

Lesson 4: The Forest Marketplace

NUTSHELL

In this classroom lesson, students participate in activities that illustrate economic factors influencing the supply of and demand for forest products. Students first learn how veneer is produced and used. They create a circular flow market diagram, define economic terms, and interpret supply-and-demand graphs. Students work in small groups and use data tables and statistics to describe the general supply of and demand for forest resources in different regions of Wisconsin. They use graphs to further describe the supply-and-demand characteristics of the Midwest and United States. In summary, students compare and contrast the economies of different nations, analyze the relative cost of production in each, and work together to describe the economic relationship between Wisconsin's forest resources and those of the rest of the world.

ENDURING UNDERSTANDINGS

- Wisconsin's forests have multiple economic values including forest products, recreation, tourism, and jobs. Forests provide a variety of raw materials for many industries.
- Our worldwide economic system is based on resources — both natural and human. Wisconsin forests are part of this system. Changes in the use of Wisconsin forests may affect forests worldwide.
- Wisconsin's forests are under private (e.g., industrial, non-industrial private forests), public (e.g., county, state, national forests), and tribal ownership; each may have different objectives.
- The public trust empowers governments to have a role in conserving, maintaining, and sustaining forest resources by enacting laws, creating policies, establishing agencies, creating public lands, and providing management incentives for forest landowners.

ESSENTIAL QUESTIONS

- What role do Wisconsin's forest resources play in the global supply chain?
- What factors influence demand for Wisconsin forest products?

OBJECTIVES

Upon completion of this lesson, students will be able to:

- List factors that can influence the supply of and demand for forest resources.
- Differentiate between primary wood products, secondary wood products, nonwood products, and forest services, and give examples of each.
- Describe the general supply of and demand for forest resources in Wisconsin, the Midwest, and the United States.
- Identify the variables that make up production cost and the price of goods in a competitive, global marketplace.
- Explain the role of governments in the global marketplace for wood products and list ways they support businesses, workers, communities, and the environment.
- Identify specific ways the use of Wisconsin's forests is influenced by the decisions of local and foreign businesses and governments.
- Predict how changes in social and economic conditions can affect the use of Wisconsin's forest resources and those of other nations.

(Continued on page 130.)

MATERIALS LIST

For Every 2 to 3 Students

- Copy of Student Page ✍️ **1, Computer Desk Sale!**
- Copy of Student Page ✍️ **2, Wisconsin Market Predictions**
- One or two copies of Student Pages ✍️ **3A-B, Wisconsin Marketplace: Demand**
- One or two copies of Student Pages ✍️ **4A-G, Wisconsin Marketplace: Supply**
- Copy of Student Page ✍️ **5, Midwest Demand Profile**
- Copy of Student Page ✍️ **6, Midwest Supply Profile**
- Copy of Student Page ✍️ **7, U.S. Demand Profile**
- Copy of Student Page ✍️ **8, U.S. Supply Profile**
- Copy of Student Page ✍️ **9, Global Statistics**
- Copy of Student Page ✍️ **10, Global Production Costs**
- One card cut out from Teacher Page 🗑️ **14, Discussion Cards**

For the Teacher

- The Forest Marketplace video (from DVD or LEAF website)
- Marker board
- Poster paper
- Tape
- Markers
- Teacher Page 🗑️ **1, Sawtimber and Poletimber**, to project
- Teacher Page 🗑️ **2, Circular Flow Diagram**, to project
- Teacher Page 🗑️ **3, Veneer Supply Graph**, to project
- Teacher Page 🗑️ **4, Veneer Demand Graph**, to project
- Teacher Page 🗑️ **5, Veneer Supply-and-Demand Graph**, to project
- Copy of Teacher Page 🗑️ **6, Forest Products**
- Teacher Page 🗑️ **7, Forest Product Use**, to project (optional)
- Teacher Page 🗑️ **8, Wisconsin Regions**, to project
- Copy of Teacher Key 🗑️ **9, Wisconsin Demand Statistics Key**
- Teacher Page 🗑️ **10, Wisconsin Demand Profile**, to project
- Copy of Teacher Key 🗑️ **11, Wisconsin Supply Statistics Key**
- Teacher Page 🗑️ **12, Wisconsin Supply Profile**, to project
- Teacher Page 🗑️ **13, Wisconsin Forest Ownership**, to project
- Student Page ✍️ **5, Midwest Demand Profile**, to project
- Student Page ✍️ **6, Midwest Supply Profile**, to project
- Copy of Teacher Key 🗑️ **15A-B, Discussion Cards Key**

“Never say there is nothing beautiful in the world anymore.

There is always something to make you wonder in the shape of a tree, the trembling of a leaf.”

★ Albert Schweitzer ★

SUBJECT AREAS

Agriculture Education, Language Arts, Marketing Education, Social Studies (Geography, Economics)

PROCESS SKILLS

Circular flow diagramming, Graph interpretation, Simple market analysis

LESSON/ACTIVITY TIME

Total Lesson Time: 230 minutes

- Introduction.....15 minutes
- Activity 120 minutes
- Activity 230 minutes
- Activity 320 minutes
- Activity 430 minutes
- Activity 560 minutes
- Activity 640 minutes
- Conclusion.....15 minutes

STANDARDS CONNECTIONS

Standards for this lesson can be viewed online at the LEAF website (www.leafprogram.org).

BACKGROUND INFORMATION

Veneer

Veneer is a thin wood sheet of uniform thickness that is peeled or sliced from logs. The art of veneer production developed with early civilization, and evidence of veneered furniture dates back to the Egyptian dynasties and the Renaissance period. Today, veneer is valued for its role in the conservation of wood because less attractive wood can be covered with a thin sheet of quality, attractive wood that reduces the use of valued trees.

Veneer use produces a richly grained appearance at a fraction of the cost of solid wood products. A large selection of wood species is used to produce veneer. Veneer use allows for custom matching of uniquely figured panels and may be the best choice when looking for economical, ecological, and highly decorative building materials. Custom veneered panels are becoming the industry standard for furniture, built-in projects, and whole room design. Some of the uses for veneer include doors and windows, furniture and cabinets, architectural panels, flooring, automobile dashboards and doors, yachts and luxury boat finishing, canoes and kayaks, musical instruments, skateboards, and inlay and marquetry.

The vast majority of veneer is produced from mature, straight trees. High-grade sawlogs (logs eight feet in length with the smallest end measuring at least nine inches in diameter) with uniform shape and wood color, and with few defects, are sought for veneer production. Veneer logs bring high prices in timber sales.

Nearly all of Wisconsin's tree species are used for veneer production. The most widely used are sugar maple, ash, paper birch, aspen, red oak, basswood, and spruce. There is also a **demand** for veneer from species that do not grow in Wisconsin. These trees come from different regions of the U.S. and world. Global demand for veneer has been growing steadily over the last 50 years. Veneer currently has a very competitive international market.

**“Though a tree grows so high,
the falling leaves
return to the root.”**

★ Malay Proverb ★

VOCABULARY TERMS

Board Foot: Measurement used to describe wood volume in the U.S.; volume equal to one foot by one foot by one inch.

Circular Flow: A simplified economic model that illustrates the relationships between households, businesses, and government.

Competition: An attempt by two or more individuals to buy or sell the same goods or services; competition exists between buyers and between sellers.

Consumer: The buyer of goods and services.

Cost of Production: The price paid by businesses to produce goods and services and get them to consumer markets.

Demand: The quantity of a good or service that consumers are willing and able to buy at a specific price.

Forest Management: The use of techniques (e.g., planting, harvesting) to promote, conserve, or alter forests to meet desired outcomes.

Forest Product: An object produced from forest resources for sale to a consumer.

Forest Services: The social and environmental benefits that forests provide humans.

Forest Values: Social, economic, and ecologic worth given to forests.

Free Market: A general term for all the monetary exchanges that take place in a society; each exchange is undertaken as a voluntary (free) agreement between two people.

Government: An elected body of officials and their appointees that works to ensure the economic, social, and environmental welfare of a community; referred to as the public sector.

Grade: The classification of logs and lumber according to their quality of form, uniformity, soundness, and appearance.

Hardwood: Refers to broadleaf deciduous trees used for wood production (e.g., ash, aspen, basswood, beech, cherry, maple, oak, hickory, walnut).

Income: The amount of money made by an individual; commonly measured as per capita income which describes the average annual income per person in a specific region.

Interdependence: A situation in which decisions made by a group of people in one part of the world affect decisions made by groups in other parts of the world; as regions specialize, they become more dependent on other regions to meet their needs and wants.

Poletimber: A tree of a size between a sapling and a mature tree with a minimum diameter at breast height of five inches.

Primary Wood Product: A minimally processed consumer good that comes from a tree (e.g., lumber, wood chips).

Profit: The money earned when a good or service is sold; determined by subtracting investment and cost of production from the money made during sales.

Sale Price: The amount of money paid by a consumer for a good or service.

Sawtimber: A tree that contains at least one sound, straight log that measures eight feet in length, with the smallest end measuring at least nine inches in diameter.

Secondary Wood Product: A consumer good manufactured from a primary wood product (e.g., door, table).

VOCABULARY TERMS

Self-interest: To benefit oneself; motivation for entering into a monetary exchange in the free market.

Service: An activity performed to satisfy the wants and needs of consumers.

Softwood: A reference to coniferous trees used for wood production (e.g., cedar, fir, pine, spruce, tamarack).

Specialization: A situation in which a nation or business produces only the goods for which their natural and human resources are best suited.

Supply: The amount of a good or service that businesses are willing to sell at a given price.

Sustainable: The ability of something to be maintained for use today and in the future.

Veneer: A thin layer of wood sliced or peeled from a log.

The Demand for Forest Resources

Demand for products, including forest resources, is most heavily related to population, **income**, and societal trends. As human populations grow, so does the demand for goods and services.

As the average annual income increases, so does demand for goods and services. Yet, if the population of a given area grows but total income remains stagnant, the demand will also remain stagnant in the long-term.

*“This oak tree and me,
we’re made of the same stuff.”*

★ Carl Sagan ★

The demand for goods is also related to societal trends. Trends begin in many ways, including innovation, marketing, and endorsement. A variety of trends has recently influenced the forest products industry. One notable trend was the increase in demand for exotic woods like teak and mahogany and the decrease that followed after the harmful effects of rainforest clearcuts were widely understood. Some trends have the potential to stay for quite some time, for example, the installation and restoration of **hardwood** flooring in U.S. homes. Each of these trends in demand has had effects on the supply and, ultimately, price of products.

The Supply of Forest Resources

Forest resource **supply** in a given region can be determined by looking at three characteristics:

- Availability of forest resources
- Production capacity of the forest industry
- Supportive infrastructure

The availability of forest resources in a given region can be estimated using:

- Volume of standing timber (by species, size, and grade): to determine the total resource
- Net annual growth of trees: to determine productivity of the forest
- Forest ownership (to determine accessibility to the resource; landowners have different objectives; not all owners are willing to harvest trees)

This information can be gathered from U.S. Forest Service surveys. The U.S. Forest Service conducts inventory and analysis in all of the major forested states in the U.S. The statistics are published annually in some states and every five to 10 years in others. The surveys provide a variety of statistical information organized by tree species, size, ownership, region, and grade. The surveys are useful for determining timber supply and comparing the forest resources of the different states and regions of the U.S.

Production capacity of the forest industry in a given region can be estimated using:

- Number of **forest products** establishments
- Type and size of the forest products establishments
- Availability of skilled workers

These three indicators help to define the size and diversity of the industry, the potential gaps and surpluses in production, and the availability of human resources. The U.S. Forest Service publishes assessments of the timber industry in all of the major forested states in the U.S. The assessments provide statistics on industry status, the volume of production of primary wood products, production efficiency, and timber growth and removals. The assessments are useful for comparing states and regions in the U.S. and determining the status and trends in the industry.

Supportive infrastructure helps businesses produce and transport their products and includes:

- Transportation systems
- Availability of water
- Waste disposal
- Education system
- Security
- Other **services**

Infrastructure is usually provided by **government** and funded through tax monies. The tax rates and infrastructure of different countries and even different states in the U.S. can differ dramatically. Infrastructure can have a large influence on the productivity and efficiency of a company and this, along with tax rates, can influence when and where businesses construct new facilities.

The Economics of Trade

CIRCULAR FLOW

The **circular flow** of economic activity describes the economic relationships that exist between households, businesses, and government (see page 152). This simplified economic model illustrates how the three players exchange goods, services, productive resources, and money.

COMPETITION

Competition for resources is the core concept around which modern economics is built. Prices, wages, production methods, type and quantity of production, size and organization of business firms, distribution of resources, levels of environmental regulation and compliance, outsourcing, and tax rates all result directly or indirectly from competitive processes.

Competition acts as both stick and carrot (it can threaten punishments or offer rewards). If a worker does not perform, or if the living wage in a region is relatively high, the employer can replace the worker or can move production to a region where wages are lower. If the employer does not treat the employee as well as other employers would, the employee can quit and go somewhere else if a job is available. If a company is not run efficiently or is too small to compete with large companies, customers can choose to go where they find better service at the same price or equal service at a lower price. All companies are subject to replacement by those that are able to do the job better or more cheaply. On the other hand, if the job is done well (better service at a cheaper price), the company is more likely to be rewarded.

**“How beautiful leaves grow old.
How full of light and color are their last days.”**

★ John Burrough ★

SUPPLY-AND-DEMAND

In a capitalist economy, producers combine natural, human, and financial resources to provide goods and services that **consumers** are willing and able to purchase. The market price of a product or resource is determined by the interaction of **supply-and-demand**.

The costs and benefits of purchasing a good or service determine the amount of a product that a consumer will buy in a given time period. This is known as demand. As costs or benefits change, the demand for a product will also change. In general, as prices decrease, demand increases.

The amount of a good or service that producers are willing to sell during a certain period is determined by the amount of **profit** they can make. Producers intend to make the largest profit possible from their sales. Since profit is the difference between revenues and costs, anything that influences either can influence the amounts sellers want to sell. In general, the higher the price, the more producers will want to sell.

FREE MARKET

Market is a general term for the monetary exchanges that take place in a society. Each exchange is undertaken as an agreement between two people. The individuals exchange economic goods, either commodities or services, to satisfy their needs or wants. The modern, global framework of exchanges is known as the **free market**.

Production begins with natural resources, and eventually goods are sold to the consumer. At each stage of production, from natural resource to consumer goods, money is voluntarily exchanged for capital goods, labor services, and land resources. At each step of the way, terms of exchanges, or prices, are determined by the voluntary interactions of suppliers and demanders. This market is “free” because choices, at each step, are made freely and voluntarily.

INTERDEPENDENCE

Natural, human, and financial resources are not evenly distributed among the nations of the world. In the free market, it is advantageous for countries to specialize by deciding what to produce and how to produce it efficiently. Countries tend to specialize in goods and services they can produce more efficiently (at lower costs) than those of trading partners.

When countries specialize, they must trade with other countries to obtain products they do not produce. Free trade and **specialization** lead to **interdependence**, where countries depend on one another for the things they need.

SELF-INTEREST

Self-interest is to benefit oneself. Self-interest is the motivating factor behind the actions of individuals in a capitalist economy. A central tenet of capitalism is that rational self-interest leads to the economic well-being of the nation. Private self-interest determines what is produced, in what proportions the factors of production will be combined to produce it, and how the value of the final product will be distributed between them.

Some modern economists have identified unregulated, enlightened self-interest as the answer to the social inequities and environmental degradation that results from the self-serving actions of consumers and suppliers. It is now widely understood that this alone is not sufficient. A variety of reasons have been given for the ineffectiveness of relying on the enlightened self-interest of businesses to protect the social and environmental services on which we depend, the more widely accepted being:

- Lack of knowledge to act in a manner that does not detract from long-term social and environmental well-being; lack of knowledge increases as the size of the market increases
- Desire of some businesses to seek the highest possible short-term profit without regard to long-term social and environmental well-being

The Forest Marketplace

The world's forests and human populations are interconnected by the free market. Consumer habits in Wisconsin impact forests in Indonesia, and trade liberalization in China impacts forests in our backyards.

The forest products market is shaped as much by economic, political, and demographic trends as it is by forces working within the sector itself. During the past decade, population growth, economic growth, trade liberalization, and increasing environmental concerns have had major influences.

Global population will change dramatically in the next 100 years. The United Nations Population 2000 Report projects that by the year 2150, Africa will increase from its current 12% of global population to 24%, China will decrease from its current percentage of 22% to 14%, and Europe will decrease from 13% to only 5% of world population. These changes will undoubtedly have huge influences on the global marketplace.

Along with population, global production of forest products increased during the past 40 years. Paper products and wood-based panels (including veneer) increased much faster than other products. There has also been an upward trend in the value of forest products exports in the last 40 years.


One major feature of current world trade in forest products is the dominance of the developed countries in exports and imports. Statistics clearly indicate the dominance of North America and Europe as importers and exporters, and of Asia as an importer.

While trade is not the direct cause of environmental degradation, it can be a stimulus for poor management and exploitation of human and natural resources. There is a wide range of possible environmental and social outcomes in the international trade of forest products.

For example, unregulated free trade can be devastating to forests and local communities if forests are only cut at opportune times when prices are high. However, trade in certified forest products from sustainably managed forests can promote ecological health and provide social and economic benefits.

PROCEDURE

Introduction – Veneer

1. Tell students that over the next few class periods, they will look at how forest products are bought and sold. During these activities, they will be focusing on one specific forest product — veneer. Watch the video [The Forest Marketplace – Our Relationship with Forests](#).
2. Once the video is finished, ask students to discuss what they learned. Discussion topics could include forest management, wood products facilities, veneer, and forest services. During the discussion, review these terms:
 - **Veneer:** A thin layer of wood sliced or peeled from a log.
 - **Forest Management:** The use of techniques (e.g., planting, harvesting) to promote, conserve, or alter forests to meet desired outcomes.
 - **Primary Wood Product:** A minimally processed consumer good that comes from a tree (e.g., lumber, wood chips).
 - **Secondary Wood Product:** A consumer good manufactured from a primary wood product (e.g., door, table).
 - **Sawtimber:** A tree that contains at least one sound, straight log that measures eight feet in length, with the smallest end measuring at least nine inches in diameter.
 - **Poletimber:** A tree of a size between a sapling and a mature tree with a minimum diameter at breast height of five inches. Project Teacher Page  1, **Sawtimber and Poletimber**, to illustrate the difference between sawtimber and poletimber.

- **Board Foot:** Measurement used to describe wood volume in the U.S.; volume equal to one foot by one foot by one inch.
 - **Grade:** The classification of logs and lumber according to their quality of form, uniformity, soundness, and appearance.
 - **Forest Values:** Social, economic, and ecologic worth given to forests.
3. Explain to the class that economics has a big influence on how forests are managed, the type of forest products produced, the distance that forest products travel to market, and how much they cost. During the next few class periods, students will study the factors that influence the buying and selling of forest products in Wisconsin.

Activity 1 – Circular Flow Diagram

1. To spark student interest, allow students to pick any part of their lives that they think is not connected in some way to economics. It is very difficult, if not impossible, to identify parts of our lives that are not influenced. Students may identify their personal relationships, sports, appreciation of the outdoors, water, etc. As students list ideas, help them identify how each of these is related to the purchase of goods and the dependence on services provided by either the government or businesses.
2. Tell the class that there are three major players in the economy — businesses, households, and government. Each of the players has a relationship with the others.

Write the words “household” and “business” on opposite sides of the board. Ask students to identify how the two are related. (*Businesses supply products and services to households. Households pay for products. Households provide labor to businesses. Businesses pay households for their labor.*) Put the ideas on the board, and draw arrows from each, similar to Teacher Page **2**, **Circular Flow Diagram**.

Have students identify specific examples for each relationship.

Next, write the words “household” and “government” on opposite sides of the board. Ask students to identify how the two are related. (*Households pay taxes to the government. Governments provide services to households. Households provide labor for government. Governments pay households for their labor.*) Put the relationships on the board, and draw arrows from each. Have students identify specific examples for each relationship.

Finally, write the words “government” and “business” on opposite sides of the board. Ask students to identify how the two are related. (*Businesses pay taxes to the government. The government provides services for businesses. The government pays businesses for goods and services. Businesses provide goods and services for the government.*) Label the relationships on the board, and draw arrows from each. Have students identify specific examples for each relationship.

3. Once the relationships are identified, project Teacher Page **2**, **Circular Flow Diagram**. Tell students that all the relationships they identified are reciprocal, meaning they represent a give-and-take for businesses, households, and governments. Each player depends on the other. The circular flow diagram is the most basic representation of an economy.

Tell students they have just described what is often referred to as the “economy.” When they hear the word “economy” they should think of the relationship between businesses, households, and government.

NOTE: You may wish to provide each student a copy of Teacher Page **2**, **Circular Flow Diagram**, to write ideas on and keep for reference.

4. Tell students that the economic model is much more complex in real life. To understand how the actions of businesses, households, and governments affect forests requires an understanding of economics, forest ecology, forest management, the forest products industry, and consumer values.

Tell students that they will participate in a variety of activities that will help them understand how forest products are bought and sold in the forest marketplace. The activities will help them understand the following topics:

- The fundamental economic principles that govern the trade of goods
- The production and use of forest products (specifically veneer)
- The interrelationship between the supply of and demand for forest resources
- The Wisconsin marketplace for forest products
- The global marketplace for forest products

NOTE: It may help to have these points listed on a large piece of paper kept visible throughout the lesson. Because students will be presented with a lot of information, it may help them stay focused if you continually refer to the topics and cross them out as activities are completed and students become comfortable with them.

Activity 2 – Key Economic Principles

1. Lead a brainstorm to define the following terms – “free market,” “specialization,” “interdependence,” “competition,” and “self-interest.” Write each term on the board, allow students to come up with ideas, and write their ideas on the board. Discuss each idea and form a brief definition. Once the definition is formed, it might help to give real-life examples for each. The definitions should be similar to the following:
 - **Free Market:** A general term for all the monetary exchanges that take place in a society; each exchange is undertaken as a voluntary (free) agreement between two people.

- **Specialization:** A situation in which a nation or business produces only the goods for which their natural and human resources are best suited.
- **Interdependence:** A situation in which decisions made by a group of people in one part of the world affect decisions made by groups in other parts of the world; as regions specialize, they become more dependent on other regions to meet their needs and wants.
- **Competition:** An attempt by two or more individuals to buy or sell the same goods or services; competition exists between buyers and between sellers.
- **Self-interest:** To benefit oneself; motivation for entering into a monetary exchange in the free market. A founding theory of capitalism is that the sum actions of individuals will lead to the common good.

Ideas for real-life examples include:

- **Free Market:** If you are robbed, is it a free exchange? (*No, it is not voluntary, it is coerced.*) If you purchase a bottle of soda, is it a free exchange? (*Yes. You had to pay for it, but the “free” in “free market” is similar to the word “freedom,” meaning no one forced you to buy it. You exchanged money voluntarily to satisfy your want.*)
- **Specialization:** Do you eat bananas or chocolate or drink coffee or tea? Do any of these grow in abundance in the U.S.? (*No.*) Where do they come from? (*From tropical countries like Ecuador, Costa Rica, India, Tanzania, and Indonesia. Many of these countries specialize in their production and make money by selling their product to other nations; they can then import many of the other products that they need.*)
- **Interdependence:** What would happen to your diet if you couldn’t get bananas, coffee, or chocolate? (*You would surely survive with other foods, but much of the food we eat and products we buy are from other countries [if you doubt it, just check the tag on the inside of your shirt].*)

- **Competition:** Who here has a cellular phone? How many cell phone companies are there? Which one is the best? What kinds of offers do they give? (*Prices, special offers, multiple designs, and celebrity endorsements are all ways that companies compete with one another for your business.*)
 - **Self-interest:** Who here has gone out to eat recently? Where did you go? What motivation did the restaurant have to serve you food? (*Money.*) Did the restaurant serve you out of some personal need to keep everyone fed? (*No, not likely. They did it to gain something for themselves. They do it out of their own self-interest, usually to make money.*)
2. Once students are comfortable with the terms, tell them that the opportunity to make a profit is the driving force behind the economy. In its simplest form, profit is the relationship between investment, cost of production, product price, and quantity sold. Write this on the board:

Profit = [quantity sold (sale price per product - cost per product)] - investment

Give the class the following example:

Sarah sells firewood to campers at a popular campsite near her property. Before beginning her small business, she spent \$500 on equipment for harvesting, splitting, storing, and transporting the firewood. Her other costs include labor, chain saw repairs, and gas. She figures that it costs her about \$1 for every bundle of firewood she makes. If she charges \$3 per bundle and sells 300 bundles during the season, how much profit will she make?

Profit = 300 bundles (\$3 - \$1) - \$500 = \$100

Ask students how Sarah determined the price. Why didn't she charge more and make more profit? (*Other people might be selling firewood at a lower price and people would*

buy the cheaper firewood.) Why didn't she charge less to outsell her competition? (*She couldn't charge too little because then she wouldn't cover her cost of investment.*)

3. Ask the class the following question: If everyone in the free market is operating out of their own self-interest (trying to make the highest possible profit), who determines the price of goods and services? (*Price is determined by competition between consumers and competition between producers. This is often referred to as supply-and-demand.*)

Price can be understood by looking at supply-and-demand graphs. The graphs portray how supply-and-demand interact to determine price. Project Teacher Page 📄 3, **Veneer Supply Graph**. Tell students the graph describes the relationship between price and the supply of wood veneer at a specific moment in time.

Point out the axes to the class. The vertical axis (the Y axis) is the price per square foot. The price increases as you move up the axis. (From \$0 to \$1.40.) The horizontal axis (the X axis) is the quantity of product produced. The quantity increases as you move to the right. (From 1 to 19 square feet.)

Ask students what happens to the quantity produced as price increases. (*It increases.*) Show students the correlation on the graph, and ask them to explain why. (*Supply increases because at higher prices, suppliers are more willing to sell their product.*)

Ask students what happens to the quantity produced as price decreases. (*It decreases.*) Why? (*Supply decreases because at lower prices, suppliers are less willing to sell their product.*) This may seem counterintuitive to some students, since the graphs can also be interpreted to mean that as supply increases, price increases, and as supply decreases, price decreases.

4. Tell the students that supply can undergo shifts based on the scarcity or abundance of resources. Tell students that the vertical position of the supply line takes into consideration the scarcity of the resource. Draw a dotted, parallel line just above the supply line on the graph. Tell the class that when the entire supply line shifts up or down, this is a supply shift.

Ask students what happened to all of the prices along the supply line after this shift. *(They all went up.)* What could cause a shift like this? *(This kind of shift is caused by resource scarcity.)* Ask students what could cause a scarcity of veneer. *(Disease outbreaks in forests, forest depletion, disruption in production caused by insecurity, etc.)*

Draw another dotted, parallel line just below the original supply line. What happens to all the prices if the supply line shifts downward? *(Prices decrease.)* What might cause this? *(This is usually caused by an abundance of resources.)* Ask students what could cause an abundance of veneer. *(Imports from foreign companies, overproduction by industries, reduction of use, etc.)*

Finally, ask students how they think the supply line is determined. *(The line is determined by competition between sellers. They all want to make a profit and compete with each other for the lowest price to attract consumers. Theoretically, the line represents the lowest price at which they can sell a square foot of veneer and still make a profit.)*

5. Now project Teacher Page 🐝 4, **Veneer Demand Graph**, and tell the class that the graph explains the relationship between the price of veneer and the demand for veneer at a specific moment in time.

Have the class explain each axis. *(They are the same as in the supply graph, but in this case, quantity of product is the quantity demanded.)* Ask students what happens to the quantity demanded as price decreases.

(It increases.) Why? *(Demand increases because consumers are more willing to buy as prices decrease.)* What happens to demand as price increases? *(Demand decreases.)* Why? *(Demand decreases because consumers are less willing to buy as price increases.)*

Ask the class if they remember what causes shifts in the supply line. *(Scarcity and abundance.)* Ask the class to speculate what might cause shifts in demand. *(Shifts in demand are caused by the changing values and goals of consumers.)*

Ask students in which direction the line would shift if the majority of home remodeling magazines promoted veneer for its beauty, durability, flexibility of project design, and conservation of wood. *(More people would value veneer, want to purchase it, and the demand line would shift up.)* Draw a parallel line above the demand line on the overhead and ask students what happens to prices. *(They go up.)*

Ask students what could cause a downward shift in demand. *(Ideas may include changes in style and tastes of consumers, replacement of some veneer uses by cheaper synthetic materials, and consumer action against forest products because of poor forest management.)*

Finally, ask students how they think the demand line was determined. *(The demand line is determined by competition between buyers. All buyers want to purchase their product at the cheapest price to save money, but are willing to pay more depending on their needs and wants. This line represents the highest prices that consumers are willing to spend for a square foot of veneer.)*

6. Project Teacher Page 🍷5, **Veneer Supply-and-Demand Graph**. Tell students that the graph is the combination of both the supply and demand lines. Ask students what they think the graph shows is the current market price of veneer. (*60¢ a square foot.*) The price is determined by the equilibrium point that is found where the supply line and demand line cross. Shifts in either the demand line or supply line will change the price.

Ask students what the demand is. (*10 square feet.*) This can be interpreted as 10 square feet per person. Be sure that students understand that price and quantity are read independently (e.g., as 60¢ per square foot, not 60¢ per 10 square feet).

Activity 3 – Providing Forest Products and Services

1. Tell the class that the economic principles they just learned apply to all the products (wood and nonwood) they use daily. Begin a brief discussion by having students identify some of the wood products they use.
2. Divide students into groups of two to three. Tell students there are two major categories of forest products — wood products and nonwood products. Wood products include all products that are made from the wood fiber of trees, including lumber, veneer, composite wood products (e.g., plywood, oriented strand board), and reconstituted wood products (e.g., paper, paperboard). Nonwood forest products include all of the other products that come from forests, including resins, oils, chemical compounds, fruit, mushrooms, and medicines. Use Teacher Page 🍷6, **Forest Products**, for examples.

Have groups write down at least five different products that fit into each category.
3. Explain that wood products fall into two categories (primary and secondary), and describe each.

- The primary wood products industry receives trees directly from the forest and processes whole logs into whole (primary) wood products. These products include lumber, firewood, and wood particles like sawdust and chips that require minimal processing.
- The secondary wood products industry uses primary wood products and processes them into the variety of wood products that are available to consumers. These include furniture, cabinets, popsicle sticks, paper, and many other products that require complex manufacturing.

Ask students to note with a “P” or “S” on their list which category their products fall into. Ask which category veneer would fall into. (*Primary.*)

4. Project Teacher Page 🍷7, **Forest Product Use**, and discuss the importance of forest products and the enormity of our consumption level. The statistics are as follows:
 - The wood products industry in Wisconsin sells \$18 billion in products each year.
 - Wisconsin’s wood products industry employs more than 100,000 people.
 - The average person in the U.S. uses 75 cubic feet of wood each year (that is a solid block of wood the size of a car), 3.5 times more than the average for the rest of the world.
 - The average person in the U.S. consumes 700 pounds of paper each year.
 - The annual global wood consumption is 116 billion cubic feet (that is a solid square foot of wood that would stretch around the earth 880 times at the equator).
5. Ask groups to think of any forest uses that are not found on their list of forest products and write them down. They should come up with any, including recreation (hiking, biking, camping, hunting, fishing, etc.) beauty, wildlife habitat, water retention and filtration, oxygen production, carbon sequestration, etc. Tell the class all of these are called forest services.

6. Discuss how forest services differ from forest products. (*Forest products are objects that are sold by quantity to consumers who recognize their personal need or want for the object and willingly purchase it. Forest services, on the other hand, can usually not be quantified, and in many cases, the people who benefit do not directly purchase the service and do not even know that they are benefiting.*)

Give students the following example:

A pencil is a good example of a forest product. Trees are harvested from a forest. Logs are cut into boards at a primary wood product facility. A secondary wood product facility buys the boards (as well as graphite, aluminum, erasers, etc.), makes pencils, and sells them to a store. The stores sell the pencils to consumers who need them and are willing to purchase them.

Water retention and water purification are good examples of forest services. Forests protect surface and groundwater reservoirs that are used by rural communities, cities, and businesses for all of their water needs and provide water needed for fish habitat. Many of the forests that protect water resources are national, state, and county forests that are maintained by tax revenue. They can also be private and industrial forests that remain forested through sustainable management. The people who benefit from clean water provided by forests pay for the protection of public lands when they pay taxes or pay extra for forest products that come from forests managed to protect water resources. Many people do not realize that forests provide this service and that they are benefiting from the service when they drink water, shower, or go fishing.

7. Ask students if they think forest services are bought and sold just like forest products. (*Many forest services are public goods that cannot be easily sold by the private sector. Water and air are public goods. Biodiversity is a public good. Wilderness areas are public goods. Protecting these public goods and the services they provide for current and future generations may not produce a short-term economic profit, but is necessary for our environmental, social, and long-term economic needs.*)

Ask students to recall the circular flow diagram that shows the relationship between households, businesses, and government. Help students identify businesses as the main provider of forest products and government as the main provider of forest services. Tell students that businesses are usually referred to as the private sector and government institutions are called the public sector.


The private sector is driven by the pursuit of financial gain and may be inherently ill-suited to provide (and protect) services that do not produce financial returns. The public sector is run by elected officials who should represent the wants and needs of the people and provide for the public well-being.

The management of public goods is a continuing and controversial issue. In the following activities, students will begin to see the relationships that exist between households, businesses, and government to better understand the issues and trends important to forests and forestry.

“Someone is sitting in the shade today because someone planted a tree a long time ago.”

★ Warren Buffet ★

Activity 4 – Demand, Supply, and Production Costs

1. Form groups of two to three students. Hand each group a copy of Student Page  1, **Computer Desk Sale!** Have each group read the advertisement and news article.

2. Tell students the article talks about many factors that determine demand, supply, and cost of production. Write the three terms (“demand,” “supply,” “cost of production”) on the board and have students do the same on the back of the student page.

Have the groups use the information in the article to describe the factors that influence demand, supply, and cost of production. Once finished, have them discuss their answers and write down the ideas of other groups.

3. Expand on their ideas to form a list on the board similar to the following:

- **DEMAND**

- **population and population increase** (more people require more resources, increasing demand)
- **per capita income** (as people have more income, they have more ability to buy what they want in addition to what they need)
- **societal trends** (innovation, fashion, endorsement, and other social influences can create, sustain, and terminate trends that affect what, where, and how often people buy)

- **SUPPLY**

- **amount of forestland and wood** (area of forestland, species of trees in the forest, quantity of trees/wood in the forest, quality of trees/wood in the forest)
- **type of forest management** (forest ownership, health and productivity of forestland, intensity of use, long-term management plans/ environmental regulation)

- **capability to produce wood** (number and type of forest products facilities, availability of skilled labor)
- **regional infrastructure** (water, electricity, garbage disposal, roadways, schools, law enforcement, libraries, justice system, etc.)

- **COST OF PRODUCTION**

- **labor** (employee wages and benefits)
- **materials** (primary wood products, energy, building construction, etc.)
- **environmental compliance** (Endangered Species Act, Clean Air Act, Clean Water Act, etc.)
- **transportation of materials**
- **taxes**

4. Once the list is complete, have the groups revisit the profit equation.

Profit = [quantity sold (sale price per product - cost per product)] - investment

Discuss how each of the factors in the cost of production will affect both the price of the product and the profit that a business will make.

5. Tell students that in the next activities, they are going to look at the supply of and demand for forest resources in Wisconsin, the Midwest, the U.S., and the world. They will then look at how the cost of production affects the trade of goods and ultimately the management of forests in the global marketplace.

“Trees are poems that the earth writes upon the sky.”

★ *Kahlil Gibran* ★

Activity 5 – A Wisconsin Marketplace

- Form groups of two or three students. Tell the groups that they will be looking at the supply of and demand for veneer in Wisconsin. Tell students that to understand the Wisconsin marketplace for veneer, they will need to create a profile of both the supply of veneer and demand for veneer in different regions of the state.

Project Teacher Page 🗺️8, **Wisconsin Regions**.

Explain to the class that the U.S. Forest Service studies five regions to describe forest resources and forest industry output. The regions are differentiated because of their different forest and land types, different industrial base, and different population densities. Have students identify the region in which their school and home are found.

- Hand each group a copy of Student Page ✍️2, **Wisconsin Market Predictions**. Ask the groups to use their current knowledge to answer the questions on the worksheet.

The questions are as follows:

- Which region do you think is the most/least populous?
- Which region has the fastest/slowest growing population?
- Which region has the highest/lowest per capita income?
- Which region do you think has the most/least forested area?
- Which region has the most primary veneer products industries?
- Which region has the most secondary veneer products industries?

Have groups share and explain their answers with the class. Ask groups to use their worksheet for reference during the final discussion.

- Tell the groups that they are going to analyze some statistics to describe the supply of and demand for veneer in Wisconsin. Hand each

group Student Pages ✍️3A-B, **Wisconsin Marketplace: Demand**. Complete the first demand question as a class. Allow students time to answer the remaining questions.

Hand out Student Pages ✍️4A-G, **Wisconsin Marketplace: Supply**. Again, complete the first question as a class. Allow students time to answer the remaining questions.

- Once the assignment is completed, review each of the demand questions with the class using Teacher Key 🗺️9, **Wisconsin Demand Statistics Key**.

Once the questions are answered, project Teacher Page 🗺️10, **Wisconsin Demand Profile**. Explain the type of graphs used (pie graph, horizontal bar graph, and column graph) and have students interpret them.

Use the graphs and demand statistics to discuss and answer the following questions with the class:

- When looking at the population distribution in a pie graph, it becomes immediately apparent that the southeast has a much larger population than all the other regions combined. Why do you think that is? (*The Southeast is situated near the major urban center of the Midwest [Chicago/Milwaukee] and has access to the transportation and water resource benefits of Lake Michigan. Historically, much of the Southeast was prairie with rich agricultural soils that were easily cultivated by early settlers. The Southeast is now the major urban and industry center of the state.*)
- The percent growth horizontal bar graph shows that the human populations of each region are growing, with the Southwest growing the fastest. How can we explain why all of the regions are growing? (*People are moving to Wisconsin, people are living longer, families are growing.*)

- The per capita income column graph shows that the southern regions have higher per capita incomes than the northern regions, with the average person in the Southeast making about \$6,500 a year more than the average person in the Northwest. Why do you think that is? (*Goods and services cost more in the Southeast, there is much more business activity in the Southeast, there are more high-paying jobs in the Southeast.*)

5. Use Teacher Key 🗝️ 11, **Wisconsin Supply Statistics Key**, to discuss the remaining questions on the group assignment.

Once all the questions are answered, project Teacher Page 🗝️ 12, **Wisconsin Supply Profile**, and have students interpret each graph.

Discuss and answer the following questions as a class:

- When comparing the land area and forested area pie charts side by side, what do you notice? (*The Southeast has the largest land area [23%] yet the smallest forested land area [7%.] Why do you think this is? (The northern regions are, in general, more heavily forested than the southern regions.)*)
 - You'll notice in the standing sawtimber and high-grade sawtimber pie charts that the percentages are different. What could cause a region like the Southeast that has only 8% of the standing volume, to have 14% of the high-grade sawtimber? (*Trees counted as high-grade sawtimber are large, solid, straight, and uniform in character. Heavily forested areas may not have much high-grade sawtimber, and landscapes with poor soils and low rainfall may have fewer high-grade trees. The Southeast has rich soils and plentiful rainfall, and the logging pressure is lower than in other regions.*)
 - Finally, you'll notice that the veneer log production graph and the veneer product manufacturers graph are nearly mirror opposites. What does this mean? (*This means that most of the primary veneer products [veneer and veneer logs] are produced in the northern regions, while the majority of the secondary veneer products [doors, cabinets, etc.] are produced in the Southeast.*) Why do you think this is? (*The primary products are produced near the resource [the forest] and the secondary products are produced near the consumer market.*)
6. Ask students if all of the high-grade sawtimber is available to supply demand. (No.) In order to emphasize the influence of ownership on the availability of forest products, project Teacher Page 🗝️ 13, **Wisconsin Forest Ownership**. Review the ownership categories with the class, and have them identify the largest owners of forested land. (*Private individuals and county and municipal governments.*)
7. Have students work in their groups to calculate the percent annual removal for each ownership category, and write the answers on the overhead. Use the following equation: $(\text{Net Annual Removals} / \text{Net Annual Growth}) \times 100$ (*Answers: Federal Government = 30%, State Government = 33%, County and Municipal Government = 36%, Tribal = 88%, Forest Industry = 68%, Corporate = 39%, Private Individual = 70%, Total = 59%.*)
8. Ask groups to brainstorm how forest management (tree harvest) might differ between ownership groups.
- **Private individuals** will have varying objectives, ranging from preservation to timber removal for profit and for construction and yard space.
 - **County, municipal, state, and federal governments** will have multiple goals, including wildlife habitat, water conservation, recreation, hunting, and timber harvest.
 - **Industry** will have the primary goal of selling timber for profit.
 - **Corporations** may have multiple goals including timber sales, expansion, and real estate.



Ask the groups to discuss how ownership may influence the volume of tree species that can be harvested to satisfy increases in demand. *(As demand increases, a variety of landowners will have to respond. If this does not occur, other areas in the world will satisfy demand, or human population will have to use less forest resources.)*

NOTE: Students may notice the tribal land in Wisconsin seems to be the most heavily harvested. The data is somewhat deceiving. The Menominee reservation contains the majority of forested tribal land in the state. Much of the forested land is managed in a mature to old-growth forest structure with large, old trees. The larger trees do not grow as fast as younger trees, and only a relatively small portion of trees are growing from the poletimber to sawtimber size category. Since this reduces the annual sawtimber growth number, it leaves the impression that the tribe is overharvesting. It may be more the case that they have reached a sustainable harvest level due to a very long historical dedication to forest management.

Interestingly, you can see the entire outline of the Menominee reservation on satellite images due to the darker green color caused by the dominance of large trees compared to surrounding areas (for more information, see the Menominee Tribal Enterprises website at www.menominee.edu/mte/).

9. Refer back to the predictions that students made before completing the profiles. Have the groups check to see if their predictions were correct and discuss the differences.
10. Ask the class if the buying and selling of veneer products is limited to suppliers and consumers in Wisconsin. *(No, there are many other regions in the U.S. and world that produce and purchase veneer.)* Ask the class what other states near Wisconsin produce and buy veneer products. *(All of the states near Wisconsin, including Minnesota, Michigan, Iowa, Illinois, Missouri, and Indiana.)*


Activity 6 – A Growing Marketplace: The Midwest, U.S., and World

1. Hand each group a copy of Student Page  **5, Midwest Demand Profile**, and Student Page  **6, Midwest Supply Profile**. Have students use their knowledge of supply-and-demand to answer the following questions:
 - Which of the states have the most forested area? *(Minnesota, Michigan, and Wisconsin.)*
 - Since all the states are roughly the same size, why do you think that some have more forests than others? *(Much of the land in the more southern states is part of the grassland biome and is used for growing food crops like corn and soybeans.)*
 - Which of the states have the largest supply of forest resources (forest areas, sawtimber, high-grade sawtimber)? *(Michigan and Wisconsin.)*
 - Which states are the big veneer producers? Why? *(Michigan, Wisconsin. They have the largest amount of sawtimber.)*
 - Which state is the big consumer? Why? *(Illinois. Population is high.)*
 - Which states do you think are the biggest exporters of veneer and other forest products? Why? *(Wisconsin and Indiana. Higher volume of sawtimber, lower population.)*
 - Which state do you think is the biggest importer? Why? *(Illinois. High population, low supply.)*
 - Which states might have the largest increases in demand? Why? *(Illinois and Minnesota. Population, population growth rate, and income.)*
 - Which states do you think depend on other states and regions to supply their veneer and other wood needs? *(Illinois is the most obvious, but all states depend on other regions to meet their wood needs because of their high consumption rates and diverse needs.)*

Conclusion – Wisconsin in the Global Marketplace

1. Explain to the class that all of the economic principles that they have learned over the last few class periods — profit, self-interest, supply, demand, interdependence, cost of production, etc. — can be used to help explain current forest issues and predict future issues.

Ask students if they have heard of issues such as job outsourcing, trade agreements/protests, and rainforest destruction. Have them explain why these issues happen using the terms and principles that they have learned. Tell the class that decisions made by consumers, businesses, and government in Wisconsin can affect forests in other countries, and decisions made outside of Wisconsin can have major influences on the products we buy and the way we use forests.

2. Hand each group one discussion card cut from Teacher Page  **14, Discussion Cards**. Have the groups answer each of the questions using the economics principles and terms that they have learned. Tell groups that all the members' ideas should be recorded and discussed, and they should try their best to use only the ideas that can be supported with economic principles.

Use Teacher Key  **15A-B, Discussion Cards Key**, to help groups answer questions.

3. After groups have discussed their scenario, have each student write a one- to two-page summary that answers one of the questions and describes his or her reasoning. You may wish to have students find internet and newspaper articles that deal with their scenarios and include them with their assignments.

SUMMATIVE ASSESSMENT

Provide class time for students to find articles on the internet and in newspapers that deal with one of the scenarios outlined on the discussion cards or on a relevant economic or forest issue (e.g., job outsourcing, taxes, environmental regulation, etc.). Have students use the articles

to identify the economic principles that the author is using. Have students identify the players and their goals. Help students identify how the goals of an individual influence their opinion about current issues.

SOURCES

Buongiorno, J. et al. (2003). *The Global Forest Products Model*. New York: Academic Press.

CIA World Factbook. United States Central Intelligence Agency. World Wide Web: www.odci.gov/cia/publications/factbook/index.html

Concise Encyclopedia of Economics. The Library of Economics and Liberty. World Wide Web: www.econlib.org/library/CEE.html

Food and Agriculture Organization of the United Nations. (2001). *Global Forest Resources Assessment 2000*. FAO Forestry Paper 140.

Hackett, R. L., & Dahlman, R. A. (1997). *Minnesota timber industry – An assessment of timber product output and use, 1992*. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Research Station. Resource Bulletin NC-186.

Hackett, R. L., & Pilon, J. (1997). *Michigan timber industry – An assessment of timber product output and use, 1994*. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Research Station. Resource Bulletin NC-189.

Hackett, R. L., & Sester, J. A. (1998). *Illinois timber industry – An assessment of timber product output and use, 1996*. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Research Station. Resource Bulletin NC-192.

Hackett, R. L., & Settle, J. (1998). *Indiana's timber industry – An assessment of timber product output and use, 1995*. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Research Station. Resource Bulletin NC-193.

Haygreen, J. G., & Bowyer, J. L. (1989). *Forest Products and Wood Science*. (2nd ed). Ames: Iowa State University Press.

KPMJ International. (2004). *Corporate Tax Rates Survey – January 2004*. Switzerland.

Leatherberry, E. C., Roussopoulos, S. M. & Spencer, J. S., Jr. (1992). *An analysis of Iowa's forest resources, 1990*. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station. Resource Bulletin NC-142.

Leatherberry, E. C., & Spencer, J. S., Jr. (1996). *Michigan forest statistics, 1993*. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Research Station. Resource Bulletin NC-170.

Leatherberry, E. C., & Treiman, T. B. (2002). *Missouri's forest resources in 2000*. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Research Station. Resource Bulletin NC-209.

Lopus, J. S., & Willis, A. M. (eds). (2003). *Economics in Action: 14 Greatest Hits for Teaching High School Economics*. National Council on Economic Education.

Miles, P. D., Chen, C. M., & Leatherberry, E. C. (1995). *Minnesota forest statistics, 1990, Revised*. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Research Station. Resource Bulletin NC-158.

Piva, R. J., & Jones, S. G. (1997). *Missouri timber industry – An assessment of timber product output and use, 1994*. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Research Station. Resource Bulletin NC-184.

Piva, R. J., & Michel, D. D. (2003). *Iowa timber industry – An assessment of timber product output and use, 2000*. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Research Station. Resource Bulletin NC-215.

Reading, W. H., & Whipple, J. W. (2003). *Wisconsin timber industry – An assessment of timber product output and use, 1999*. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Research Station. Resource Bulletin NC-218.

Schmidt, T. L. (1996). *Wisconsin forest statistics, 1996*. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Research Station. Resource Bulletin NC-183.

Schmidt, T. L., Hansen, M. H., & Solomakos, J. A. (2000). *Illinois' forest in 1998*. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Research Station. Resource Bulletin NC-198.

Schmidt, T. L., Hansen, M. H., & Solomakos, J. A. (2000). *Indiana's forests in 1998*. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Research Station. Resource Bulletin NC-196.

Smith, B. W. et al. (2005). *Forest Resources of the United States, 2002*. U.S. Department of Agriculture, Forest Service.

Smith, B. W., & Hackett, R. L. (1990). *Veneer industry and timber use, North Central Region, 1988*. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station. Resource Bulletin NC-125.

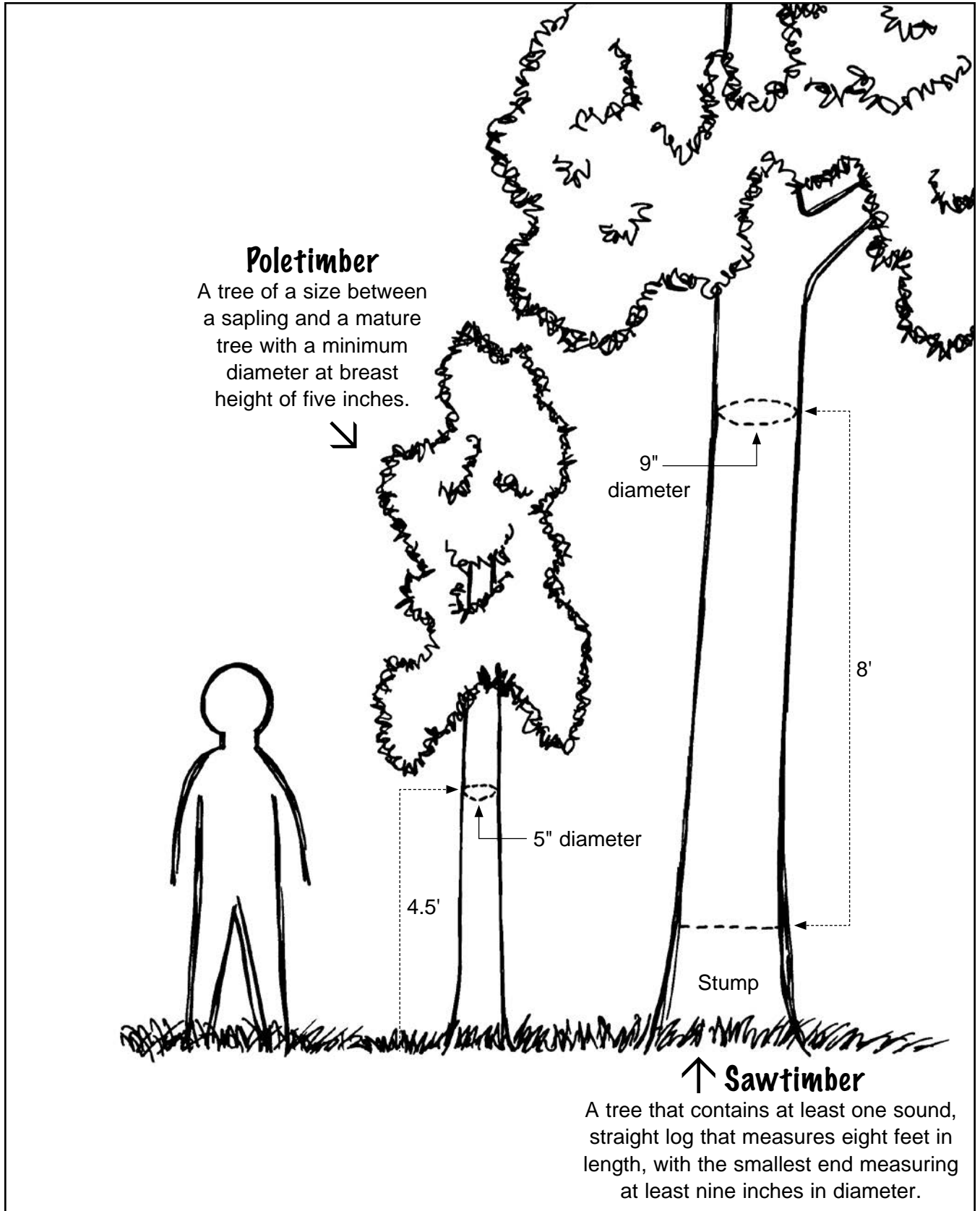
Wadley-Donovan Group. (2000). *Target Market Profile: Forest Products*. Forward Wisconsin.

Wisconsin Economic Development Institute, Inc. (2004). *Wisconsin's Forest Products Industry Business Climate Status Report 2004*. Madison, WI.

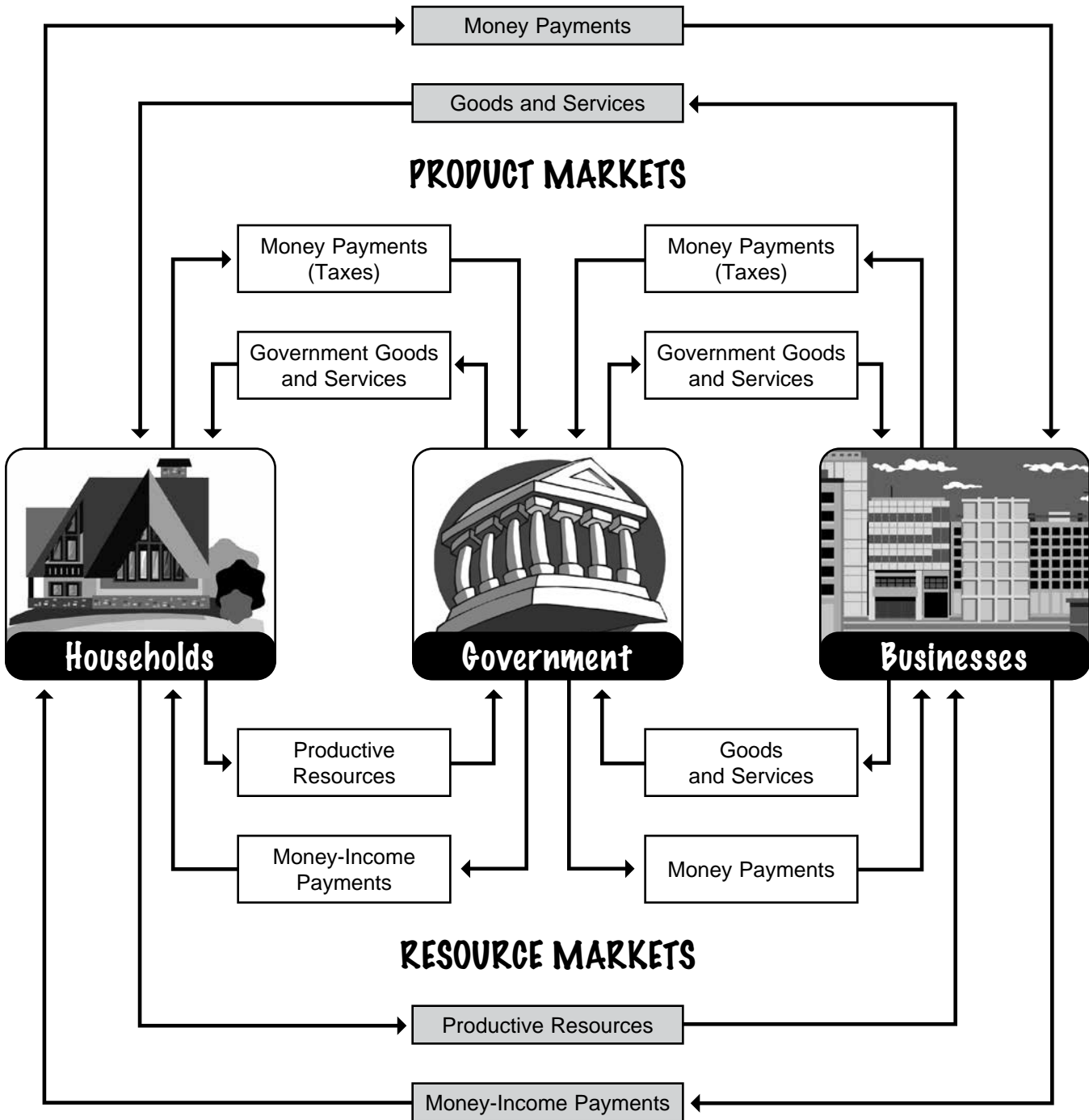
Wisconsin Primary Wood Using Industry Directory. (2002). Madison, WI: Wisconsin Department of Natural Resources. PUB-FR-025 2002.

Wisconsin Secondary Wood Using Industry Directory. (2002). Madison, WI: Wisconsin Department of Natural Resources. PUB-FR-026 2002.

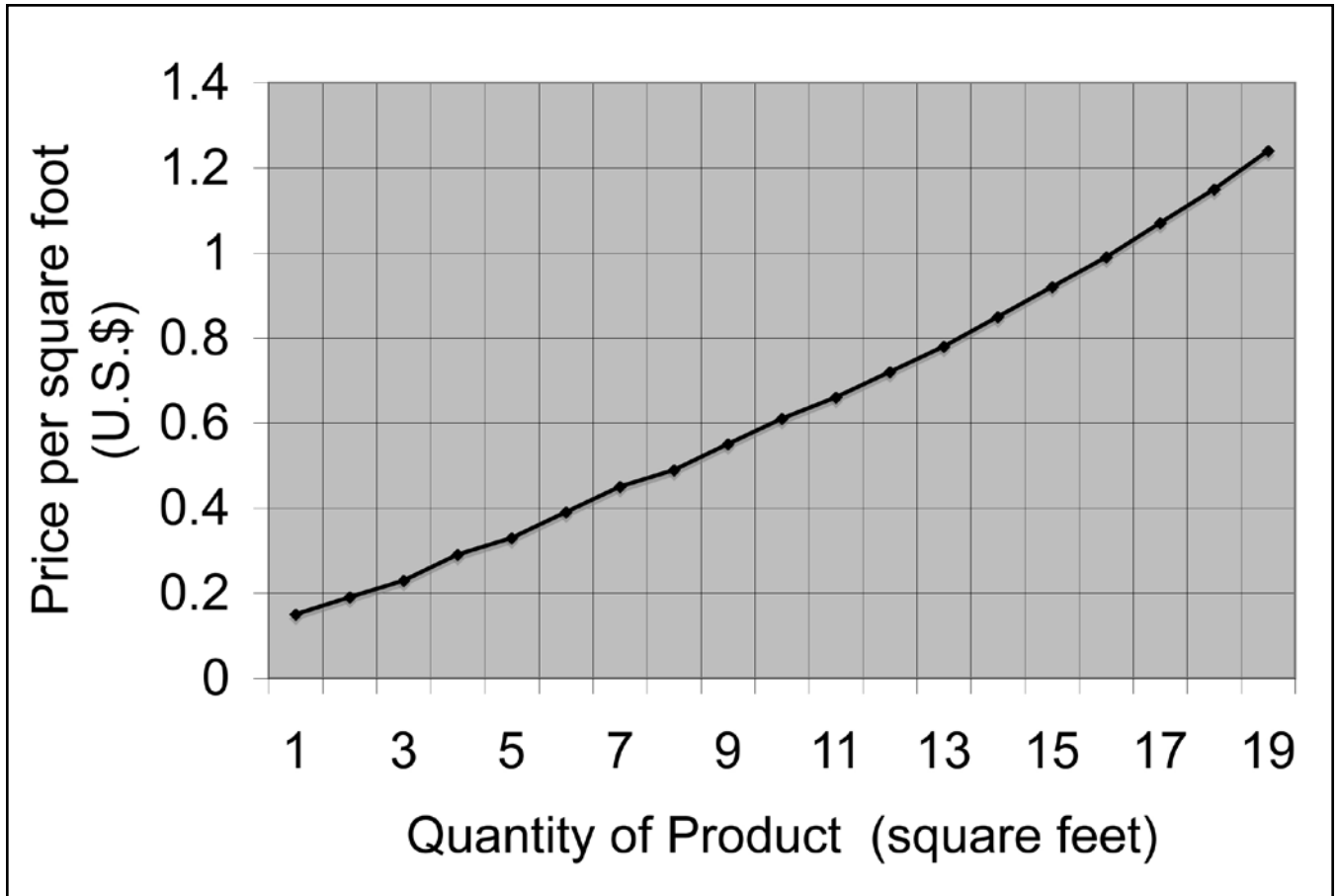
SAWTIMBER AND POLETIMBER



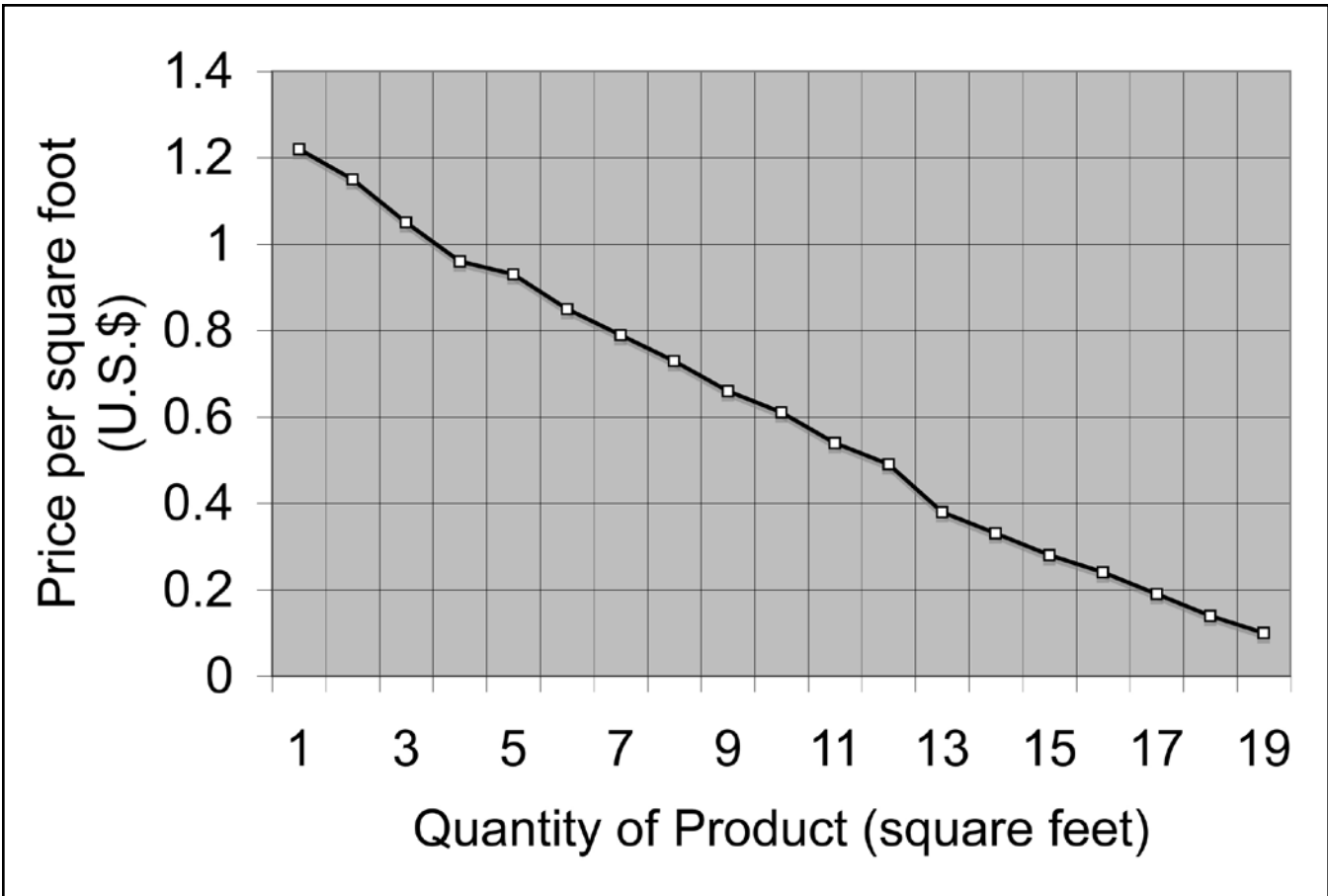
CIRCULAR FLOW DIAGRAM



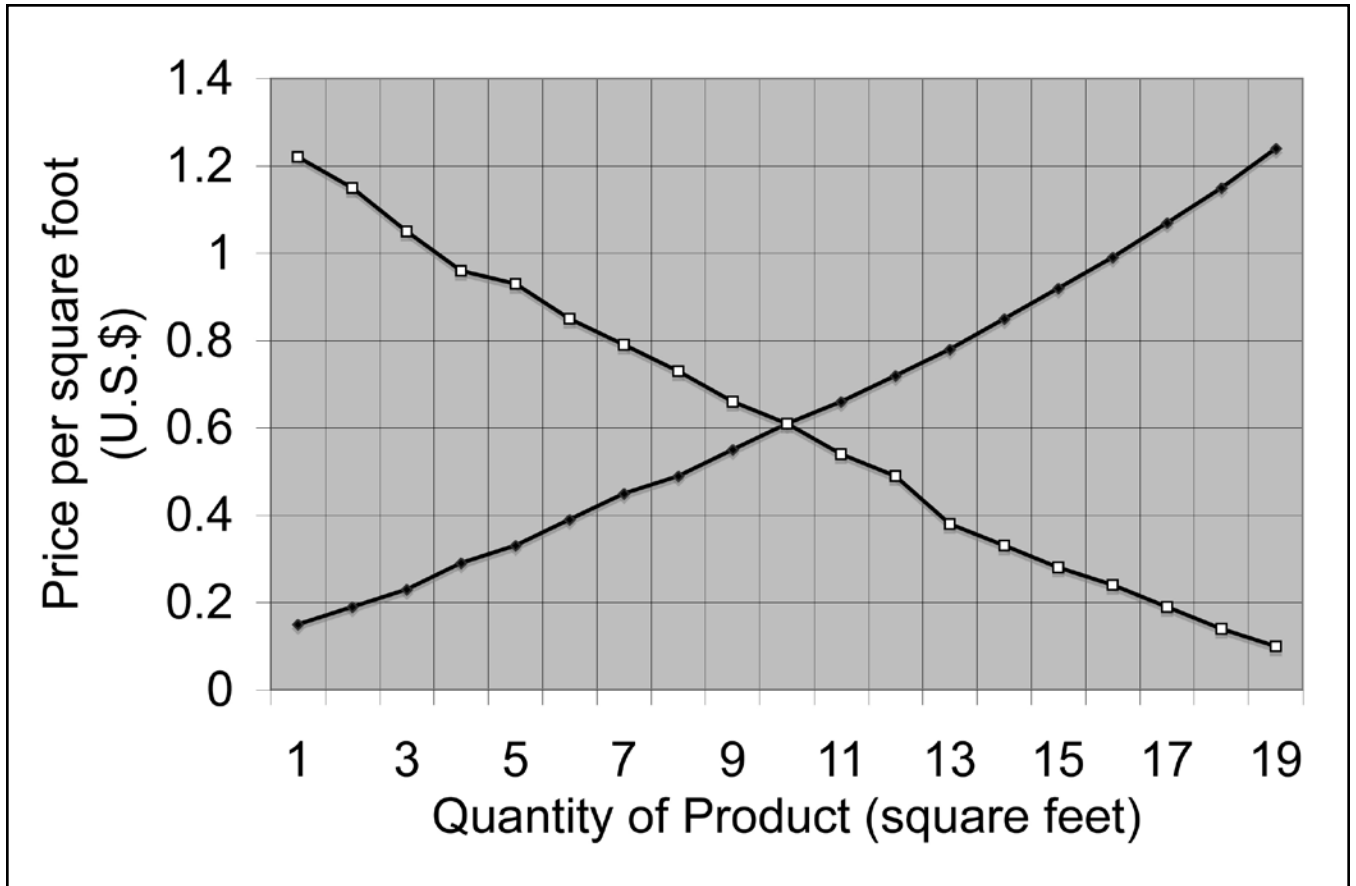
VENEER SUPPLY GRAPH



VENEER DEMAND GRAPH



VENEER SUPPLY-AND-DEMAND GRAPH



Supply



Demand

FOREST PRODUCTS

Wood Products

PRIMARY WOOD PRODUCTS

- bark
- firewood
- green and dried lumber
- plywood and other wood panels
- posts
- veneer
- wood particles, shavings, and chips

SECONDARY WOOD PRODUCTS

- baking cups
- barrels
- baseball bats
- baseball cards
- billboards
- billiard cue sticks
- birdhouses
- book covers
- bookcases
- bowling pins
- calendars
- canes
- canoe paddles and oars
- CD labels
- ceiling tiles
- cereal boxes
- charcoal
- chopsticks
- coffins
- construction paper
- corrugated boxes
- crutches
- diplomas and certificates
- doors
- egg cartons
- facial and bath tissue
- fast-food packaging
- fencing, fence posts, and rails
- fishing boats
- flooring
- furniture
- golf tees
- grocery bags
- hockey sticks
- house siding
- kitchen cabinets
- lamp shades
- LVL (laminated veneer lumber)
- magazines
- maps
- matchsticks
- menus
- milk cartons
- model airplanes
- mouldings and baseboards
- musical instruments
- napkins
- newspapers
- paneling
- paper cups
- pencils
- phone books
- picnic tables
- popsicle sticks
- postage stamps
- railroad ties
- report cards
- rulers
- shingles
- shutters
- skateboards
- sleds
- snowboards
- snowshoes
- telephone poles
- toilet seats
- tongue depressors
- tool handles
- toothpicks
- tubes for bathroom tissue and paper towels
- wallpaper
- waxed paper
- window frames and sills
- wrapping paper

Nonwood Forest Products

- apples
- artificial vanilla flavoring (byproduct of some paper production)
- avocados
- bananas
- bay leaves
- carnauba wax (from the leaves of the carnauba palm tree; used in lipsticks, automotive waxes, furniture polish)
- cellophane
- cellulose acetate (wrapping film)
- cellulose nitrate (adhesives and lacquers)
- cinnamon
- citrus fruits
- cloves
- CMC (carboxymethyl cellulose; food thickener and texturizer for ketchup and ice cream)
- coconuts
- coffee
- cola nuts (Coca-Cola®)
- cork (coasters, buoys, dartboards, ceiling tiles, foosballs, baseballs)
- dates
- hardhats, and sports helmets
- linoleum (linseed oil mixed with pine resin and wood flour)
- maple syrup
- mistletoe
- nutmeg
- nuts
- olives and olive oil
- peaches
- pears
- plums
- rosewood oil (medicinal uses)
- rubber products (tires, adhesives, chewing gum, latex gloves, hoses, gaskets, shoe soles, boots, balls)
- sandalwood fragrance
- shiitake mushrooms
- suntan lotion (e.g., almond oil, emollient)
- Taxol® (anticancer drug)
- tea tree oil (antibiotic and antifungal oil)
- toothpaste additives (e.g., cellulose gum)
- turpentine (most comes from wood pulping operations)

FOREST PRODUCT USE

The wood products industry in Wisconsin sells
\$18 billion in products each year.

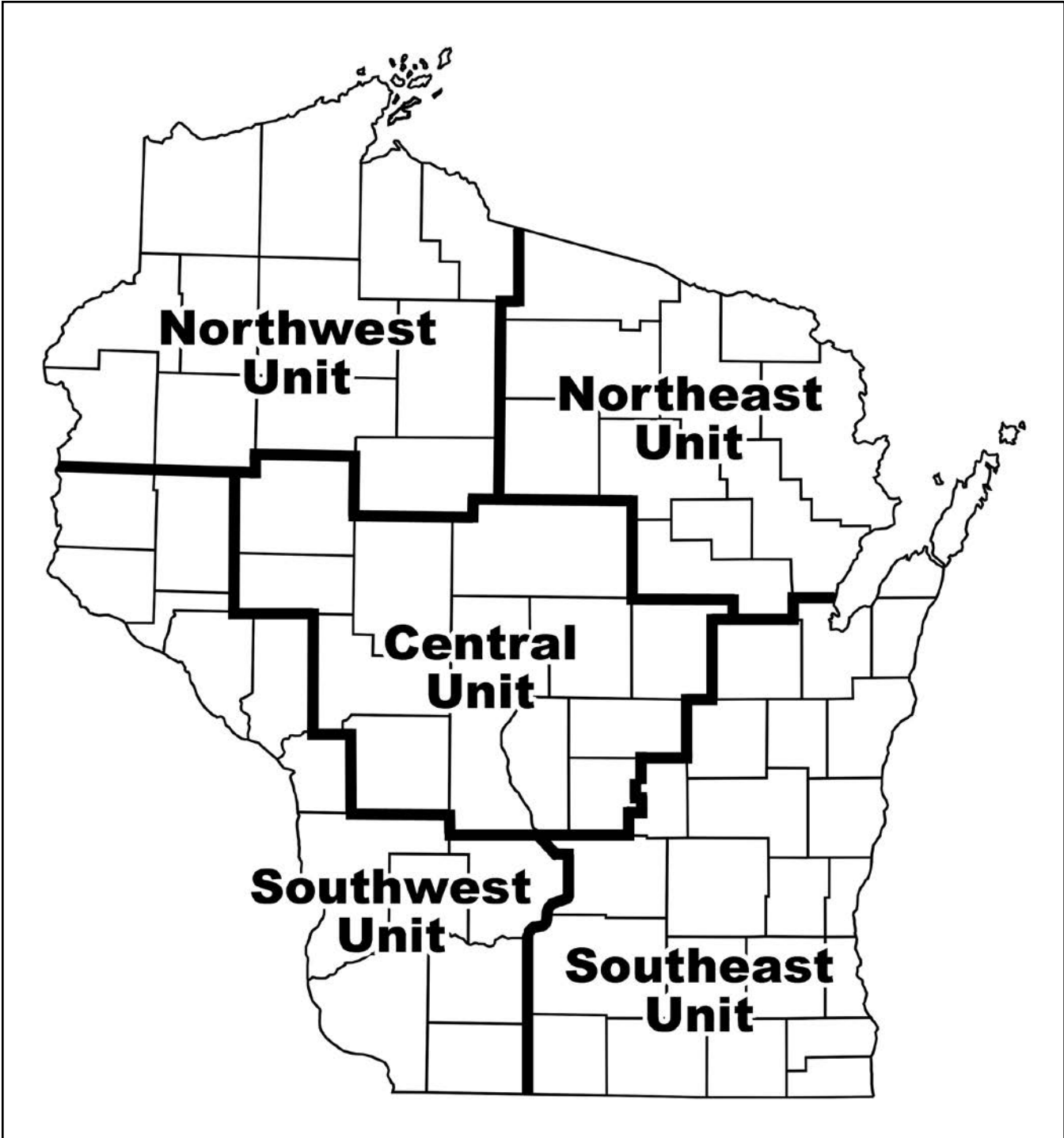
Wisconsin's wood products industry employs
more than **100,000 people**.

The average person in the U.S. uses
75 cubic feet of wood each year
(that is a solid block of wood the size of a car),
3.5 times more than the average for the rest of the world.

The average person in the U.S. consumes
700 pounds of paper each year.

The annual global wood consumption is
116 billion cubic feet
(that is a solid square foot of wood that would stretch
around the earth **880 times** at the equator).

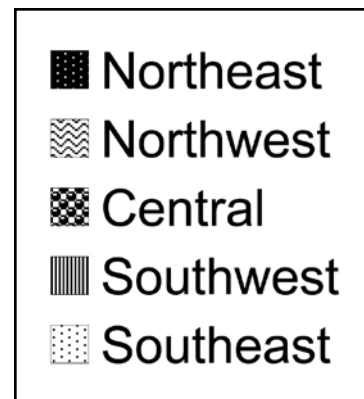
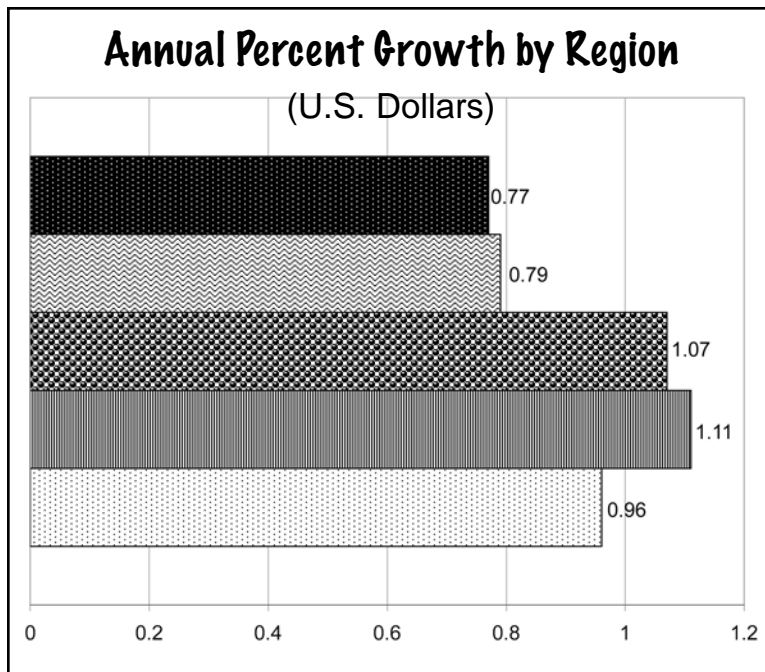
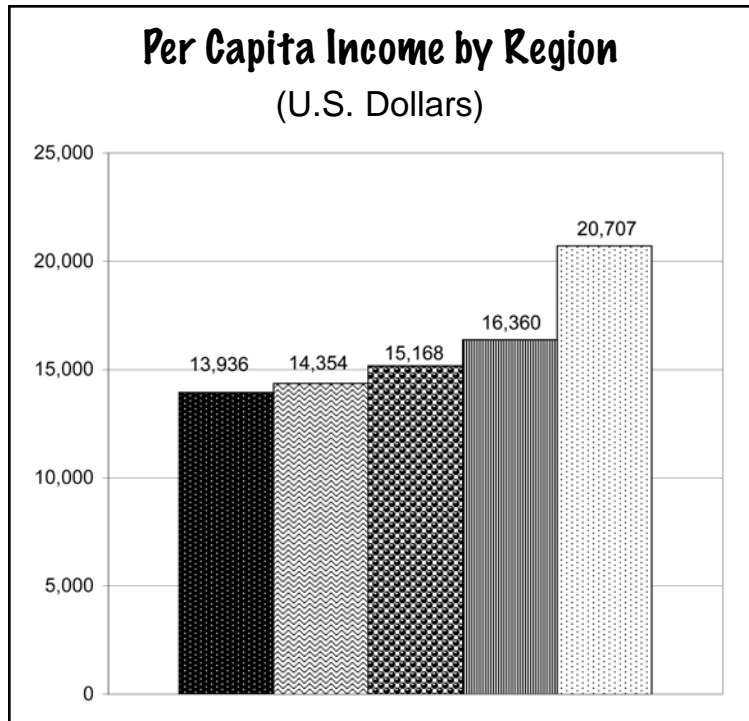
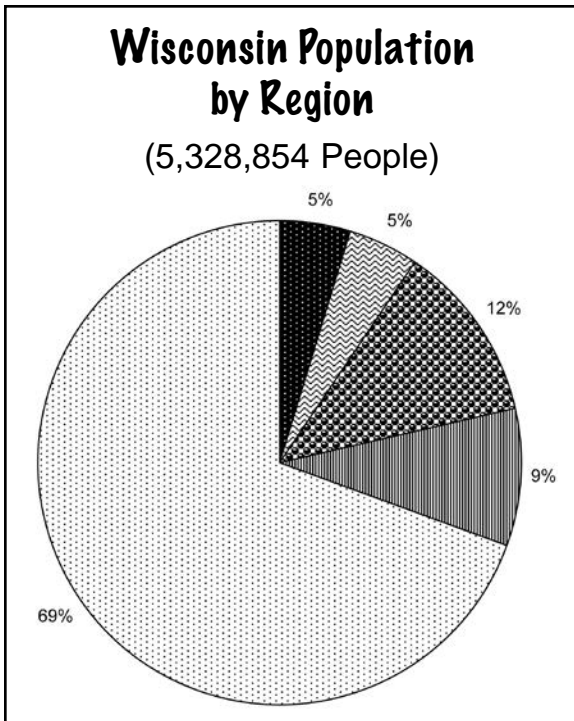
WISCONSIN REGIONS



WISCONSIN DEMAND STATISTICS KEY

- 1. Which five counties have the largest populations? List the counties and population sizes.**
Milwaukee (940,164), Dane (426,526), Waukesha (360,767), Brown (226,778), Racine (188,831)
- 2. Which five counties have the smallest population? List the counties and population sizes.**
Menominee (4,562), Florence (5,088), Iron (6,861), Pepin (7,213), Forest (10,024)
- 3. Which five counties have the fastest growth rate? List the counties and percentages.**
St. Croix (3.65%), Waushara (3.24%), Calumet (2.3%), Pepin (1.87%), Oconto (1.64%)
- 4. Which five counties have the slowest growth rate? List the counties and percentages.**
Milwaukee (.05%), Price (.22%), Wood (.29%), Ashland (.34%), Rusk (.36%), Menominee (.36%)
- 5. Which five counties have the highest per capita income? List the counties and incomes.**
Ozaukee (36,488), Waukesha (31,472), Washington (24,438), St. Croix (23,921), Dane (23,713)
- 6. Which five counties have the lowest per capita income? List the counties and incomes.**
Menominee (3,973), Forest (11,244), Rusk (11,879), Adams (12,179), Ashland (12,187)
- 7. What is the population, per capita income, and growth rate of the county that you live in? How does it compare with the other counties?**
- 8. Which region has the largest population?**
Southeast (3,702,990)
- 9. Which region has the highest per capita income?**
Southeast (\$20,707)
- 10. Which region has the fastest growth rate?**
Southwest (1.11%)
- 11. Which county do you think currently has the largest demand for goods and services? How did you determine your answer?**
Milwaukee, per capita income x population
(17,400 x 940,164 = 16,358,853,600)
- 12. Which region do you think currently has the largest demand for goods and services? How did you determine your answer?**
Southeast, per capita income x population
(20,707 x 3,702,990 = 76,677,813,930)
- 13. Which region do you think will have the largest increase in demand over the next year? How did you determine your answer?**
Southeast, annual growth x population
(.0096 x 3,702,909 = 35,549 new people each year)
- 14. If you were trying to sell veneer products in Wisconsin, in which region(s) would you market your product and why?**
Southeast. Most of the demand is there. Demand is increasing the fastest because of the large population, growth rate, and per capita income.

WISCONSIN DEMAND PROFILE

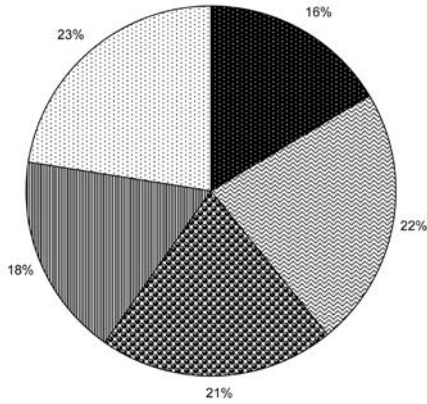


WISCONSIN SUPPLY STATISTICS KEY 🍷🔑

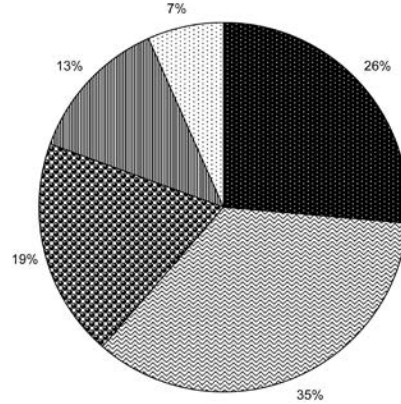
- 1. Which region has the most land area? Which has the least?**
Most: Northwest (7,933,100 acres)
Least: Northeast (5,700,100 acres)
- 2. Which region has the most forested land area? Which has the least?**
Most: Northwest (5,547,300 acres)
Least: Southeast (1,051,200 acres)
- 3. Which region has the most standing sawtimber volume?**
Most: Northwest (13,775,953,000 board feet)
Least: Southeast (3,413,473,000 board feet)
- 4. Which region has the most high-grade sawtimber?**
Most: Northeast (2,059,529,000 board feet)
Least: Central (837,876,000 board feet)
- 5. Birch, ash, aspen, basswood, red oak, and sugar maple are highly sought after for veneer. Which region has the most high-grade standing volume of each of these species?**
Birch: Northeast; Ash: Southeast;
Aspen: Northeast; Basswood: Northwest;
Red Oak: Southwest; Sugar Maple: Northeast
- 6. Which region produces the most veneer logs?**
Northwest (18,353,000 board feet each year)
- 7. Valuable specialty veneers are made from black cherry and black walnut. Which region has the most high-grade standing volume of each of these species?**
Black Cherry: Southeast
Black Walnut: Southwest
- 8. Which region has the most veneer producers? Which region has the highest production capacity for veneer (add the maximum size numbers together)?**
Northwest (6 producers); Northwest (21 million board feet per year)
- 9. Which region has the most veneer product manufacturers?**
Southeast (41)
- 10. What are some of the most common veneer products made in Wisconsin? Are there any specialty products made by only a few businesses? What are they?**
Common: cabinets, furniture, panels, counters, fixtures, doors, crafts, and mouldings
Specialty: musical instruments, jewelry boxes, humidors, models, and chiropractic tables
- 11. What Wisconsin tree species are commonly used to make the products? Are any species used that do not grow in Wisconsin? What are they?**
From Wisconsin: birch, ash, red oak, white oak, sugar maple, red maple, aspen, cherry, hickory, and white pine;
From Other Locations: pecan, western red cedar, Douglas fir, yellow poplar, ponderosa pine, mahogany, and ebony
- 12. How does the region you live in rank in the following categories — standing sawtimber volume, high-grade sawtimber volume, annual veneer log production, production capacity, and number of veneer product manufacturers?**

WISCONSIN SUPPLY PROFILE

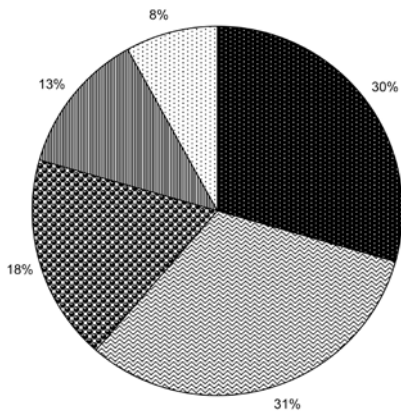
Land Area by Region
(34,760,900 Acres)



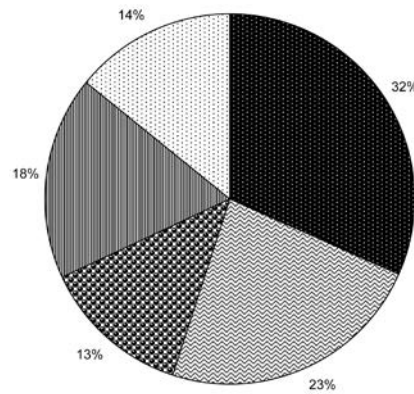
Forested Area by Region
(15,944,900 Acres)



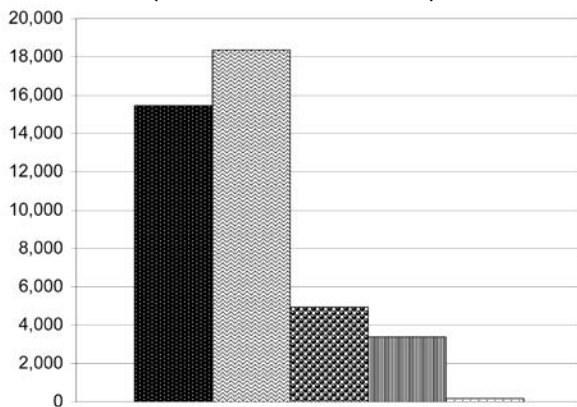
Standing Sawtimber Volume by Region
(43,002,196,000 Board Feet)



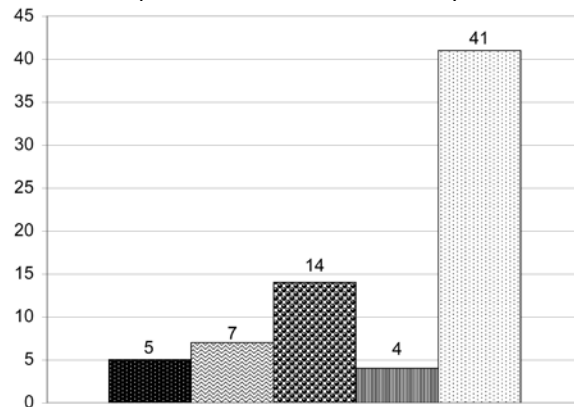
High-grade Sawtimber Volume by Region
(6,744,409,000 Board Feet)



Veneer Log Production by Region
(1,000 Board Feet)



Veneer Product Manufacturers by Region
(Number of Facilities)



Northeast
 Northwest
 Central
 Southwest
 Southeast

WISCONSIN FOREST OWNERSHIP

FOREST OWNER	AREA OF FOREST (1,000 Acres)	SAWTIMBER			
		Standing Volume (1,000 bd. ft.)	Net Annual Growth (1,000 bd. ft.)	Net Annual Removals (1,000 bd. ft.)	Annual Removal (%)
Federal Government	1,512	5,516,785	195,448	58,676	
State Government	744	2,244,167	78,737	26,045	
County and Municipal Government	2,282	5,268,488	207,079	74,997	
Tribal	344	2,618,792	50,418	44,259	
Forest Industry	1,102	3,096,465	113,357	76,610	
Corporate	692	2,260,248	73,393	28,648	
Private Individual	9,018	27,015,462	962,142	676,947	
TOTALS	15,703	48,020,407	1,680,574	986,182	

$$\text{Annual Removal} = \left(\frac{\text{Net Annual Removals}}{\text{Net Annual Growth}} \right) \times 100$$

DISCUSSION CARDS

POPULATION GROWTH

- How might population growth in Wisconsin affect forests in Wisconsin?
- How might population growth in Wisconsin affect forests in the rest of the world?
- How might population growth in the rest of the world affect forests in Wisconsin?

INCREASED DEMAND FOR LOCAL PRODUCTS

- How might increased demand for Wisconsin products affect forests in Wisconsin?
- How might increased demand for Wisconsin products affect forests in other countries?
- How might increased demand for local products in other countries affect forests in Wisconsin?

LOWER TAXES

- How might lower taxes in Wisconsin affect forests in Wisconsin?
- How might lower taxes in Wisconsin affect forests in other countries?
- How would lower taxes in other countries affect forests in Wisconsin?

STRICT ENVIRONMENTAL LAWS

- How might strict environmental laws in Wisconsin affect forests in Wisconsin?
- How might strict environmental laws in Wisconsin affect forests in the rest of the world?
- How might strict environmental laws in the rest of the world affect forests in Wisconsin?

INCREASED WORKER WAGES

- How might increased worker wages in Wisconsin affect forests in Wisconsin?
- How might increased worker wages in Wisconsin affect forests in other countries?
- How might increased worker wages in other countries affect forests in Wisconsin?

DISCUSSION CARDS KEY

POPULATION GROWTH

- **How might population growth in Wisconsin affect forests in Wisconsin?** Population growth would increase the demand for forest products and may also increase the land area needed for human habitation. Population growth may create conditions where we need to harvest more wood from a decreasing forest area.
- **How might population growth in Wisconsin affect forests in the rest of the world?** As population increases in Wisconsin, we may be forced to import more wood from other nations to satisfy a growing demand. This may increase wood harvesting in other countries.
- **How might population growth in the rest of the world affect forests in Wisconsin?** As populations grow in countries around the world, so will their demand for forest resources. This demand may lead to increased costs of imported wood and increased exports of Wisconsin wood.

INCREASED DEMAND FOR LOCAL PRODUCTS

- **How might increased demand for Wisconsin products affect forests in Wisconsin?** Increased demand for local wood would cause increases in the harvesting and manufacturing of Wisconsin wood products. This may create more state jobs and bring money into Wisconsin communities (through taxes and consumer spending). Forests would need to be managed sustainably to produce long-term benefits for Wisconsin's citizens.
- **How might increased demand for Wisconsin products affect forests in other countries?** As people buy and use local wood products, the demand for imported wood would decrease. This may cause decreases in the harvesting and manufacturing of wood in other countries, since Wisconsin and the U.S. are big importers of wood products.
- **How might increased demand for local products in other countries affect forests in Wisconsin?** As populations in other countries use wood resources that are closer to home, their demand for exported wood from Wisconsin and other states would decrease. This would cause decreases in the harvesting and manufacturing of Wisconsin wood products.

LOWER TAXES

- **How might lower taxes in Wisconsin affect forests in Wisconsin?** Taxes represent a cost to businesses. As taxes decrease, the cost of producing a product may also decrease. Since the cost of production is already high in the U.S., this may help U.S. businesses better compete with businesses in other countries and increase exports of forest products. But, cutting taxes also has its downside for both businesses and citizens. Taxes support government, which provides infrastructure, schools, public lands, environmental protection, social security, etc. Lower taxes may result in decreased public forestland, decreased environmental protection, and decreases in quality of life for workers and communities.
- **How might lower taxes in Wisconsin affect forests in other countries?** As Wisconsin lowers taxes, businesses may be able to decrease the price of their products and increase exports. But, other states and countries may lower taxes as well. This may lead to constant pressures to decrease taxes, thus continually decreasing government services in Wisconsin and other states and countries.
- **How would lower taxes in other countries affect forests in Wisconsin?** Since many other countries already have lower production costs than Wisconsin and the U.S., lower taxes may further reduce the price of imported products. This may cause decreases in the production of Wisconsin wood products and/or decreases in taxes leading to less government services.

Teacher Key  15A

DISCUSSION CARDS KEY

STRICT ENVIRONMENTAL LAWS

- **How might strict environmental laws in Wisconsin affect forests in Wisconsin?** Strict environmental laws that ensure future supplies of wood and other forest services (i.e., by protecting endangered species, water, soil, air) may reduce the area of forest available for harvest, increase production costs, and increase the price of wood products from Wisconsin. Since many other countries do not have strict environmental laws, their products may be much cheaper. States and countries that have strict environmental laws may have long-term supply advantages over other countries that are depleting their supply of forest resources and services.
- **How might strict environmental laws in Wisconsin affect forests in the rest of the world?** As it becomes cheaper to harvest and process wood outside of Wisconsin and the U.S., other countries may produce and sell more wood to U.S. markets. If countries proceed without forest management plans that protect forest services, they may eventually deplete their supply of forest resources.
- **How might strict environmental laws in the rest of the world affect forests in Wisconsin?** As many other countries increase their environmental protections, their short-term costs will increase, helping to equalize the prices of their products to those of the U.S. and other countries. Environmental protections that ensure the continued supply of forest resources would ensure that resources are available to satisfy the demand of current and future generations.

INCREASED WORKER WAGES

- **How might increased worker wages in Wisconsin affect forests in Wisconsin?** The cost of living is much higher in Wisconsin and the U.S. than many other countries in the world. Increases in wages represent costs to businesses, increasing the price of products. If wages in other countries stay low, the price of Wisconsin forest products will increase. This may decrease sales of Wisconsin products. Although, high worker wages may also attract a high-quality workforce that helps businesses improve their product.
- **How might increased worker wages in Wisconsin affect forests in other countries?** As the cost to produce wood products in Wisconsin increases, consumers may buy cheaper, imported products. This may increase the production of wood products in other countries. If high wages help Wisconsin attract a high-quality workforce, it may give Wisconsin businesses a competitive advantage (e.g., inventing new technologies) over other countries.
- **How might increased worker wages in other countries affect forests in Wisconsin?** Increased wages in other countries may help to relieve pressure on Wisconsin businesses to cut positions, employee wages, and employee benefits to keep costs low. Having a living wage in all countries may help to eliminate the advantage that many countries gain by paying very low wages to their employees and selling products at a lower price.

COMPUTER DESK SALE!

Local Veneer Mills Struggle During Boom in Retail Sales

The Hardwood Gazette

One thing is for sure, veneer products have never been so cheap. “We could peel veneer all day long, but at these prices we’d lose money for every hour we worked.” Jeremy, a local veneer mill owner, would not describe himself as happy about the low veneer prices. This is because the veneer being sold in local stores is not from his company. It comes from forests and factories halfway around the globe.

Last month’s loosening of trade barriers has led to a large increase in wood imports from other areas of the world. Jeremy and other local producers are obviously not happy about it. “How can we compete with these prices? We pay our workers ten times as much per hour. We provide health insurance. We pay taxes and pay more for wood that comes from well-managed forests. All of these things bump up our price. Think of it. These foreign companies can get their product to stores 10,000 miles away and charge less than the guy making the product a block away,” Jeremy explains.

Consumers, on the other hand, are lining up. “We just built a new house and are really excited about how cheap some of the wood products are, especially the office furniture,” says Erin, a new homeowner in the area.

Randy, an economist at the university, seems to think that this scenario will be commonplace as more markets are opened to trade. “With increases in population and income, consumers are buying, but still buying cheap. This is the way things work. And I’m not saying that some local businesses won’t be hurt, but other businesses will benefit. For example, the high-quality paper produced here is finding new markets because of the trade deal. And, you know, the local folks will have to find a new market, where demand is high and competition is low. If they can get in on a market like

that, with high prices, they’ll do just fine. The new era is going to be about innovation and utilizing your supply advantages like good forest management, good infrastructure, a trained workforce, etc.”

Jessica, a worker at the local veneer mill, hopes that they find their new market soon. “It seems we get the sharp end of the stick – no raises, decreased benefits, longer hours, and so on. I understand that the folks upstairs need to lower costs to compete, but at some point, you’re going to lose all of your good workers,” she concluded.

HUGE SALE!!!

Rock Bottom Prices!

Computer desks have never been so cheap! Are you tired of working at that uncomfortable space you call a computer desk? Now is the time to make a difference for yourself at work or home.



All styles. Beautiful hardwood veneer – maple, ash, beech, oak, and more...

They're so cheap, buy two! You'll never see prices like this again!

ACT NOW WHILE SUPPLIES LAST!

Student Page 1

WISCONSIN MARKET PREDICTIONS

1. Which region do you think is the most populous? _____
2. Which region do you think is the least populous? _____
3. Which region has the fastest growing population? _____
4. Which region has the slowest growing population? _____
5. Which region has the highest per capita income? _____
6. Which region has the lowest per capita income? _____
7. Which region do you think has the most forested area? _____
8. Which region do you think has the least forested area? _____
9. Which region has the most primary veneer products industries? _____
10. Which region has the most secondary veneer products industries? _____

WISCONSIN MARKETPLACE: DEMAND

Statistics

1. Which five counties have the largest populations? List the counties and population sizes.

2. Which five counties have the smallest population? List the counties and population sizes.

3. Which five counties have the fastest growth rate? List the counties and percentages.

4. Which five counties have the slowest growth rate? List the counties and percentages.

5. Which five counties have the highest per capita income? List the counties and incomes.

6. Which five counties have the lowest per capita income? List the counties and incomes.

7. What is the population, per capita income, and growth rate of the county that you live in? How does it compare with the other counties?

8. Which region has the largest population?

9. Which region has the highest per capita income?

10. Which region has the fastest growth rate?

11. Which county do you think currently has the largest demand for goods and services? How did you determine your answer?

12. Which region do you think currently has the largest demand for goods and services? How did you determine your answer?

13. Which region do you think will have the largest increase in demand over the next year? How did you determine your answer?

14. If you were trying to sell veneer products in Wisconsin, in which region(s) would you market your product and why?

WISCONSIN MARKETPLACE: DEMAND

Forest Resources

County	Population	Annual Growth (%)	Per Capita Income (U.S. Dollars)
Northeast	248,551	0.77	13,936
Florence	5,088	0.98	12,774
Forest	10,024	0.44	11,244
Langlade	20,740	0.67	14,027
Lincoln	29,641	0.51	16,601
Marinette	43,384	0.48	14,309
Menominee	4,562	0.36	3,973
Oconto	36,634	1.64	16,301
Oneida	36,776	0.88	18,469
Shawano	40,669	0.75	14,953
Vilas	21,033	1.01	16,710

County	Population	Annual Growth (%)	Per Capita Income (U.S. Dollars)
Northwest	247,384	0.79	14,354
Ashland	16,866	0.34	12,187
Barren	44,963	0.75	15,359
Bayfield	15,013	0.84	14,481
Burnett	15,674	1.21	13,097
Douglas	43,287	0.45	14,343
Iron	6,861	0.52	13,158
Polk	41,319	1.58	19,763
Price	15,822	0.22	14,365
Rusk	15,347	0.36	11,879
Sawyer	16,196	1.20	13,086
Taylor	19,680	0.41	17,570
Washburn	16,036	1.26	15,029

County	Population	Annual Growth (%)	Per Capita Income (U.S. Dollars)
Central	644,140	1.07	15,168
Adams	18,643	1.02	12,179
Chippewa	55,195	1.26	15,461
Clark	33,557	0.45	12,949
Eau Claire	93,142	1.07	17,288
Jackson	19,100	0.74	13,936
Juneau	24,316	1.52	14,396
Marathon	125,834	0.88	19,221
Marquette	15,832	0.74	15,155
Monroe	40,899	1.18	14,149
Portage	67,182	0.78	16,582
Waupaca	51,731	0.77	17,697
Waushara	23,154	3.24	14,841
Wood	75,555	0.29	18,041

County	Population	Annual Growth (%)	Per Capita Income (U.S. Dollars)
Southwest	485,789	1.11	16,360
Buffalo	13,804	0.55	14,446
Crawford	17,243	0.48	13,018
Dunn	39,858	1.22	14,081
Grant	49,597	0.58	13,640
Iowa	22,780	0.82	16,347
La Crosse	107,120	0.62	18,015
Lafayette	16,137	0.04	16,811
Pepin	7,213	1.87	15,068
Pierce	36,804	1.30	18,072
Richland	17,924	0.37	14,373
Sauk	55,225	1.30	18,989
St. Croix	63,155	3.65	23,921
Trempealeau	27,010	0.71	16,580
Vernon	28,056	0.94	13,305

County	Population	Annual Growth (%)	Per Capita Income (U.S. Dollars)
Southeast	3,702,990	0.96	20,707
Brown	226,778	1.12	21,512
Calumet	40,631	2.30	20,078
Columbia	52,468	0.95	19,195
Dane	426,526	1.45	23,713
Dodge	85,897	0.69	17,294
Door	27,961	1.22	19,648
Fond du Lac	97,296	0.67	18,664
Green	33,647	1.05	18,554
Green Lake	19,105	0.47	16,082
Jefferson	74,012	1.02	18,395
Kenosha	149,557	1.15	18,861
Kewaunee	20,187	0.75	17,021
Manitowoc	82,887	0.63	17,767
Milwaukee	940,164	0.05	17,400
Outagamie	160,971	1.42	21,118
Ozaukee	82,317	1.00	36,488
Racine	188,831	0.43	20,206
Rock	152,307	0.56	18,373
Sheboygan	112,646	0.66	20,202
Walworth	93,759	1.38	19,961
Washington	117,493	1.25	24,438
Waukesha	360,767	1.02	31,472
Winnebago	156,763	0.77	19,811

WISCONSIN MARKETPLACE: SUPPLY

Forest Resources - Northeast

Florence, Forest, Langlade, Lincoln, Menominee, Marinette, Oconto, Oneida, Shawano, and Vilas Counties

TOTAL LAND AREA: 5,700,100 ACRES • TOTAL FORESTED AREA: 4,244,600 ACRES

WOOD SUPPLY

Tree Species		Standing Sawtimber Volume (1,000 Board Feet)	High-grade Standing Sawtimber Volume (1,000 Board Feet)	Annual Veneer Log Production (1,000 Board Feet)
SOFTWOODS	Jack pine	255,830	0	126
	Red pine	1,511,479	121,830	385
	White pine	1,665,914	387,679	380
	Northern white cedar	699,183	5,175	8
	Spruce (white, black)	453,079	0	610
	Tamarack	144,420	0	0
HARDWOODS	Ash (black, white, green)	394,879	70,814	6
	Aspen (bigtooth, quaking)	1,535,096	85,814	1,281
	Basswood	935,849	268,244	796
	Beech	100,231	22,235	32
	Birch (yellow, paper)	682,601	101,411	4,192
	Hickory	12,840	0	0
	Sugar maple	2,271,634	589,956	3,783
	Red maple	642,098	68,934	204
	Red oak	1,292,216	351,312	3,342
	White oak	46,943	1,176	154
	Black walnut	923	0	49
	Butternut	13,003	818	0
	Black cherry	68,360	5,131	99
TOTALS		12,726,578	2,059,529	15,447

VENEER PRODUCERS

(M=Million Board Feet)

Company	County	Tree Species Bought	Products Sold	Size
Solon	Oneida	White birch	Veneer cores, popsicle sticks	3M-5M
Weber Veneer and Plywood Company	Shawano	Sugar maple, red maple	Hardwood plywood, veneer	1M-3M
Wisconsin Veneer and Plywood	Shawano	Ash, aspen, basswood, sugar maple, red maple, red oak, white oak	Hardwood veneer, dimensional hardwood	3M-5M

VENEER PRODUCT MANUFACTURERS

Company	County	Tree Species Used	Products Sold
Burkel, Inc.	Oconto	Yellow poplar, sugar maple, red maple	Dieboards/boxes, plywood, veneer panels
George Fiedorwicz Company	Marinette	Aspen, basswood, red oak, white pine	Cabinets
Placid Woods, Inc.	Oneida	Birch, cherry, sugar maple, red maple	Partitions, fixtures
Warvel Products	Oconto	-----	Plywood and veneer panels
Wysocki Veneer, Inc.	Forest	Birch, red maple, red oak	Veneer face or technical grade veneer

WISCONSIN MARKETPLACE: SUPPLY

Forest Resources - Northwest

Ashland, Barron, Bayfield, Burnett, Douglas, Iron, Polk, Price, Rusk, Sawyer, Taylor, and Washburn Counties

TOTAL LAND AREA: 7,933,100 ACRES • TOTAL FORESTED AREA: 5,547,300 ACRES

Tree Species		Standing Sawtimber Volume (1,000 Board Feet)	High-grade Standing Sawtimber Volume (1,000 Board Feet)	Annual Veneer Log Production (1,000 Board Feet)
WOOD SUPPLY	SOFTWOODS			
	Jack pine	390,208	0	17
	Red pine	1,153,249	134,778	218
	White pine	1,073,707	188,856	126
	Northern white cedar	706,991	17,455	0
	Spruce (white, black)	593,750	0	140
	Tamarack	257,504	0	0
WOOD SUPPLY	HARDWOODS			
	Ash (black, white, green)	591,818	46,863	37
	Aspen (bigtooth, quaking)	2,426,089	23,844	11,210
	Basswood	1,093,064	284,888	900
	Beech	0	0	0
	Birch (yellow, paper)	651,750	94,284	2,267
	Hickory	38,633	0	0
	Sugar maple	1,622,186	257,824	679
	Red maple	972,340	85,104	96
	Red oak	1,827,568	354,764	2,533
	White oak	345,489	23,787	31
	Black walnut	5,915	0	0
	Butternut	12,862	0	-----
Black cherry	12,830	1,652	99	
TOTALS		13,775,953	1,514,102	18,353

Company	County	Tree Species Bought	Products Sold	Size
Birchwood Lumber and Veneer	Washburn	Aspen, basswood, red oak	Hardwood veneer	1M-3M
Birchwood Manufacturing Company	Barron	Balsam poplar, red maple, sugar maple	Wood chips, golf clubs, tennis rackets, veneer	5M-7M
Bird's Eye Veneer	Ashland	Aspen, basswood, cherry, maple, oak	-----	1M-3M
Columbia Forest Products	Ashland	Ash, aspen, birch, sugar maple, red maple, white oak, red oak	Wood chips, cores, veneer	5M-7M
Columbia Forest Products Flitch Wood	Ashland	Variety of hardwoods and softwoods	Wood chips, veneer	101M-500M
Reel Sheer Veneer Products	Ashland	Ash, butternut, cherry, sugar maple, red oak, white oak	Veneer	101M-500M

Company	County	Tree Species Used	Products Sold
B&B Engineering	Taylor	Sugar maple, red oak, white pine, ponderosa pine	Millwork, architectural woodwork
Bishop Fixture and Millwork, Inc.	Polk	Ash, birch, yellow poplar, cherry, Douglas fir, sugar maple	Store fixtures
BJ Wood Products, Inc.	Rusk	Birch, sugar maple, red oak, white oak, ponderosa pine, yellow poplar	Cabinets, laminated counters, other laminated products, store fixtures
Fossum Cabinets	Polk	Cherry, sugar maple, red oak	Cabinets, millwork, laminated counters, mouldings
Fraser Shipyards, Inc.	Douglas	Douglas fir, red oak, white oak	Ship repair
Holmes Wood Products	Barron	Ash, cherry, hickory, pecan, sugar maple, red maple, red oak	Household furniture, crafts, models
Wegner Cabinetry	Burnett	Ash, birch, cherry, hickory, pecan, sugar maple, red maple	Cabinets, stair parts

(M=Million Board Feet)

Student Page 4C

WISCONSIN MARKETPLACE: SUPPLY

Forest Resources - Central

Adams, Chippewa, Clark, Eau Claire, Jackson, Juneau, Marathon, Marquette, Monroe, Portage, Waupaca, Waushara, and Wood Counties

TOTAL LAND AREA: 7,132,600 ACRES • TOTAL FORESTED AREA: 3,053,000 ACRES

Tree Species		Standing Sawtimber Volume (1,000 Board Feet)	High-grade Standing Sawtimber Volume (1,000 Board Feet)	Annual Veneer Log Production (1,000 Board Feet)
SOFTWOODS	Jack pine	283,454	3,115	0
	Red pine	538,912	17,961	26
	White pine	1,292,647	134,778	32
	Northern white cedar	34,725	0	0
	Spruce (white, black)	16,688	0	0
	Tamarack	58,172	0	0
HARDWOODS	Ash (black, white, green)	246,108	46,863	1
	Aspen (bigtooth, quaking)	690,898	23,844	143
	Basswood	268,117	73,066	515
	Beech	0	0	0
	Birch (yellow, paper)	89,245	0	195
	Hickory	38,633	0	0
	Sugar maple	353,925	67,432	905
	Red maple	847,540	107,850	562
	Red oak	2,193,992	300,949	2,493
	White oak	729,686	59,805	3
	Black walnut	3,011	0	28
	Butternut	19,880	2,213	-----
Black cherry	27,071	0	36	
TOTALS		7,732,704	837,876	4,939

WOOD SUPPLY

Company	County	Tree Species Bought	Products Sold	Size
IKE International Corporation	Chippewa	Aspen, basswood, white oak, birch	-----	5M-7M
Hatley Veneer Company, Inc.	Marathon	White oak	Veneer	1M-3M

VENEER PRODUCERS

Company	County	Tree Species Used	Products Sold
Glen Oak Lumber and Milling Co.	Marquette	Aspen, red maple, red oak	Millwork, mouldings
Kitchen and Bath by Wads	Marathon	Ash, birch, cherry, hickory, pecan, sugar maple, red oak	Cabinets, household fixtures
Larson's Custom Cabinets	Chippewa	Ash, aspen, birch, cherry, hickory, pecan, sugar maple	Cabinets, furniture, doors
Mapleton Wood Products, Inc.	Clark	Basswood, cottonwood, red oak, white pine	Household furniture
Marion Plywood Corporation	Waupaca	Ash, aspen, basswood, beech, birch, yellow poplar	Plywood and veneer panels
Marshfield Door Systems	Wood	Aspen, mahogany, sugar maple, red oak, white oak, walnut	Doors
Menzner Lumber and Supply Co.	Marathon	Yellow poplar, sugar maple, red oak	Millwork, mouldings, doors
Noritage, Inc.	Waupaca	Ash, red maple	Furniture
Spectrum Industries, Inc.	Chippewa	Sugar maple, red maple, red oak, pine, fir, yellow pine, western pine, Canadian spruce	Furniture
Streckert Manufacturing Company, Inc.	Clark	Fir, mahogany, sugar maple, red oak, white pine, spruce	Millwork, doors
Wausau Homes, Inc.	Marathon	Birch, sugar maple, red oak, yellow pine, Canadian spruce, pine, fir	Mobile and modular homes
Wisconsin Box Company	Marathon	Ash, aspen, birch, sugar maple, red maple	Boxes, crates
Wood Model Shop, Inc.	Waupaca	Cherry, sugar maple, white pine	Household furniture

VENEER PRODUCT MANUFACTURERS

(M=Million Board Feet)

WISCONSIN MARKETPLACE: SUPPLY

Forest Resources - Southwest

Buffalo, Crawford, Dunn, Grant, Iowa, La Crosse, Lafayette, Pepin, Pierce, Richland,
St. Croix, Sauk, Trempealeau, and Vernon Counties

TOTAL LAND AREA: 6,137,600 ACRES • TOTAL FORESTED AREA: 2,068,800 ACRES

WOOD SUPPLY

Tree Species		Standing Sawtimber Volume (1,000 Board Feet)	High-grade Standing Sawtimber Volume (1,000 Board Feet)	Annual Veneer Log Production (1,000 Board Feet)
SOFTWOODS	Jack pine	15,057	0	0
	Red pine	97,781	0	0
	White pine	268,375	8,722	0
	Northern white cedar	0	0	0
	Spruce (white, black)	2,383	2,383	0
	Tamarack	0	0	0
HARDWOODS	Ash (black, white, green)	233,066	40,423	0
	Aspen (bigtooth, quaking)	572,298	62,216	0
	Basswood	492,606	132,355	437
	Beech	0	0	0
	Birch (yellow, paper)	97,413	4,068	32
	Hickory	238,393	31,667	58
	Sugar maple	501,755	114,273	598
	Red maple	481,558	84,352	27
	Red oak	910,491	511,973	1,972
	White oak	1,259,584	131,891	107
	Black walnut	114,668	18,513	9
	Butternut	42,437	3,247	-----
	Black cherry	125,623	5,650	143
TOTALS		5,453,488	1,151,733	3,383

VENEER PRODUCERS

(M=Million Board Feet)

Company	County	Tree Species Bought	Products Sold	Size
NONE	-----	-----	-----	-----

VENEER PRODUCT MANUFACTURERS

Company	County	Tree Species Used	Products Sold
Esterhouse Furniture	Dunn	Walnut	Furniture
Luepke and Sons, Inc.	Dunn	Birch, yellow poplar, cherry, pecan, hickory, red oak, white oak	Cabinets, furniture, doors, mouldings
Pine River Woodcraft	Richland	Alder, western red cedar, Douglas fir, cherry, hickory, pecan, sugar maple	Crafts, home furniture, mouldings, doors
Ravenwood	Iowa	Cherry, mahogany, sugar maple, red maple, red oak, white oak	Cabinet, furniture, crafts, models
Wisconsin Woodworks	Grant	Birch, cherry, hickory, pecan, red oak, white pine, walnut	Cabinets, counters, bath cabinets

WISCONSIN MARKETPLACE: SUPPLY

Forest Resources - Southeast

Brown, Calumet, Columbia, Dane, Dodge, Door, Fond du lac, Green, Green Lake, Jefferson, Kenosha, Kewaunee, Manitowoc, Milwaukee, Outagamie, Ozaukee, Racine, Rock, Sheboygan, Walworth, Washington, Waukesha, and Winnebago Counties

TOTAL LAND AREA: 7,857,500 ACRES • TOTAL FORESTED AREA: 1,051,200 ACRES

Tree Species		Standing Sawtimber Volume (1,000 Board Feet)	High-grade Standing Sawtimber Volume (1,000 Board Feet)	Annual Veneer Log Production (1,000 Board Feet)
SOFTWOODS	Jack pine	674	0	0
	Red pine	55,914	0	0
	White pine	99,227	7,959	0
	Northern white cedar	167,246	0	0
	Spruce (white, black)	9,705	0	0
	Tamarack	29,303	0	0
HARDWOODS	Ash (black, white, green)	457,731	132,210	0
	Aspen (bigtooth, quaking)	105,728	1,711	6
	Basswood	231,098	60,705	0
	Beech	74,939	15,404	0
	Birch (yellow, paper)	53,284	1,484	82
	Hickory	96,937	20,115	0
	Sugar maple	302,055	102,308	16
	Red maple	426,459	79,053	4
	Red oak	534,337	351,312	17
	White oak	616,034	123,469	30
	Black walnut	39,962	3,983	0
	Butternut	1,535	0	-----
Black cherry	111,305	23,632	10	
TOTALS		3,413,473	932,345	165

WOOD SUPPLY

VENEER PRODUCERS

(M=Million Board Feet)

Company	County	Tree Species Bought	Products Sold	Size
Bayland Veneer, Inc.	Brown	Ash, aspen, cherry, maple, oak	Sliced veneer	1M-3M

Company	County	Tree Species Used	Products Sold
Ahvenlee/Yankee Woodcrafters	Jefferson	Cherry, sugar maple, red oak, walnut	Furniture
AJ Heinzen Company, Inc.	Waukesha	Yellow poplar, oak, pine	Cabinets, mouldings
AJ Pietsch Company	Milwaukee	Aspen, birch, butternut, yellow poplar, Douglas fir	Cabinets, furniture, woodwork, mouldings
Algoma Hardwoods, Inc.	Kewaunee	Beech, birch, cherry, sugar maple, red oak, white oak	Doors
Banjoes By Richelieu	Dane	Fir, sugar maple, red oak, yellow poplar	Musical instruments, chiropractic tables
Beck's Quality Cabinets	Brown	Red oak	Cabinets
Buckstaff Company	Winnebago	Ash, aspen, birch, maple, oak	Cabinets, furniture
Deleers Millwork	Brown	Ash, aspen, beech, birch, cherry, hickory, pecan	Cabinets, furniture, counters, millwork
Distinctive Woodwork, Inc.	Racine	Alder, ash, basswood, beech, birch, butternut	Cabinets, furniture, millwork, woodwork
Dufeck Manufacturing Company	Brown	Aspen, basswood, birch, cottonwood, red maple, red pine	Boxes, crates, crafts, gifts
Elipticon Wood Products, Inc.	Outagamie	Alder, ash, basswood, beech, birch, butternut	Millwork, mouldings, architectural millwork

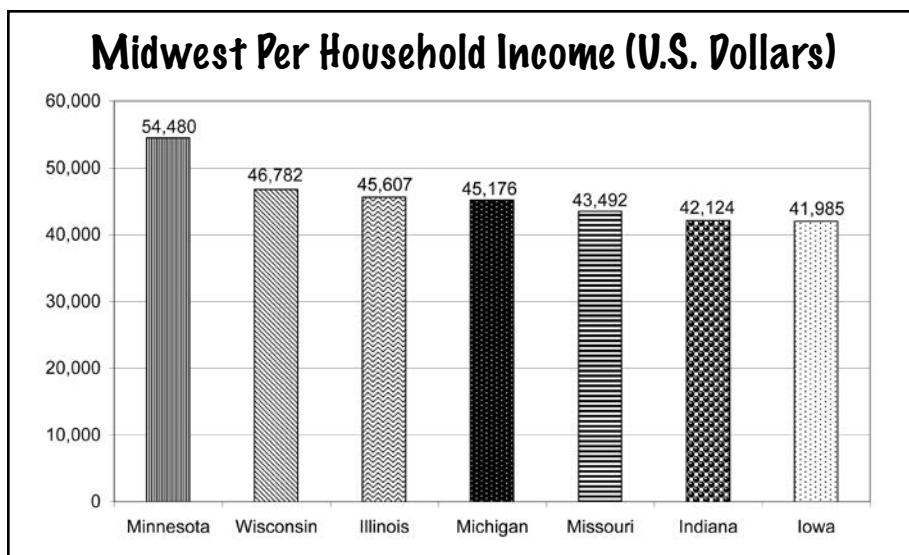
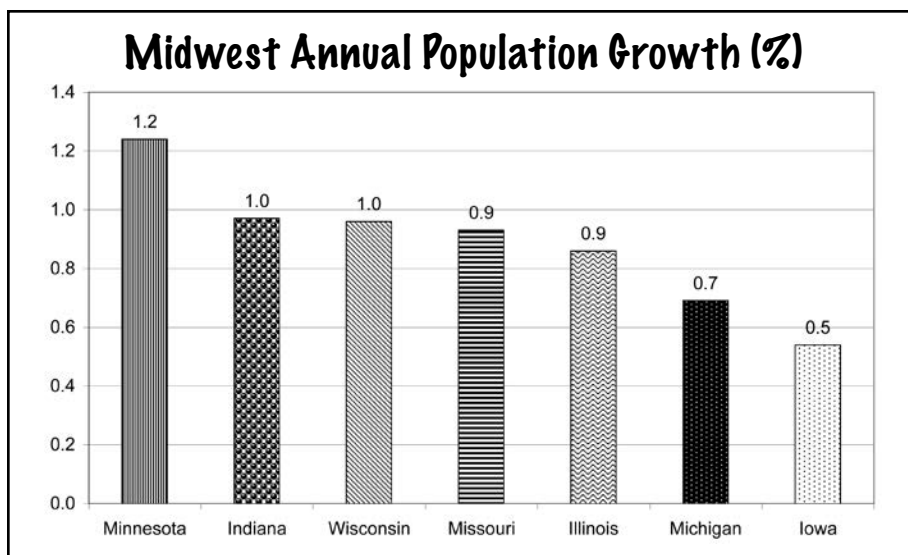
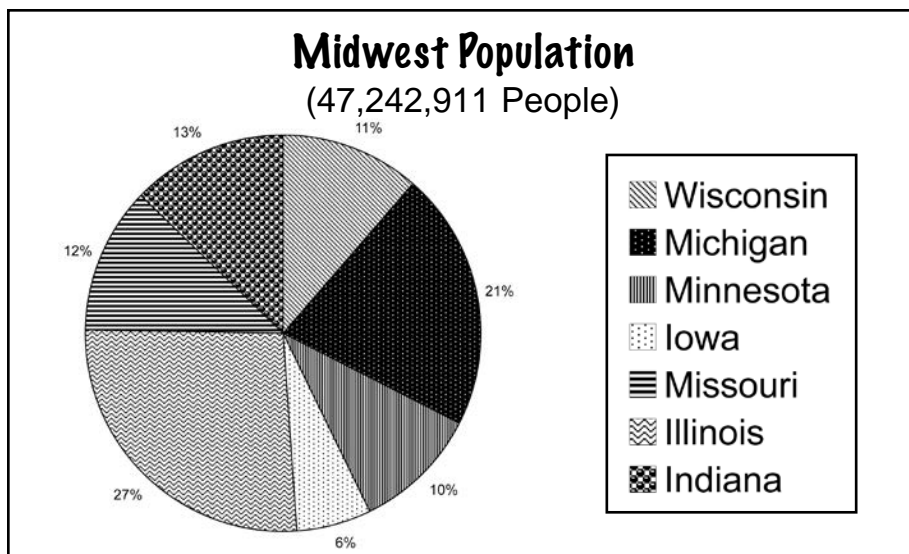
VENEER PRODUCT MANUFACTURERS

WISCONSIN MARKETPLACE: SUPPLY

VENEER PRODUCT MANUFACTURERS (CONTINUED)

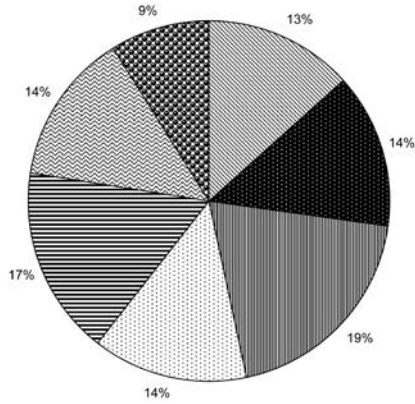
Company	County	Tree Species Used	Products Sold
Esterhouse Furniture	Dunn	Walnut	Furniture
Fillingham Furniture	Milwaukee	Birch, cherry, oak, walnut	Furniture
Fischer Hamilton, Inc.	Manitowoc	Douglas fir, sugar maple, red oak	Furniture
Franklin Woods	Door	Birch, cherry, maple, red oak, walnut	Furniture
Groebel Woodwork, Inc.	Ozaukee	Birch, yellow poplar, western red cedar, cherry, hickory, pecan, maple	Cabinets, furniture, counters, woodwork
Hewitt's Woodesign	Dane	Ash, birch, butternut, yellow poplar, eastern red cedar, cherry	Cabinets, furniture, models, crafts, counters, woodwork
Hillcraft Limited	Dane	Cherry, sugar maple, red oak	Cabinets
Hilleque Creative Laminates	Dane	Red oak	Cabinets, laminated countertops
JT Millwork	Dane	Aspen, yellow poplar, red maple, red oak, white pine	Cabinets, millwork, mouldings, partitions
Janesville Church Furniture	Rock	Red oak, white oak, yellow poplar	Furniture, millwork
Kettle Moraine Hardwoods	Racine	Ash, basswood, beech, butternut, sugar maple, red oak	Hardwood lumber
Lakewood Woodcraft	Waukesha	Birch, cherry, hickory, pecan, oak, pine	Cabinets, millwork, stairs
Lamico, Inc.	Winnebago	Sugar maple, red maple	Medical supply
Morgan Manufacturing	Winnebago	Aspen, basswood, sugar maple, red oak, white oak, ponderosa pine	Doors, millwork
Oshkosh Architectural Door	Winnebago	Ash, aspen, beech, birch, cherry, Douglas fir	Architectural doors
Palmer Johnson, Inc.	Door	Ash, cherry, white oak, white pine	Boats, ships, cabinets
Precision Woodwork, Inc.	Waukesha	Birch, cherry, mahogany, sugar maple, red oak, white pine	Architectural millwork, store fixtures
Richard Ivens Woodworking	Milwaukee	Birch, cherry, sugar maple, red oak, white pine, walnut	Millwork
Richard Judd Furniture, Limited	Dane	Cherry, ebony, mahogany, sugar maple, red maple, walnut	Furniture
SB Woodcrafters	Dane	Mixed hardwoods	Cabinets, furniture
Schweiger - Division of KCS	Jefferson	Ash, yellow poplar, cherry, oak	Furniture
Specialty Cove Custom Cabinets, Inc.	Rock	Cherry, hickory, pecan, sugar maple, red maple, red oak	Cabinets, counters
TJ Hale Company	Waukesha	Cherry, mahogany, sugar maple, red oak, spruce	Store displays, fixtures
Valley Planning Mill, Inc.	Outagamie	Alder, ash, beech, birch, butternut, yellow poplar	Mouldings, millwork, paneling, doors
Wilco Cabinet Makers, Inc.	Brown	Ash, basswood, birch, cherry, hickory, pecan, sugar maple	Cabinets, furniture, laminated counters
Wilson Woodcraft, Inc.	Dane	Birch, yellow poplar, western red cedar, cherry, Douglas fir, maple	Cabinets, counters, millwork, woodwork
Wisc Woodcraft, LLC	Sheboygan	Birch, sugar maple, red maple, red oak, white pine, southern yellow pine	Cabinets, millwork, partitions, fixtures, displays
Wisconsin Cabinets	Walworth	Cherry, hickory, pecan, maple, oak	Cabinets, bookcases
Wood Creations	Outagamie	Ash, aspen, birch, yellow poplar, cherry, sugar maple	Furniture, cabinets, jewelry boxes, humidors, frames
Woodmill Products, Inc.	Milwaukee	Yellow poplar, cherry, sugar maple, oak	Architectural millwork

MIDWEST DEMAND PROFILE

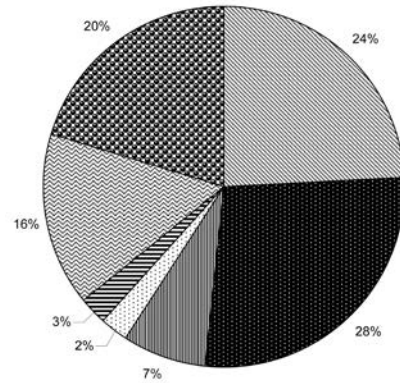


MIDWEST SUPPLY PROFILE

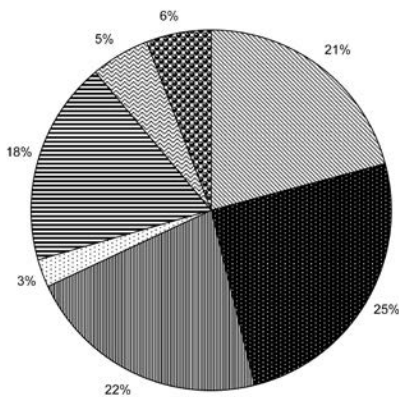
Midwest Land Area
(260,733,200 Acres)



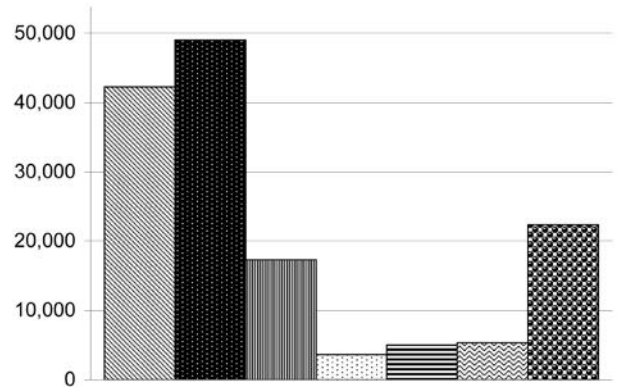
Midwest High-grade Sawtimber Volume
(26,706,493,000 Board Feet)



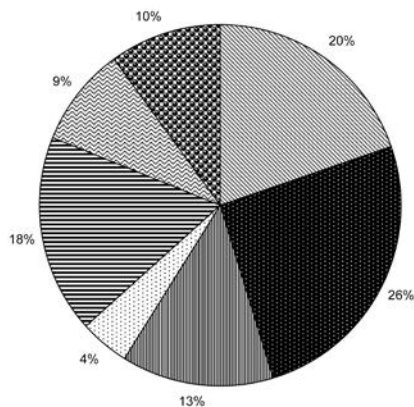
Midwest Forested Area
(76,477,800 Acres)



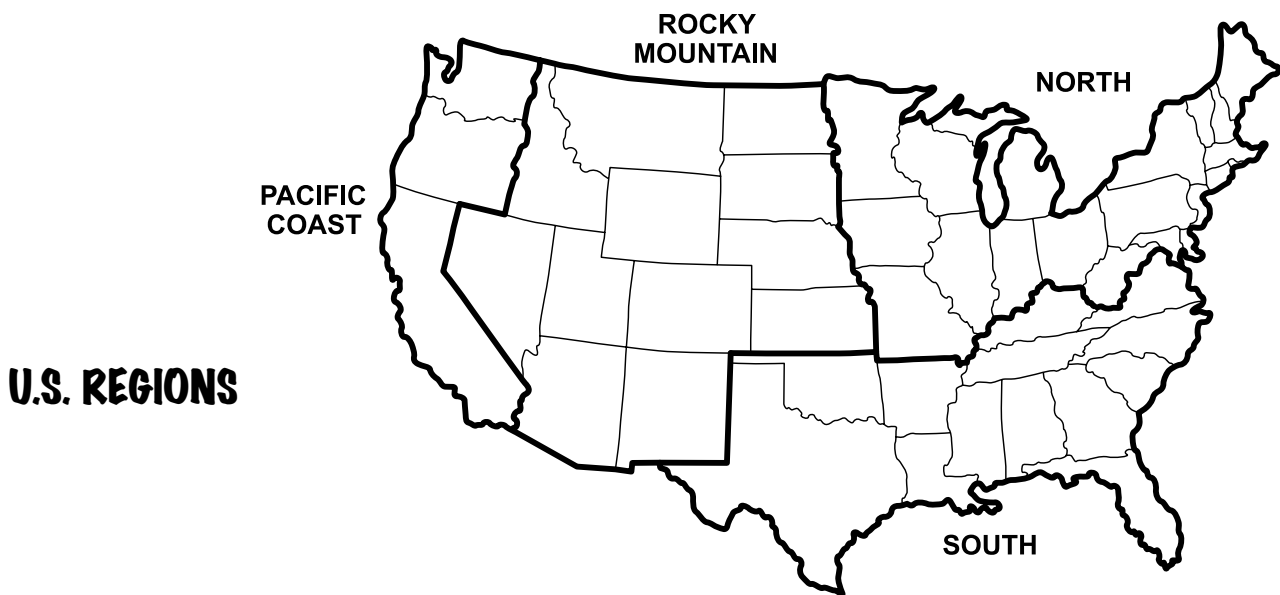
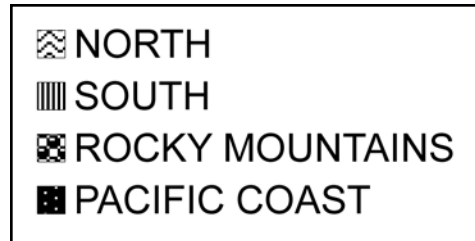
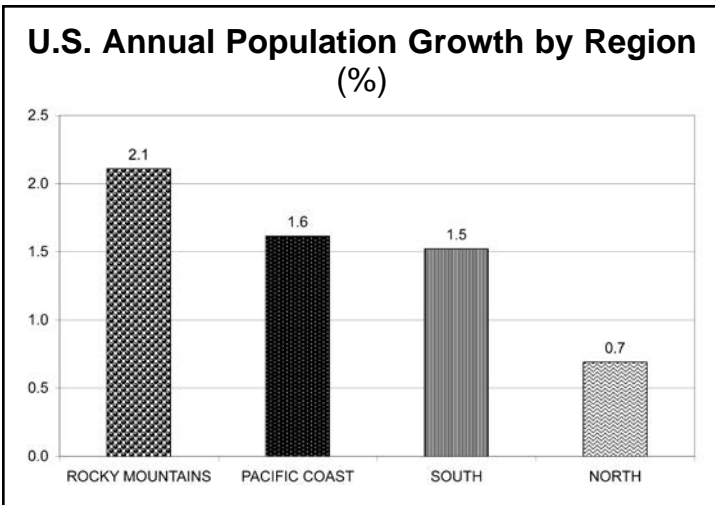
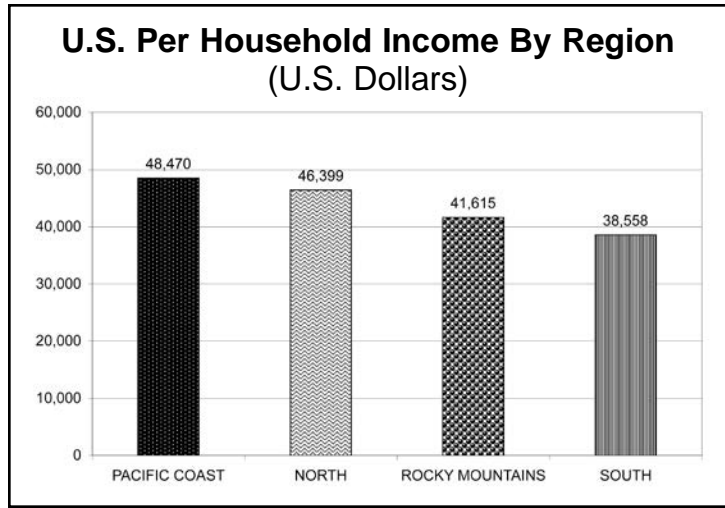
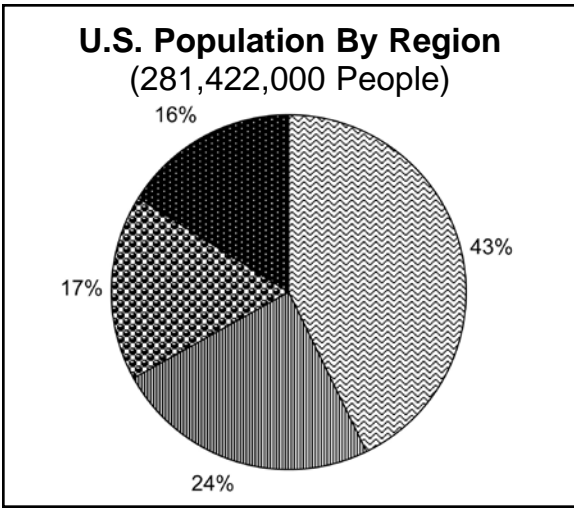
Midwest Veneer Production
(1,000 Board Feet)



Midwest Standing Sawtimber Volume
(227,408,637,000 Board Feet)



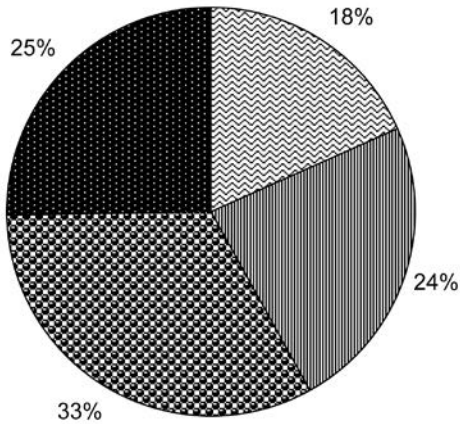
U.S. DEMAND PROFILE



U.S. SUPPLY PROFILE

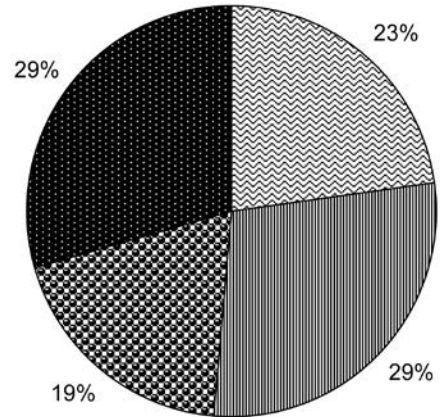
U.S. Land Area by Region

(2,263,000,000 Acres)



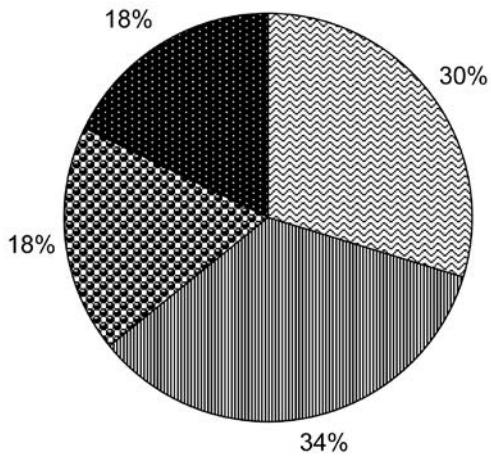
U.S. Forestland Area by Region

(749,000,000 Acres)



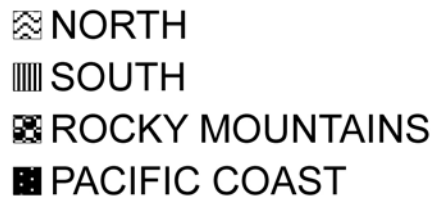
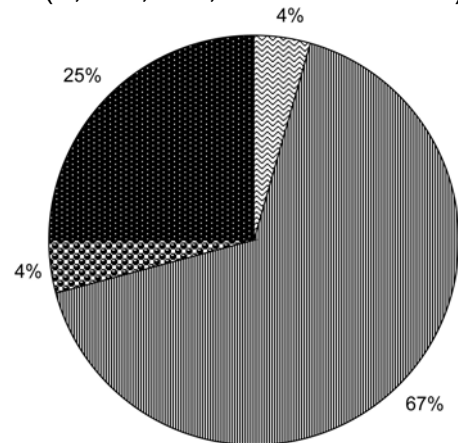
U.S. Standing Sawtimber by Region

(257,280,000 Acres)



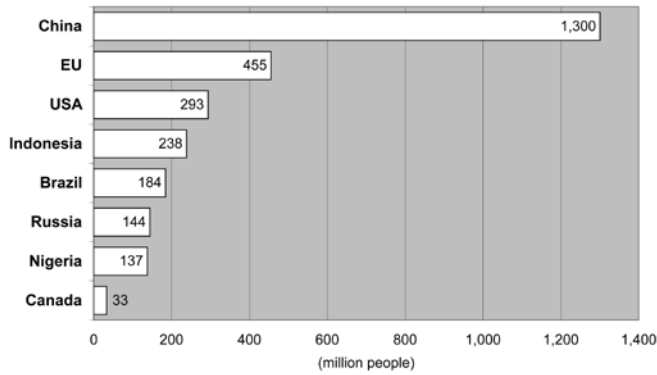
U.S. Annual Veneer Log Harvest by Region

(1,338,791,000 Cubic Feet)

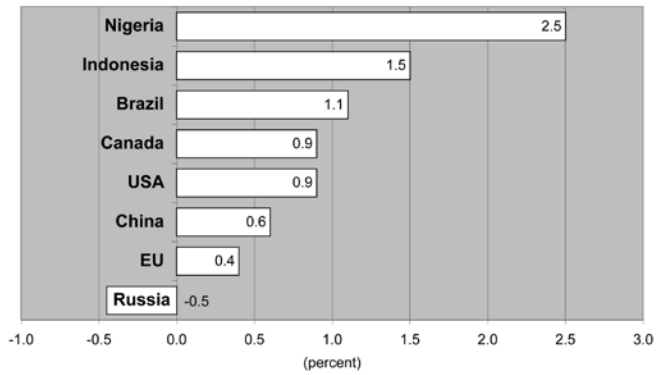


GLOBAL STATISTICS

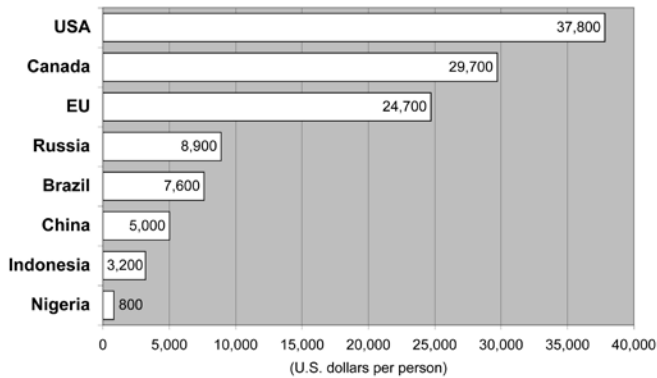
Population



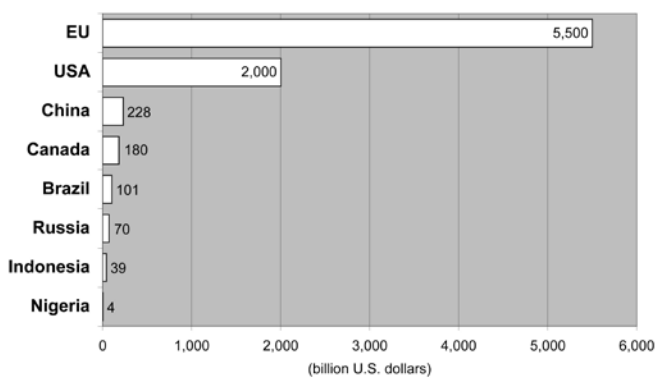
Annual Population Growth



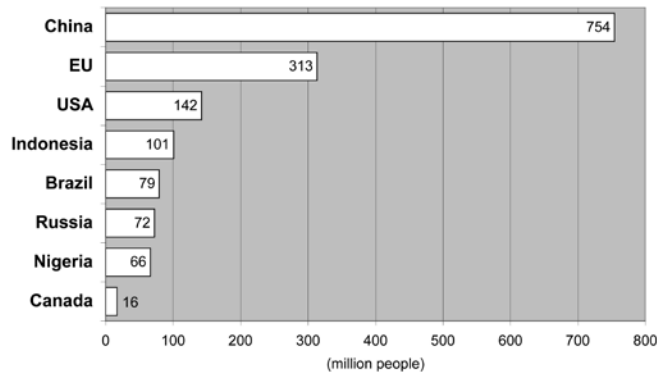
Gross National Income (similar to per capita income)



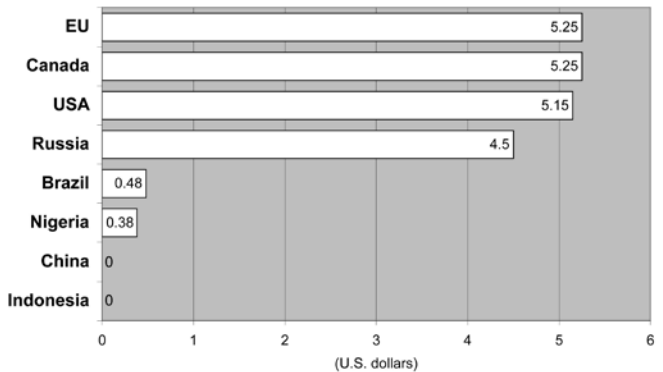
Government Budget



Labor Force



Minimum Wage



GLOBAL PRODUCTION COSTS

Country	Demand for Forest Resources	Supply for Forest Resources	Wealth and Influence	Taxes	Labor Costs	Infrastructure
USA	↑	↑	↑	↑	↑	↑
European Union	↑	↑	↑	↔	↑	↑
Canada	↔	↑	↔	↔	↑	↔
China	↑	↔	↑	↔	↓	↔
Brazil	↔	↑	↔	↔	↓	↔
Russia	↓	↑	↔	↓	↑	↔
Indonesia	↔	↔	↓	↓	↓	↓
Nigeria	↓	↓	↓	↓	↓	↓
Statistics Used	<ul style="list-style-type: none"> • Population • Population Growth • Gross National Income 	<ul style="list-style-type: none"> • Labor Force • Forested Area • Wood Volume 	<ul style="list-style-type: none"> • GDP • GDP Growth • Government Budget • Military Spending • Annual Aid • External Debt • Imports • Exports 	<ul style="list-style-type: none"> • Tax Rate 	<ul style="list-style-type: none"> • Poverty • Employment • Gross National Income • Minimum Wage 	<ul style="list-style-type: none"> • Government Budget • GDP • Exports

Statistical Relationships

- **DEMAND IS HIGH** if: 1) population is large; 2) population growth is high; and 3) Gross National Income (GNI) is high
- **SUPPLY IS HIGH** if: 1) labor force is large; 2) forested area is large; and 3) wood volume is large
- **WEALTH AND INFLUENCE ARE HIGH** if: 1) Gross Domestic Product (GDP) is high; 2) GDP growth is high; 3) government budget is large; 4) military spending is high; 5) foreign aid is given, not received; 6) external debt is small; and 7) exports are greater than imports
- **TAXES ARE HIGH** if the corporate tax rate is high
- **LABOR COSTS ARE HIGH** if: 1) poverty rates are low; 2) unemployment is low; 3) GNI is high; and 4) the minimum wage is high
- **INFRASTRUCTURE IS GOOD** if: 1) government budget is large and 2) GDP is large