/Stone

Nonfuel minerals include cement, sand, gravel, and lime. Of the nonfuel minerals, crushed stone (limestone and sandstone) continues to be the most valuable. The top nonfuel minerals produced in West Virginia in 2017 were crushed stone, portland cement, and sand and gravel. Limestone is used to manufacture agricultural lime, steel, cement, and chemicals. Monongalia County was the state's largest producer of limestone, followed by Ritchie and Harrison Counties.



something
extra!

Only New Hampshire and Maine have more forested land than West Virginia.

Biological Resources

Biological resources are plants and animals, also called *flora* and *fauna*, respectively. Biological resources differ from mineral resources in that they are renewable and can replenish themselves over time.

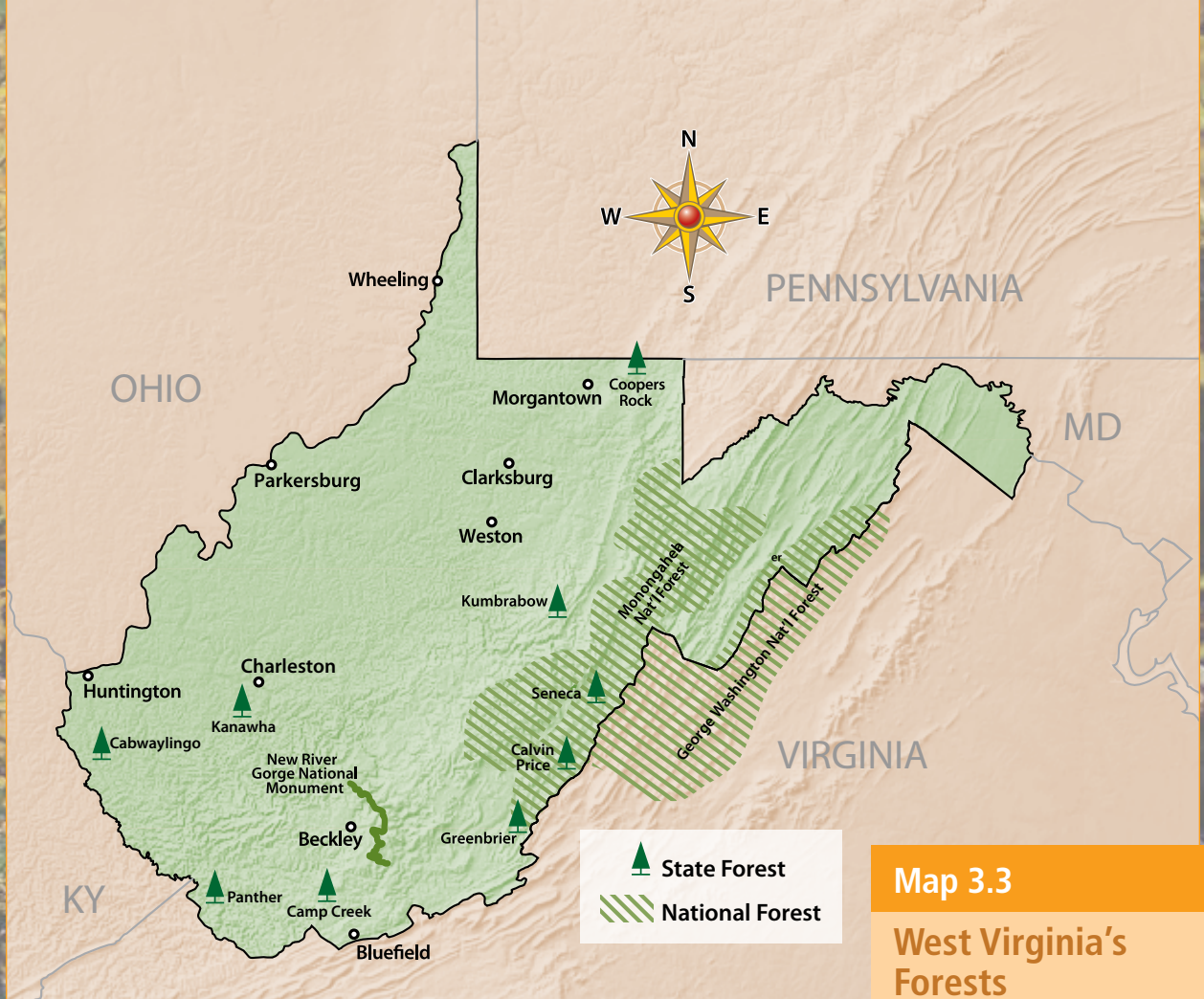
Forests

Money may not grow on trees, but trees can certainly bring money to the economy. West Virginia is located in the geographical center of the Appalachian hardwood belt. About 80 percent of the state is covered by forests, making it the third most forested state in the United States.

West Virginia has nine state forests covering more than 79,500 acres. State forests include Cabwaylingo, Calvin Price, Camp Creek, Coopers Rock, Greenbrier, Kanawha, Kumbrabow, Panther, and Seneca. Two national forests—the Monongahela and the George Washington and Jefferson—are also located in the Mountain State. The Monongahela National Forest includes 919,000 acres in ten counties, making it the fourth-largest national forest in twenty northeastern states.

In 2011, the timber industry produced 30,000 jobs in West Virginia. These jobs are not only in sawmills and shops that make furniture and kitchen cabinets, but also in container factories, tanneries, charcoal processing plants, and a variety of other areas. Some of the nation's largest

Top: Crushed stone is the most valuable nonfuel mineral produced in the state.



Map 3.3
West Virginia's Forests
Map Skill: Which state or national forest is closest to Weston?

wood products companies are represented in West Virginia, including Bruce Hardwood Floors, Coastal Lumber, Georgia-Pacific, Trus Joist MacMillan, Westvaco, and Weyerhaeuser.

Timber volume has increased, and more timber is being grown than is being cut. Hardwoods, like maple, oak, yellow poplar, and walnut, make up 94 percent of the total volume, and oak accounts for more than 40 percent of the hardwoods. West Virginia hardwoods are in great demand by furniture manufacturers. About 70 percent of all lumber and veneers (a thin layer of fine wood) produced in West Virginia is shipped to furniture manufacturers out of state.

The timber industry also means Christmas trees. Real West Virginia Christmas trees are a valuable, renewable natural resource. Raised on over four hundred farms, Christmas trees are a million dollar industry.

The state is exploring new uses for wood, including biomass energy. *Biomass* is usually thought of as garbage. It can include dead trees, tree branches, wood chips, bark, and sawdust. These items can be used to produce electricity, heat, compost materials, and fuel.



something extra!



The black bear is the state animal, and the brook trout is the state fish.

Wildlife

Animals have always helped satisfy human needs. West Virginia provides a home to some seventy species of animals. The largest animals found in the state are the black bear and the white-tailed deer. Although there have also been isolated sightings of other large animals, like the mountain lion and panther, the state is mostly inhabited by beavers, chipmunks, gray and red foxes, groundhogs, otters, opossums, rabbits, raccoons, skunks, and gray and red squirrels.

These animals are an economic resource as well as a source of sport for trappers and hunters. Seasons and limits on both activities are set by law and are enforced by the West Virginia Department of Natural Resources. Some of the most popular animals to hunt are deer, black bear, wild boar, and turkey. Some of the most popular animals to trap include beaver, bobcat, gray fox, red fox, mink, muskrat, skunk, raccoon, weasel, and opossum.



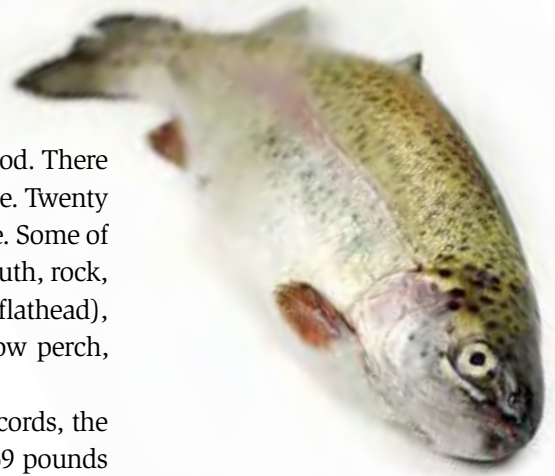
Above: White-tailed deer are found in almost every U.S. state.
Opposite Page: West Virginia's many lakes and rivers provide scenic spots to fish.

Fish

Fishing is popular in West Virginia for sport as well as for food. There are 178 species of fish plus 3 hybrid sport fish found in the state. Twenty percent of the fish are sport fish, while 80 percent are nongame. Some of the most common species include bass (largemouth, smallmouth, rock, spotted, striped), bluegill, bowfin, catfish (bullhead, channel, flathead), crappie, muskellunge, northern pike, sturgeon, walleye, yellow perch, and trout (brown, golden, rainbow, tiger, brook).

According to Division of Natural Resources state fishing records, the largest fish caught in the state was a grass carp weighing 71.69 pounds and measuring 50.75 inches. It was caught in 2005 in Warden Lake in Hardy County. The largest brook trout caught in the state weighed 7.64 pounds and measured 22.25 inches. It was caught in 2004 in Shavers Fork.

Fishing also attracts a growing number of tourists to West Virginia. The West Virginia Department of Natural Resources controls public fishing areas through management programs that assure anglers a variety of fishing experiences. This state government agency oversees such things as licensing, stocking streams, protecting fish habitats, and developing public access to fishing areas.



Reviewing the Section

Reviewing the Content

1. Name some of West Virginia's nonfuel minerals.
2. How many state forests are located in West Virginia?
3. What are some biological resources found in West Virginia?

Using the Content

Look at Map 3.2 on page 115. List the natural resources found in your county. Choose a county other than your own. Compare the resources in the two counties. Which county has the greatest potential for economic development based on your findings? Give reasons to support your answer.

Extending the Literacy Skill

Use a decision-making organizer to help you create a plan to conserve West Virginia's natural resources. On the organizer, list three things that might happen if people do not take care of natural resources. After examining the pros and cons of each idea, decide which result would be the most devastating. Highlighting your choice, develop a slogan to promote conservation.



West Virginia's Early Industries

As you read, look for

- the early industries that developed in western Virginia;
- the minerals that helped certain industries develop;
- the impact of transportation on the development and growth of industry;
- the impact of the development and growth of industry on movement and population;
- terms: **industry, conservation, subsistence farmer, cash crop, bituminous, raw material, interstate commerce.**

Industry refers to the manufacture, production, and sale of goods.

Manufacturing has not always been done in large factories.

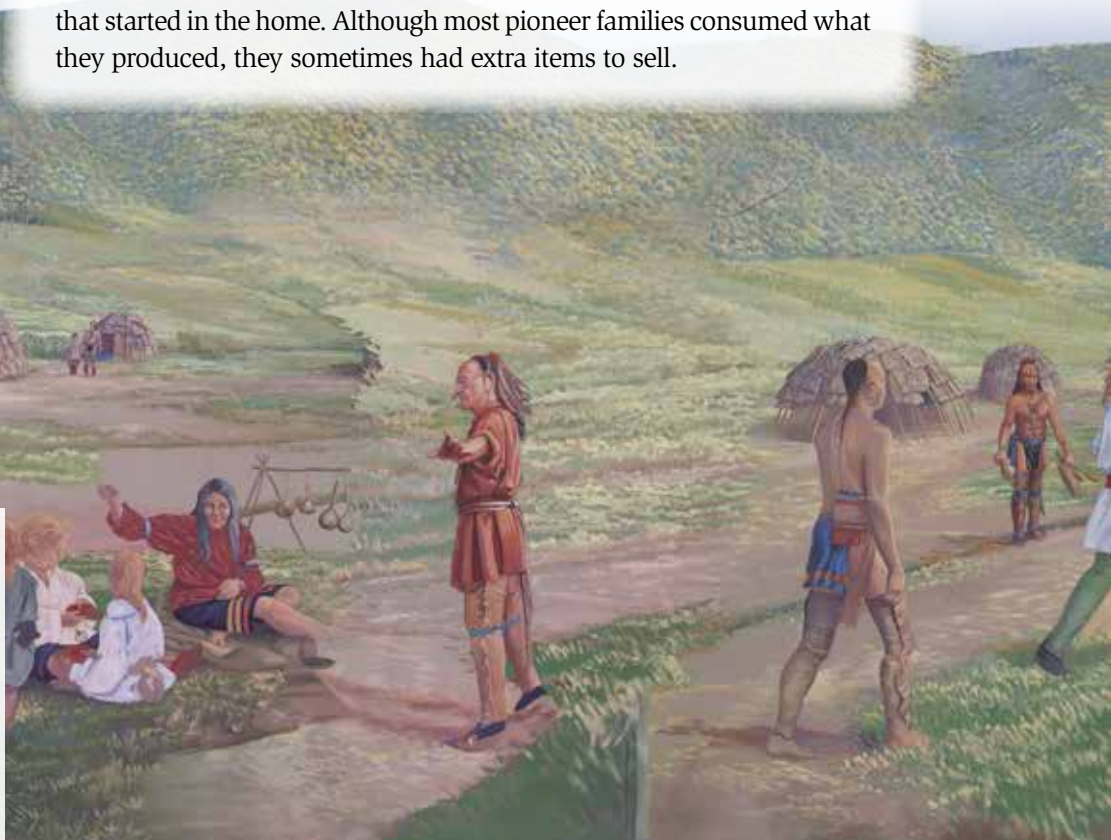
The word *manufacture* comes from a Latin word meaning “to make by hand.” Even before the Europeans entered present-day West Virginia, the Native Americans were “manufacturing” many items: clothing, canoes, tools, housing, and hunting weapons. The

first pioneer industries were *cottage industries*, industries that started in the home. Although most pioneer families consumed what they produced, they sometimes had extra items to sell.



Above: Early blacksmiths used an anvil made of iron.

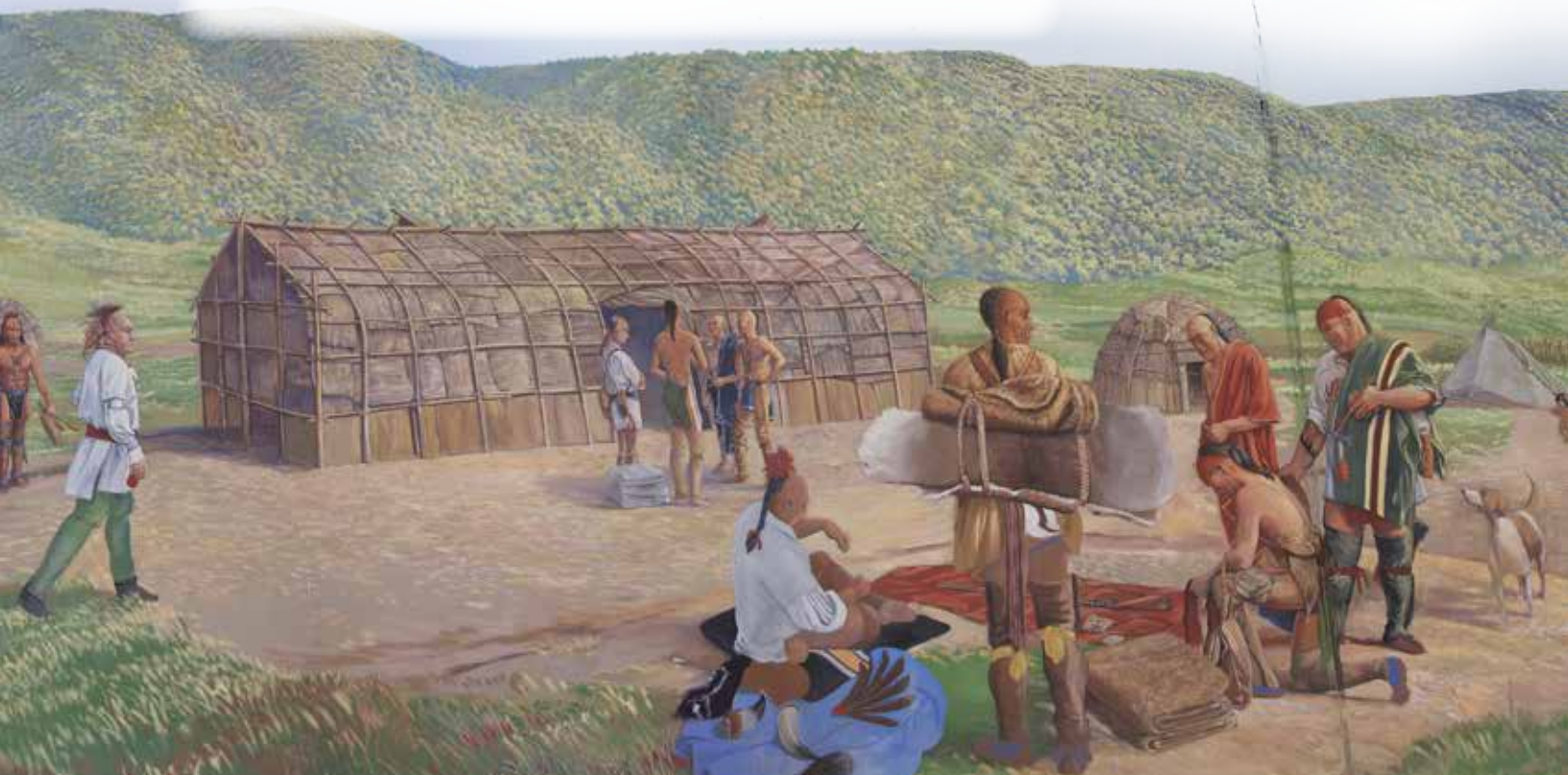
Bottom: A series of murals on the waterfront at Point Pleasant show early manufacturing methods of the Native Americans in the area.





Other industries had their beginnings in the early days of the republic. Industries such as salt, iron, timber, agriculture, coal, natural gas and petroleum, glass, chemicals, and electric power thrived because the area had the natural resources to support their development. These early western Virginia industries, however, were limited by the size of the market. Supply and demand dictated the amount of goods that were produced because those decisions were directly influenced by the number of consumers who were available to purchase them. As demands changed, industries changed to meet those demands. Many of the industries that began in West Virginia nearly two hundred years ago continue to exist side-by-side with more futuristic endeavors.

Above: Glade Creek Grist Mill at Babcock State Park is a living, working monument to the more than 500 mills that used to be located throughout the state.



Booker T. Washington

West Virginia has a rich history focused on many natural resources—not just coal. One such resource, salt, has been produced in the state since Kanawha Salines was established in Malden in 1797.

An early immigrant who came to work in the salt mines was a slave from Franklin County, Virginia, named Washington Ferguson. Wash, as he came to be called, escaped from slavery during the Civil War and found himself in Malden. After the war ended, his wife Jane, daughter Amanda, and two stepsons Booker and John received their freedom in Virginia and traveled over two hundred miles by wagon and on foot to join him.

Booker arrived in Malden at age nine with high hopes of a better life. He soon found that reality did



not meet his expectations. The Ferguson cabin was not part of the larger town of Tinkersville, where most of the black people lived, but in Malden itself. The cabins were close together and surrounded by garbage and outhouses. Drinking, gambling, and fighting were common experiences.

Booker quickly discovered that his stepfather had a selfish reason for having the family join him. Wash expected Booker and John to work with him in the mines to pack crystallized salt into barrels. The boys went to work from 4:00 am until 9:00 am each day.

Working in the mines resulted in two important events in Booker's life. The first was that he learned to read the number 18, which was used to designate the salt barrels. The second was that he was given a last name—Washington.

Booker wanted desperately to learn to read and tried unsuccessfully to teach himself. Wash reluctantly allowed him to attend a new day school in Tinkersville. That did not work out because his work in the mines interfered. When William Davis became the teacher at the Tinkersville School, he and Booker became friends. Davis modeled the importance of having energy and being dedicated to what you do. These were traits that Booker would use in his adult life. Perhaps Booker learned the biggest lessons of life when he moved into the house of General Lewis and Viola Ruffner to serve as Mrs. Ruffner's houseboy. The Ruffners were one of the most prominent families in the area. The \$5.00 per month that Mrs. Ruffner paid for his services went to Booker's stepfather.

Mrs. Ruffner taught Booker to read and allowed him to attend William Davis's school a few hours each afternoon. From Mrs. Ruffner, Booker learned the importance of hard work, cleanliness, and thrift. He learned to do things promptly and systematically with honesty and frankness.

During his time with the Ruffners, Booker witnessed a violent riot that occurred when a black man beat a white man in a fight. The humiliated white man swore out a peace warrant against the black man. The Ku Klux Klan vowed to stop any black man from testifying in the assault case. This incident resulted in a riot in which General Ruffner, who was try-





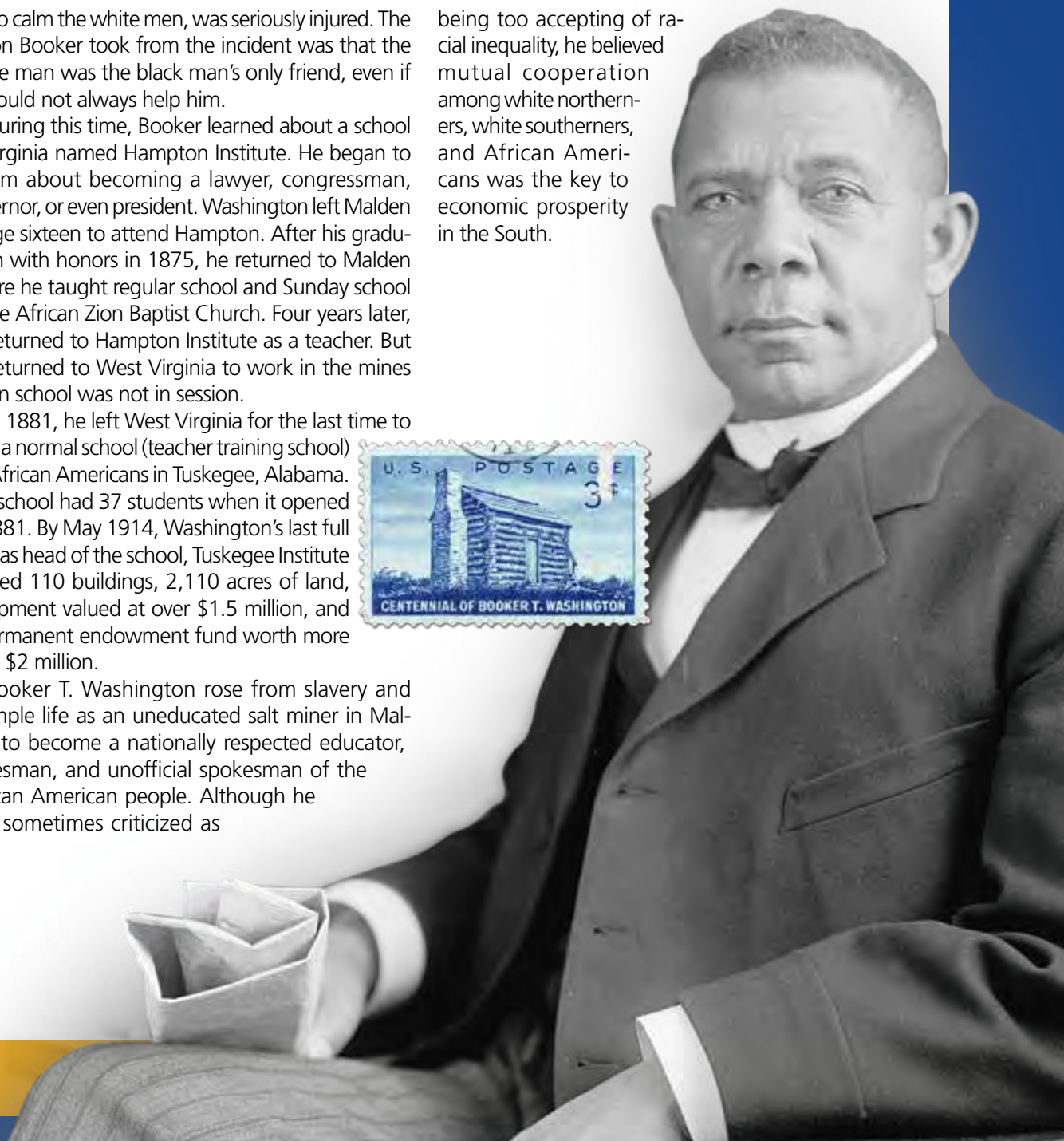
ing to calm the white men, was seriously injured. The lesson Booker took from the incident was that the white man was the black man's only friend, even if he could not always help him.

During this time, Booker learned about a school in Virginia named Hampton Institute. He began to dream about becoming a lawyer, congressman, governor, or even president. Washington left Malden at age sixteen to attend Hampton. After his graduation with honors in 1875, he returned to Malden where he taught regular school and Sunday school in the African Zion Baptist Church. Four years later, he returned to Hampton Institute as a teacher. But he returned to West Virginia to work in the mines when school was not in session.

In 1881, he left West Virginia for the last time to start a normal school (teacher training school) for African Americans in Tuskegee, Alabama. The school had 37 students when it opened in 1881. By May 1914, Washington's last full year as head of the school, Tuskegee Institute owned 110 buildings, 2,110 acres of land, equipment valued at over \$1.5 million, and a permanent endowment fund worth more than \$2 million.

Booker T. Washington rose from slavery and a simple life as an uneducated salt miner in Malden to become a nationally respected educator, statesman, and unofficial spokesman of the African American people. Although he was sometimes criticized as

being too accepting of racial inequality, he believed mutual cooperation among white northerners, white southerners, and African Americans was the key to economic prosperity in the South.



Bottom: Hartford City Coal and Salt Company in Mason County.

The Salt Industry

Salt, which both humans and animals need, was the first major industry to develop in western Virginia. One of the largest salt licks was at the present-day town of Malden in Kanawha County. Another important salt lick was located at Bulltown in present-day Braxton County.

In 1792, Adam O'Brien cut a trail from his cabin in Sutton to the salt lick at Bulltown so that the settlers in the area could use the lick. As the market for salt increased in the trans-Allegheny region, however, production methods changed. In 1797, Elisha Brooks set up his saltworks (a place to produce salt for sale) at Malden. His salt furnace evaporated the brine and produced 150 bushels of coarse salt a day. To get even more brine, Brooks sank "wells" of hollow gum trees 8-10 feet deep. The brine seeped into the wells and was dipped out by bucket.

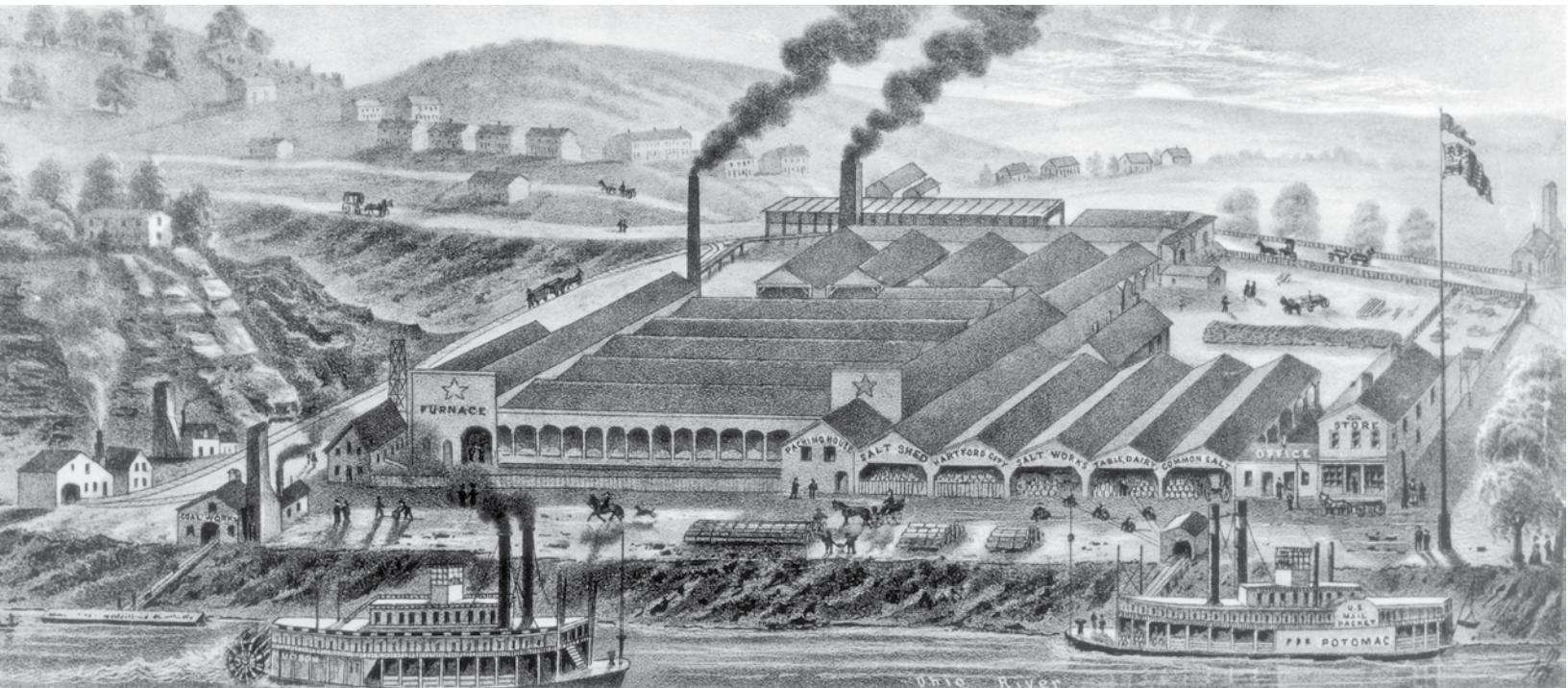
Brothers Joseph and David Ruffner followed Brooks's lead and began to produce salt in the Kanawha Salines field in 1808. The Ruffners operated a second furnace at Malden. As the American demand for salt increased, the Ruffners built facilities to produce finer salt in larger quantities. In 1809, John Haymond built a salt furnace at Bulltown that produced commercial salt for the next fifteen years. Congressman John G. Jackson built a salt furnace in 1810 on the West Fork River near Clarksburg, about thirty-five miles from Bulltown.

During the wars of the early 1800s, Great Britain controlled the seas, and the United States could not get foreign salt. The western Virginia salt fields increased production to meet the increased demand. When more salt wells were sunk, more workers were needed; many of those workers came from the slave population. When the wars ended, foreign suppliers reentered the market. The Kanawha field operators reacted by

something
extra!



The area at Malden was called "Salines" because of the amount of salt found there. *Saline* is from a Latin word that means "salt."



cooperating—setting the amount of salt to produce, the amount to sell, and the price at which to sell it. By 1827, the saltworks at Bulltown and Kanawha and the wells in Cabell County were producing 20 percent of the domestic salt.

The salt industry continued to grow, and production peaked at over 3 million bushels annually in the mid-nineteenth century. Within ten years, however, the salt industry in the Kanawha fields had almost completely ended. Several factors contributed to this decline, including cheaper salt from new fields in Ohio and expanding railroad service that made it easier to ship salt from interior regions. The last Kanawha salt furnace to operate was the Dickinson furnace, which had been built in 1832 in Malden.

The Iron Industry

The axes, hoes, saws, kitchen utensils, and other tools used on the frontier were made of iron. Because iron products weighed so much, it was difficult to transport many of them over the mountains. Once iron ore was discovered along the Potomac, Monongahela, and Ohio Rivers, small furnaces were built to smelt the ore (to heat the ore in order to separate the iron) and make iron tools.

The first major iron furnace in present-day West Virginia was built around 1742 on land owned by Lord Fairfax. Built near Harpers Ferry, the furnace produced such high-quality iron that George Washington recommended a federal arsenal be built at Harpers Ferry.

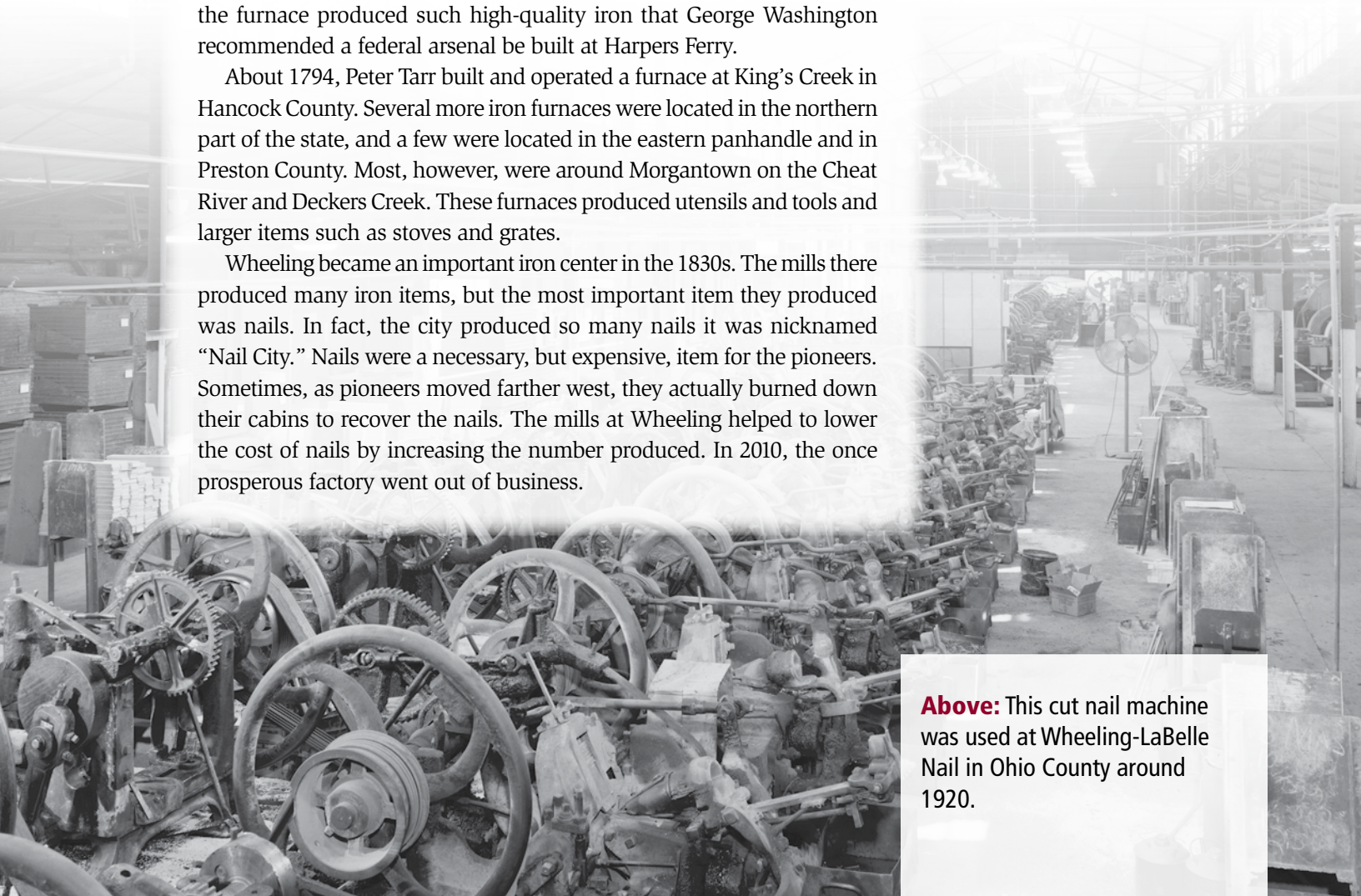
About 1794, Peter Tarr built and operated a furnace at King's Creek in Hancock County. Several more iron furnaces were located in the northern part of the state, and a few were located in the eastern panhandle and in Preston County. Most, however, were around Morgantown on the Cheat River and Deckers Creek. These furnaces produced utensils and tools and larger items such as stoves and grates.

Wheeling became an important iron center in the 1830s. The mills there produced many iron items, but the most important item they produced was nails. In fact, the city produced so many nails it was nicknamed "Nail City." Nails were a necessary, but expensive, item for the pioneers. Sometimes, as pioneers moved farther west, they actually burned down their cabins to recover the nails. The mills at Wheeling helped to lower the cost of nails by increasing the number produced. In 2010, the once prosperous factory went out of business.

something
extra!



During the War of 1812, Peter Tarr's furnace produced cannonballs used by Commodore Oliver H. Perry at the Battle of Lake Erie.



Above: This cut nail machine was used at Wheeling-LaBelle Nail in Ohio County around 1920.

The Italians

West Virginia's first coal miners were mostly native Caucasians and African Americans. By 1850, about half of Kanawha's slaves worked in the salt industry, where many mined coal to fuel the salt furnaces. When the slaves were freed after the Civil War, even more African Americans came to work in the mines.

The greatest growth in mining occurred in the early 1900s. More and more workers were needed, but there were fewer natives to work. Coal companies began to recruit workers from areas like New York City, where immigrants had entered the United States.

Among the immigrant groups that came to West Virginia were the Italians. By 1910, more than 17,000 Italian coal miners, mostly from southern Italy, were documented in West Virginia. They made up 30 percent of the state's foreign-born population. Although most came to Marion, Harrison, Tucker, Randolph, Preston, and Monongahela Counties, there was a large group in McDowell and Fayette Counties as well.

A large majority of the Italian immigrants were pick-and-shovel workers. Although West Virginia mines were among the most mechanized in the country, most immigrants did the hard, physical





work. They also worked as teamsters (truck drivers), carpenters, blacksmiths, shoemakers, and stonemasons. Italians in Marion County worked in glass factories, on the railroads, on farms, and in small businesses. Italians became union leaders and organizers.

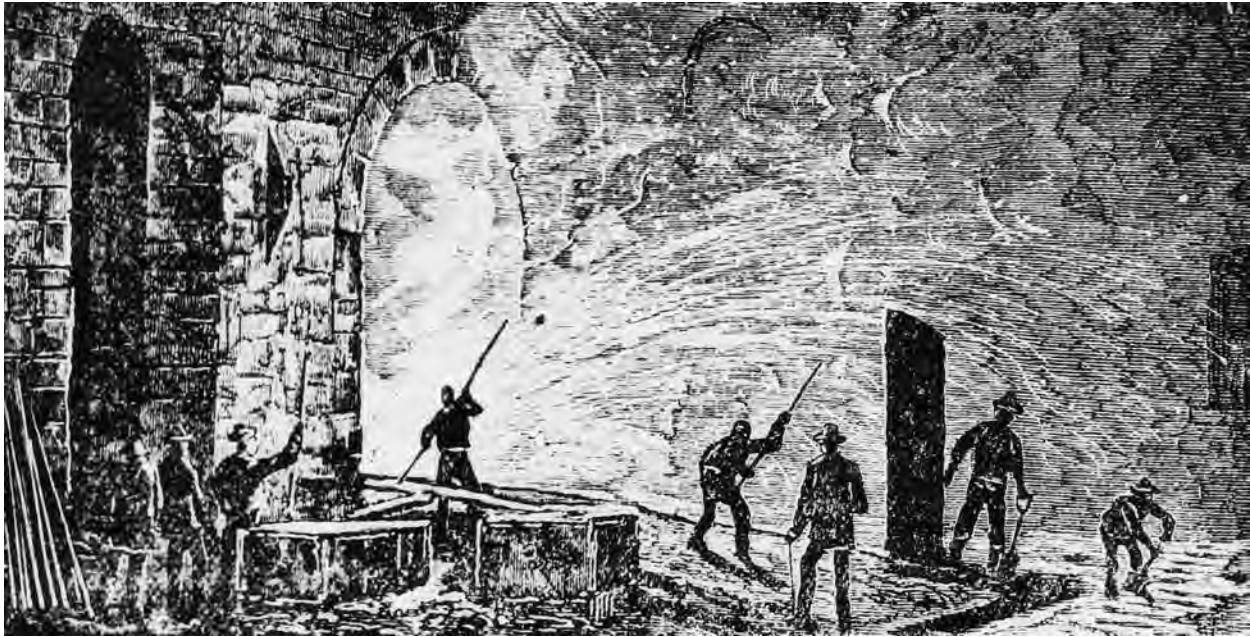
In modern times, people of Italian ancestry have become active in politics. Joe Manchin III became the state's first governor of Italian descent. His uncle, A. James Manchin, served as West Virginia secretary of state and state treasurer.

The presence of the Catholic Church in West Virginia is a reminder of the religion Italians brought with them. Italian festivals in cities like Clarksburg, Wheeling, Princeton, and Bluefield are another indication of the immigrants' continuing influence. These festivals offer ethnic food and music and a chance for Italians to reconnect with their near and distant families.



Top to Bottom: Pasta is found in many Italian recipes. Castle Aragonese, built in 474 BC, is located in the Province of Naples in the Region of Campania. The Benincasa family, whose ancestors came from Calabria, visited Castilla di Santa Severina, in the Province of Crotona.

Left: The flag of Italy flies at St. Peter's Basilica in Rome.



Top: In the late 1800s, West Virginia's iron furnaces turned to making steel. **Bottom:** Steel welder.

The Steel Industry

During the nineteenth century, the state's iron industry converted to the production of steel. After the Civil War, high-grade iron ore was discovered in the Mesabi Range in Minnesota, and it was cheaper to ship that ore to West Virginia's mills than to mine the state's low-grade ore. The mills, which had originally used charcoal as a fuel, switched to coal. Coal from West Virginia and iron ore from Minnesota were brought together in the northern panhandle, making Weirton and Wheeling major steel-producing cities.

In 1909, Ernest T. Weir and James Phillips expanded and relocated their tin mill to what is today Weirton. World War I and the emerging automobile industry stimulated the steel industry. At one time, the Weirton Steel Company operated 42 steel mills, 14 open hearth furnaces, and 111 by-product coke ovens. Many immigrants worked in the steel mills. Workers at the Weirton plant spoke 25 different languages, making the city one of the most diverse in the United States. In 1929, Weirton Steel merged with two other companies to form National Steel Corporation. Steel production continued to expand in the 1940s, 1950s, and 1960s.



In the 1970s and 1980s, the American steel industry faced global competition, and aluminum became the metal of choice for the beverage industry. In 1982, National Steel considered shutting down Weirton Steel, but workers, townspeople, and government officials found a better solution. On January 11, 1984, the company's employees, through an Employee Stock Ownership Plan, agreed to take a major pay cut and became the new owners of Weirton Steel. Through their hard work, Weirton Steel again posted profits. In 1989, stock in the company was offered for sale to the public; by 1996, the company had greatly reduced its debt and modernized its facilities. Two years later, however, an import crisis affected production. Countries like South Korea, Japan, Russia, and Germany began to sell steel to the United States at a cost lower than it could be manufactured locally. This practice is commonly known as *steel dumping* and is often a result of support from the government of the other country. Thousands of steel workers in the United States lost their jobs because of the steel dumping.

In 2004, Weirton Steel was purchased for \$4.5 billion by Mittal, a Dutch company. The following year, Mittal Steel, USA, Inc., stopped using Weirton's blast furnace and laid off 750 workers. Mittal announced plans to stop steel production at Weirton but keep the plant as a finishing facility. In 2006, Mittal took over Arcelor Steel, a European company. The merger made ArcelorMittal the largest steel company in the world. In 2018, ArcelorMittal Weirton, now a light-gauge refinishing and tin products facility, employed 880 workers.

Below: ArcelorMittal Steel, the world's leading steel and mining company, took over the former Weirton Steel facilities.



Below: Sawmills are one facet of the timber industry.

The Timber Industry

Like the salt industry, the timber industry developed naturally in western Virginia. The state had a variety and an abundance of trees. Forests provided basic building materials for pioneers, who built sawmills. These mills cut railroad cross-ties, boards for houses and flatboats, lumber for furniture, and material for barrels. Even the bark was useful; the pioneers used it to tan hides.

The number of mills in the state grew rapidly. In 1870, there were 348 mills in West Virginia. By 1880, the number had increased to 472. Production increased as operators switched from water power to steam power. As long as the market was good, the early timber barons (those who controlled the industry) cut the forests without thinking of the future. They almost stripped the state of forestlands trying to meet the demand of the new mills and their own desire for profit. In 1909, for example, almost 1.5 *billion* board feet of timber were cut and sold. West Virginia became the third-largest hardwood-producing state in the nation.

At the peak of production, the timber industry employed thousands of persons. Towns like Cass, Elkins, Rainelle, and Richwood owed their growth to the timber industry. After 1919, the timber industry steadily declined—a direct result of the overcutting of the forests. There was no attempt to replant trees until after World War II, although West Virginia began to establish state forests as a way to manage forested lands in 1924. Since the 1950s, the timber and wood products industry has made a comeback. This has come as a result of a new awareness of the value of **conservation** (the careful management of a natural resource to prevent its destruction). The federal and state governments have set aside over one million acres of forested land where cutting is controlled.





The Farming Industry

Many farmers in early western Virginia were **subsistence farmers**; that is, they raised only enough crops to feed their families. Others tried to raise **cash crops**, which are crops produced for sale and not for family use. The first cash crops were tobacco, corn, and fruit.

During the 1800s, farmers in West Virginia had a very hard life. The entire family had to work all day, every day, just to survive. There were no gasoline or diesel tractors, no electric milkers, or other modern equipment. Everything was done by hand, and plowing was done with a wooden plowshare. The invention of the iron plowshare in 1837 was an immense aid to farmers.

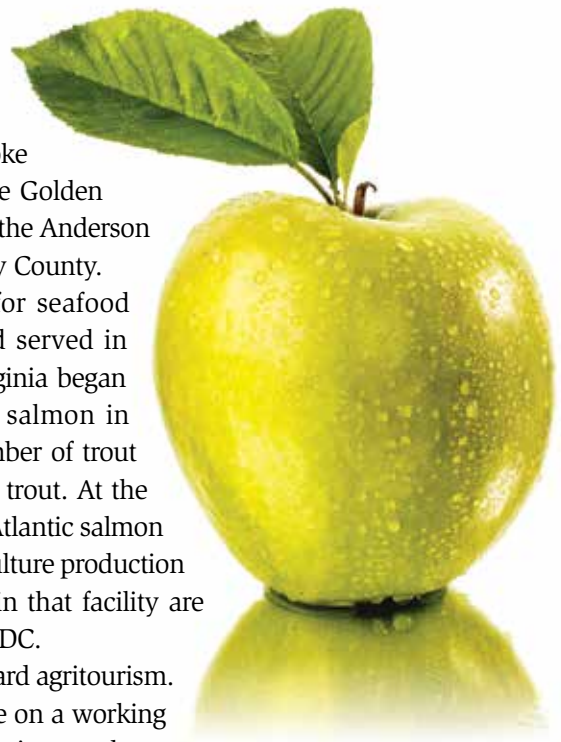
Today, West Virginia's major agricultural products include broilers, beef, turkeys, hay, dairy, apples, soybeans, peaches, and tobacco. In 2016, apples ranked 10th nationally. West Virginia's top five agriculture crops in terms of revenue generated in 2016 were broilers, cattle and calves, hay, dairy, and turkeys.

The production of grapes has increased for both home and commercial uses. West Virginia has a number of wineries, including Kirkwood Winery in Summersville and Little Hungary Farm Winery in Buckhannon. The Little Hungary Farm Winery also cultivates bees to produce a honey wine. Greenhouses, nurseries, and landscaping businesses are considered part of the agricultural economy.



Top: Dairy farming is an important part of West Virginia's agriculture economy. **Above:** West Virginia's water and rich soil produce some of the world's best grapes.

Right: The Golden Delicious apple originated in Clay County.



something extra!



For five years, the Golden Delicious tree was rented for \$5,000. It was then sold for \$5,000. The new owner built a fence around it so no cuttings or seeds could be stolen.

Two popular varieties of apples originated in West Virginia. The Grimes Golden apple was first seen on the Brooke County farm of Thomas W. Grimes. The Golden Delicious apple came from a seedling on the Anderson H. Mullins farm on Porter's Creek in Clay County.

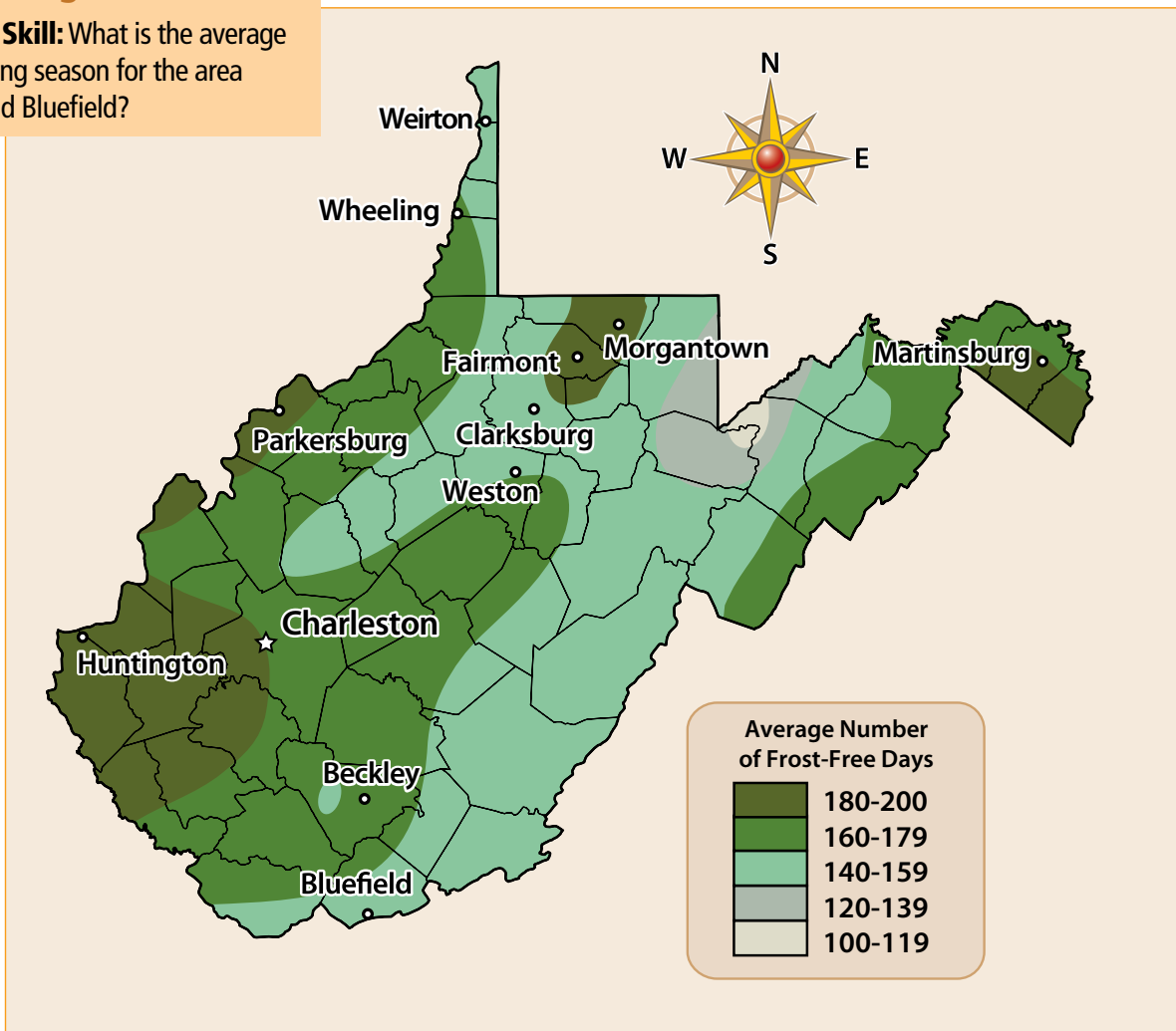
Because of an increasing demand for seafood and because 90 percent of the seafood served in restaurants must be imported, West Virginia began experimenting with raising trout and salmon in 2009. By 2018, West Virginia had a number of trout farms specializing in different species of trout. At the Freshwater Institute in Shepherdstown, Atlantic salmon are being raised using sustainable aquaculture production technology. Most of the salmon raised in that facility are marketed in Maryland and Washington, DC.

West Virginia farmers are moving toward agritourism. *Agritourism* is an activity that takes place on a working farm and is offered to the public for recreation or education. Examples of agritourism include corn mazes, hay rides, farm tours, wine tastings, and farm-to-table dining experiences.

Map 3.4

West Virginia's Growing Season

Map Skill: What is the average growing season for the area around Bluefield?



The Coal Industry

West Virginia lies in the middle of the Great Appalachian Coal Region. This large field is divided into three smaller fields within the state: the Pittsburgh Bed in the north, the New River/Pocahontas field in the south, and the Allegheny/Kanawha field in the central part of the state. The Allegheny/Kanawha field is the largest of the three. The coal mined in West Virginia is **bituminous** (soft) coal, best used for making steel.

It was to these abundant coal-producing areas that early explorers and settlers came. John Peter Salling mentioned coal in his report on the 1742 exploration of western Virginia. However, coal was not used as a fuel until the beginning of the Industrial Revolution (early 1800s). The early salt-makers and ironmongers soon found that coal burned longer and hotter than the wood they had been using. With the coming of the steam engine, coal became the most important fuel in use.

Below: Generators are used to produce electricity in the mines.
Bottom: Coal miners on their way into a mine.





something extra!

The coal from the Pocahontas Coal Mine was so highly prized that, in World War I, both the United States and Great Britain would only accept Pocahontas coal to fuel their navies.



Top: Mountaintop mining has leveled a number of West Virginia's mountains. **Above:** This statue of a coal miner on the grounds of West Virginia's Capitol is a symbol of the importance of coal in the state.

At first, coal was used locally or transported to Monongalia, Kanawha, and Ohio Counties. As the railroads crossed the state, mines were opened along their routes. The Baltimore and Ohio opened the Potomac, Fairmont, and central West Virginia mines. The Chesapeake and Ohio opened the Logan, Kanawha, and New River mines. The Norfolk and Western opened the mines in the Pocahontas and Tug Fork fields.

The development of coal as the state's largest industry has an interesting background. Far-sighted people purchased mineral rights, or claims, to any minerals found on the seemingly worthless land. They then made fortunes by mining the "black diamonds" under the surface. The first two pioneer mine operators were James Otis Watson, who located in Fairmont, and William H. Edwards, who located at the mouth of Paint Creek on the Kanawha River. Both men began operations in 1852. The first mines were small operations. The miners followed a surface seam back into the side of a hill and shored up the walls and the roof of the mine with timbers.

After the Civil War, the coal mining industry increased rapidly. In 1840, an estimated 300,000 tons of coal were dug in western Virginia. By 1870, this number had doubled. Ten years later, the amount was 1.6 million tons. By 1890, over 6 million tons were produced. At the turn of the century, production had increased to an astounding 21 million tons. During the years between 1900 and 1950, production reached over 150 million tons.

Although used mostly as a fuel, coal is also used as a **raw material** (any material that is processed to make another product). Primary products that come from coal include gas, tar, and light oil. These products are refined to make other items: fingernail polish, lipstick, detergent, dye, perfume, plastic, nylon, fertilizer, saccharin, and vanillin. Coal ash is used as landfill and road base.

Oil and Gas Museum

One of the first major oil wells in West Virginia was drilled in 1859 in Petroleum, outside Parkersburg. And one of the best-known oil wells in the state was drilled in 1860 at Burning Springs in Wirt County. Today, the Oil and Gas Museum is dedicated to preserving the early history of these, as well as hundreds of other wells located in the state. The Oil and Gas Museum, located at Point Park in Parkersburg, also sponsors a five-acre Memorial Park near Burning Springs.

The Parkersburg facility contains early artifacts, equipment, letters, and business documents that prove West Virginia was the site of the first oil and gas produced in the United States. There is also a video that traces the story of oil from its earliest use through the Civil War. Parkersburg oil barons were a driving

force in the creation of West Virginia, and they were the state's first congressman, senator, and governor.

Memorial Park in Wirt County includes on-site antique drilling and pumping rigs as well as oil and gas artifacts, steam engines, and a wooden oil tank. The old Rathbone well, located on the site, was cleaned, repaired, and returned to service as part of the state's tourism development. The renewal of this 1860 well gives it the distinction of being the oldest, although not continuously producing, well in the United States. Plans for the area include the establishment of a driving tour connecting a number of sites of historical wells throughout the Mid-Ohio Valley.



something extra!



In 1781, Thomas Jefferson described how inserting a lighted candle into escaping gas at Burning Springs could produce a brilliant flame. In fact, Burning Springs was named for the burning oil found in the area.

The Natural Gas and Petroleum Industry

The Indians and early pioneers knew of the state's gas and oil deposits, which had little value until the mid-1800s. Gas and oil deposits were found at Rand in Kanawha County, Burning Springs in Wirt County, and along the Hughes River.

William P. and John Rathbone struck oil while they were drilling salt wells in the area around Burning Springs. They became the state's first commercial oil producers in 1859-1860. About the same time, General Samuel D. Karnes drilled a well and struck oil on land he leased from the Rathbones at Burning Springs. The news of Karnes's oil strike brought a rush of people to Burning Springs. In 1861, 6,000 people were living in tents and shanties hoping to strike it rich. Before the Civil War ended, there were oil wells in Wirt, Pleasants, and Ritchie Counties. By 1876, there were 292 wells in the state producing 900 barrels of oil each day. The first oil pipeline was constructed between Volcano and Parkersburg in 1879.

Natural gas, on the other hand, was used only sparingly in the 1800s, although the saltworks used some for heat and light. The salt and oil well operators usually allowed natural gas to flow unchecked into the air. Around 1900, drillers began to realize the value of natural gas. They

began to cap the wells and transport the gas through pipelines for use in glass production as well as for lighting. West Virginia was the nation's leading producer of natural gas until 1917. When production began to decrease, the state tried to restrict shipments to neighboring states. But the U.S. Supreme Court ruled that this restricted **inter-state commerce** (business or trade between states) and was therefore illegal.

The increased price of natural gas and oil in the 1970s led to a renewed interest in the West Virginia fields. New methods of drilling deep wells and fracturing helped. In *fracturing*, the rock that contains gas is cracked (fractured) with mini-explosives, releasing the trapped gas.



Above: In the early days of the salt industry, natural gas found in the salt wells was allowed to escape into the air. This salt derrick was used by the Dickinson Salt Works of Kanawha County.

The Glass Industry

Glassmaking came to America with the first settlers at Jamestown in 1607 and moved westward with the pioneers. One of the first glassmaking plants in western Virginia was founded in 1813 when Isaac Duval built his colored glass factory at Wellsburg. George Carruthers opened a glass factory in Wheeling in 1820 to make window glass and bottles. By 1821, a glass factory to make pitchers, glasses, and wine glasses was operating in Wheeling.

The glass industry began to grow because of the natural resources of the area. West Virginia has beds of clean, pure glass sand that is rich in silica. Good sand for glassmaking is also found in Grant, Hampshire, Hardy, Mineral, Morgan, Pendleton, and Pocahontas Counties.

Glassmaking in West Virginia has taken two directions. One form of glassmaking involves the creation of hand-blown glass. One of the industry's early pioneers, William J. Blenko, came to the United States from London in the early 1890s to produce hand-blown glass for stained windows. By 1929, he had founded Blenko Glass. Today, the work of Blenko is recognized throughout the world and found in such places as the National Cathedral, the Pro Football Hall of Fame, St. Patrick's Cathedral in New York City, and the airport in Riyadh, Saudi Arabia.

In 1905, two brothers—Frank L. and John W. Fenton—began a glass company bearing their name in an old glass factory in Martins Ferry, Ohio. The brothers began by painting decorations on blank glass. When they were unable to purchase the glass they needed to produce the decorative pieces, they decided to build their own factory and produce art glass. In 1907, they opened their new factory in Williamstown, West Virginia. There, they began to produce iridescent or “Carnival” glass. During the Great Depression and World War II, the company produced more practical items, like dinnerware and mixing bowls, to address the shortages created by the war. After the war, however, it returned to the art glass for which it was famous. The unusual colors of Fenton's artistic creations were its trademark for over one hundred years. The company ceased traditional glassmaking in 2011.



something
extra!

In Morgan County, a hill known as Sandy Ridge is almost entirely white silica sand and is said to be the finest glass sand in the world.



Above: A blow pipe is used to blow and shape molten glass (glass heated to a very high temperature) like the friendship balls produced at American Glass in Lewis County. **Left:** Pieces of glass are left behind while creating colorful glassware.

Below: Blenko designs are sold in the gift shop adjacent to the factory. **Bottom:** The glass-blowing machine invented by Michael J. Owens changed commercial glassmaking.



The second method of making glass involves automated factories. One of the biggest advances in automation came from a West Virginia inventor, Michael J. Owens. Owens invented a glass-bottle-blowing machine, which he patented in 1899. The invention completely changed commercial glassmaking by introducing high-speed production, low costs, and uniform products. In 1916, Owens helped form what was to become the Libbey-Owens-Ford Glass Company in Charleston, the world's largest producer of window glass. Owens became wealthy from the more than forty inventions he developed for making glass products.

By 1920, more than one hundred glass factories were located in seventeen West Virginia counties and employed about 16,000 people. When machines began to be used to produce glass, skilled workers were no longer needed. The National Window Glass Workers Union tried unsuccessfully to keep hand production going. The last glass plant in the United States to make window glass completely by hand, located in Huntington, was closed in 1927.




The Chemical Industry

Chemicals are essential to the agricultural, communications, electrical, mining, pharmaceutical, plastic, textile, transportation, and steel industries. The chemical industry began in West Virginia during World War I. Before that war, the United States depended on Germany for chemicals. When it appeared that the supply of chemicals would soon be cut off, the United States had to increase chemical production at home. In West Virginia, chemical plants were established in Clarksburg, Huntington, Moundsville, and the Kanawha Valley. When the war began, the United States government looked to these plants to meet the shortages created by the war.

Six elements are needed in the chemical industry. Five of the elements are found in West Virginia in abundance: carbon from coal, hydrogen from water, oxygen and nitrogen from the air, and chlorine from the salt brines. West Virginia has a limited supply of the sixth element, sulphur, but it is readily available in neighboring states. Chemical plants were also attracted to West Virginia because of an abundance of coal, oil, and natural gas.

Union Carbide established its first West Virginia plant at Alloy in the late 1800s. In 1904, the company built a second plant in Clarksburg. In 1920, Union Carbide founded the petrochemical industry at Clendenin, near Charleston, when it purchased a small natural gas plant and transformed it into a combined ethylene and chemicals plant. In 1925, Union Carbide moved its operations to South Charleston to fulfill a contract to supply three million pounds of a chemical that kept dynamite from freezing; that chemical later became the base for antifreeze. Union Carbide remained a presence in the state until 2001, when Dow purchased it for more than \$11 billion.



Background: West Virginia was once home to one of the highest concentrations of chemical manufacturers in the world.

something extra!



Emphasizing the connection between coal and electricity, the Coal Association adopted the slogan "Coal Keeps the Lights On."

The Electrical Power Industry

One of the newest industries in West Virginia is the electricity-producing industry. Coal was the fuel for more than 93 percent of the electrical power generated in West Virginia in 2017. Hydro (water) and wind power produce 4.6 percent of electrical power, and natural gas is the fuel for 2.2 percent. There are nine coal-fired electricity-generating facilities owned by utility companies in West Virginia. Nationally, coal generates more than 30 percent of electricity, natural gas generates 32 percent, nuclear power produces 20 percent, and renewable resources generate 17 percent. Landowners sometimes resist hydroelectric plants because dams must back up large amounts of water. Often, this water covers good farmland or unique botanical regions.



Above: Some electrical power in West Virginia is produced by hydroelectric dams.

High-tension power lines ship much of West Virginia's power to other states. In fact, West Virginia has consistently been the leading exporter of electricity. The John E. Amos generating plant is one reason West Virginia is known as "the Nation's Powerhouse." Appalachian Power Company (a unit of American Electric Power) completed the plant in 1973. Located at Morgan's Landing in Putnam County, the plant is one of the world's largest privately owned power plants and can generate 2.9 million kilowatts of power. The Amos plant uses modern pollution control techniques to have a minimal impact on the environment. As a result, the grounds surrounding the plant are home to a variety of wildlife.

Besides John E. Amos, American Electric Power controls two major generating plants, Mitchell Plant (Marshall County) and Mountaineer Plant (Mason County). Allegheny Power operates the Harrison Plant (Harrison County), Rivesville Plant (Marion County), Fort Martin Plant (Monongalia County), Albright Plant (Preston County), Pleasants Power Station and Willow Island Plant (Pleasants County). Virginia Dominion Power operates the Mt. Storm Power Company (Grant County).

Reviewing the Section

Reviewing the Content

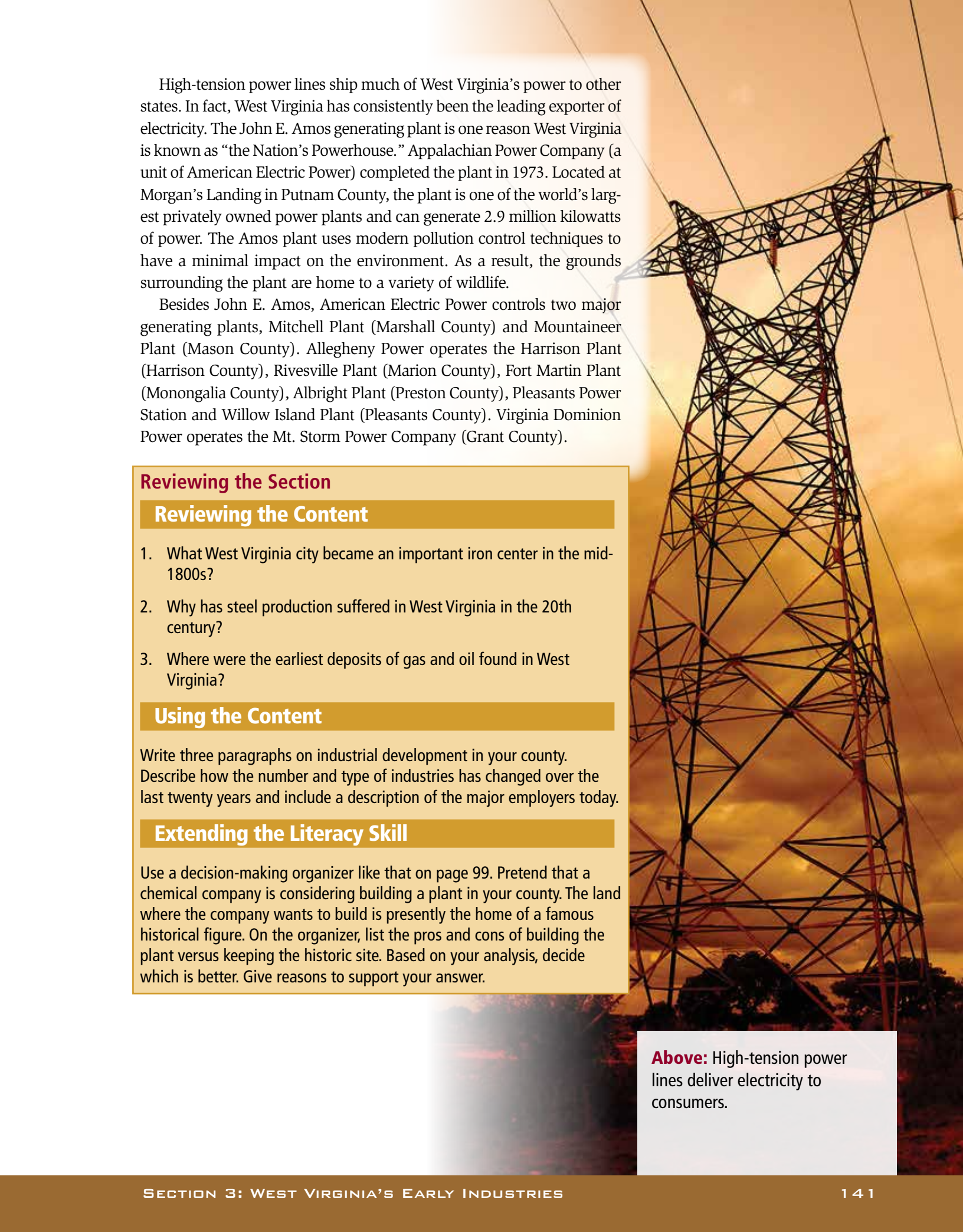
1. What West Virginia city became an important iron center in the mid-1800s?
2. Why has steel production suffered in West Virginia in the 20th century?
3. Where were the earliest deposits of gas and oil found in West Virginia?

Using the Content

Write three paragraphs on industrial development in your county. Describe how the number and type of industries has changed over the last twenty years and include a description of the major employers today.

Extending the Literacy Skill

Use a decision-making organizer like that on page 99. Pretend that a chemical company is considering building a plant in your county. The land where the company wants to build is presently the home of a famous historical figure. On the organizer, list the pros and cons of building the plant versus keeping the historic site. Based on your analysis, decide which is better. Give reasons to support your answer.



Above: High-tension power lines deliver electricity to consumers.

Chapter Summary

Section 1: Basic Economic Concepts

- All people have economic needs and wants. Goods and services meet those needs and wants.
- Producers provide various goods and services to consumers.
- Resources are used to produce goods and services. Needs and wants are unlimited, but resources are not.
- The scarcity of resources requires both producers and consumers to make choices. Sometimes trade-offs are made, combining several options.
- An economy may be a market economy, a command economy, or a traditional economy. The type of economy depends on the answers to four basic questions: what to produce, how to produce, how much to produce, and for whom to produce.
- West Virginia is part of the market economy of the United States, where producers and consumers are free to make economic choices. An important concept in a market economy is supply and demand.

Section 2: West Virginia's Resources

- Natural resources, capital resources, and human resources all contribute to an economy.
- Natural resources include water, soil, and mineral resources such as coal, salt, oil, natural gas, sand, gravel, and stone. The state also has biological resources such as forests, wildlife, and fish.
- Natural resources can be either nonrenewable or renewable.
- Capital resources include office buildings, highways, and copy machines. They are used to produce goods and services.
- Human resources are the people who do the work. Skilled workers are needed in today's economy.

Section 3: West Virginia's Early Industries

- The salt industry was the first industry to develop in West Virginia. It prospered until the mid-nineteenth century.
- The iron industry started in Jefferson County, but it soon spread to other areas of the state. The iron industry later gave rise to the steel industry in Weirton and Wheeling.
- West Virginia's abundance of trees led to the formation of the timber industry. Towns like Cass, Elkins, Rainelle, and Richwood grew because of the timber industry.
- West Virginia's early farmers were subsistence farmers. The first cash crops were tobacco, corn, and fruit.
- Coal was first discovered in western Virginia by John Peter Salling. The coal industry increased rapidly after the Civil War.
- Oil and gas deposits in the state were of little value until the mid-1800s.
- The salt industry influenced the development of the natural gas industry.
- Glassmaking developed in West Virginia because of the white silica sand found in the state. Early glassmaking was hand-blown or produced in automated factories.
- The chemical industry developed in West Virginia because five of the six elements needed for chemical production are found in abundance. These elements include carbon from coal, hydrogen from water, oxygen and nitrogen from the air, and chlorine from the salt brines.
- One of the newest industries in West Virginia is the production of electricity. Its biggest fuel source is coal.

The Economy of West Virginia

Recalling the Facts



1. How does scarcity affect a country's economy?
2. What are the four economic questions?
3. What are the three basic types of economies? Which type of economy does the United States have?
4. What are the three types of resources needed to produce goods?
5. What is the difference between nonrenewable and renewable resources? Give examples of each.
6. What are the two types of salt deposits found in West Virginia?
7. Who were the early salt makers?
8. What towns grew as the result of the timber industry?
9. How did railroads help the coal industry?
10. Where was the first glassmaking plant located in western Virginia?
11. What was one of the first large chemical industries to be developed in West Virginia?
12. What is West Virginia's largest electricity-generating plant?

Learning Skill



1. Which of the three types of economic systems is best? Give reasons to support your answer.
2. Choose three of West Virginia's early industries and decide what you think they will be like fifty years from now. Will they still exist? Will they become international companies? Will they continue to add jobs? Give reasons for your position.
3. How would life be different if West Virginia's farms, fishing, and forestry industries disappeared? Give reasons for your answer.

Chapter Review

4. Many companies in West Virginia have gone out of business. What decisions made by the companies might have made the closing necessary?
5. If West Virginia did not have an abundance of natural resources, what industries might have developed here?

Community Connection



Use a search engine or a telephone book to make a list of early West Virginia industries that still exist in your community or county. Also, make a list of service occupations located in your community or county. Compare the two lists and make a general statement about the types of businesses located in your community or county.

Literacy Skill



Write a paragraph that begins with this topic sentence: "West Virginia is dependent on its resources." Support the topic sentence with facts you have learned in the chapter.

Technology Tool



1. Use a search engine to find more information about traditional, command, and market economic systems. Find examples of countries where these systems exist.
2. Conduct an Internet search and make a list of the natural resources found in five states other than West Virginia, for example, California, Florida, Texas, Maine, Iowa. Choose states that are located in various parts of the United States. Share your findings with your class by creating a chart that also includes West Virginia and its natural resources.