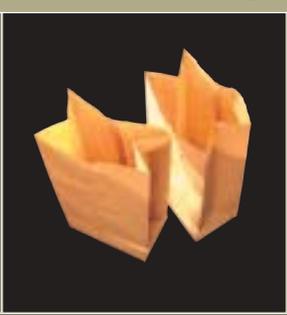
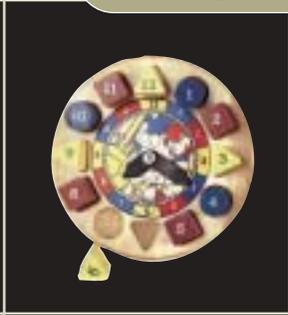


FROM THE WOODS

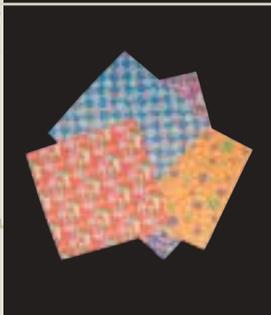


# Incredible Wood

PENNSTATE



College of Agricultural Sciences  
Cooperative Extension



AN EDUCATIONAL SERIES ABOUT FORESTRY FOR YOUTH

**W**ood is from trees...but is that all? Hardly!

Wood is a natural, attractive, versatile, and useful material that we use in thousands of ways. You may think you know many ways to use wood, but you might be surprised. A recent count listed over 5,000 products made with wood, and the list keeps growing. Wood is a truly renewable natural resource. If forests are cared for and managed properly,



trees keep producing more wood.

One reason we can use wood for so many different things is that there are many different species of trees. Each species of tree produces wood with its own properties. For example, some woods are hard and some are soft; some are flexible and some are stiff. Approximately 30 of Pennsylvania's 108 tree species have commercial importance; their wood is

harvested from forests across the state to meet people's needs.

### WOOD STUFF

Just what is wood? Wood is the hard, fibrous, inner part of trees and is mostly dead cell walls. All wood is formed from the same five chemical substances: cellulose, hemicellulose, lignin, ash-forming minerals, and "extractive" chemicals. How these substances vary in their volume and characteristics is what give each species its unique wood properties.

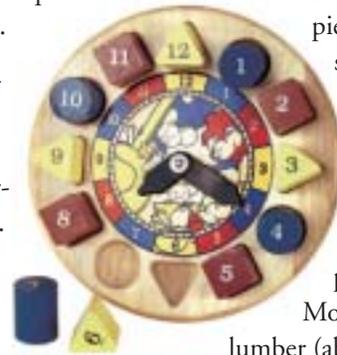
Cellulose, hemicellulose, and lignins account for about 97 percent of all wood. Cellulose and hemicellulose are what make up the wood's cell walls, and lignin acts like a glue holding the cells together. The other two substances—ash-forming minerals, and "extractive" chemicals—make up only about 3 percent of wood by weight. The ash-forming materials are minerals the tree extracted from the soil. The extractive chemicals are essentially the waste products from when the tree's cells were living. Extractive chemicals often give wood its color and odor.

When people think of wood, they think of its appearance. Wood is attractive to look at, and each species has its own unique look or *figure*. Figure

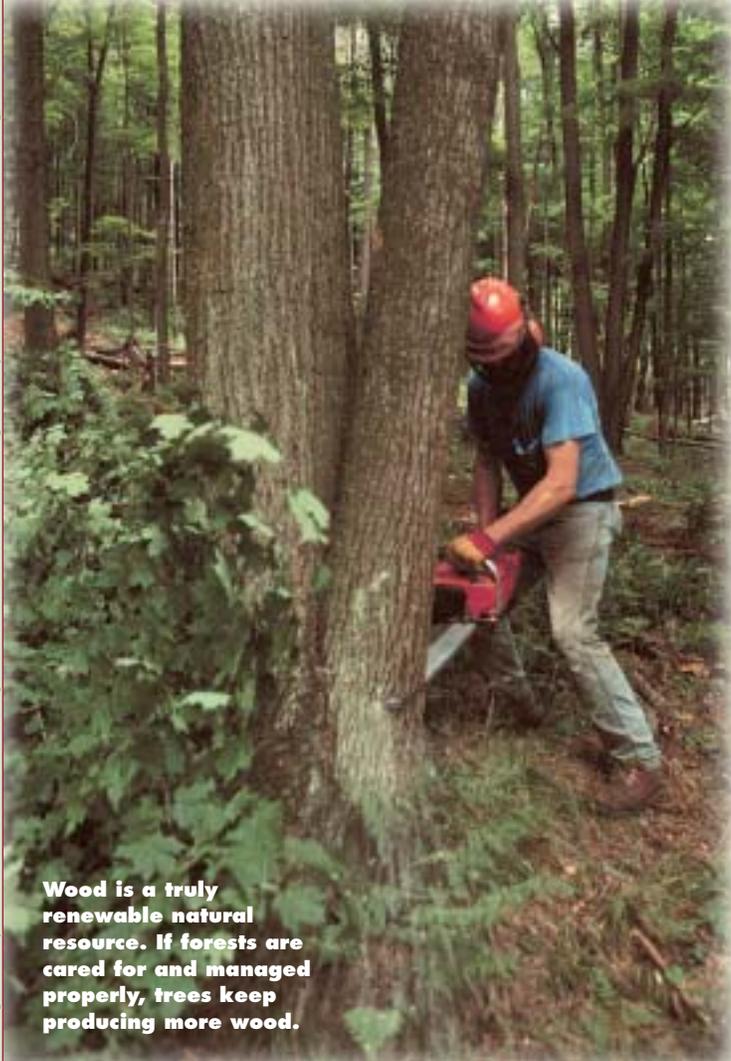
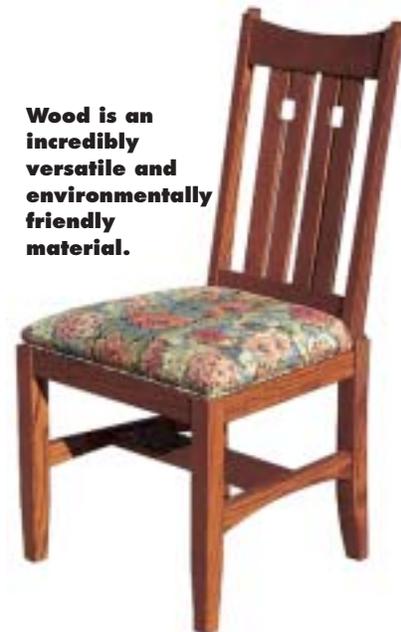
also relates to how the wood is cut from the tree and the tree's growth pattern. Yet, many of the products that are made from wood do not look like wood at all. We use numerous wood products without ever thinking of their connection to wood. Here are the ways we use the wood from Pennsylvania's trees.

### LUMBER

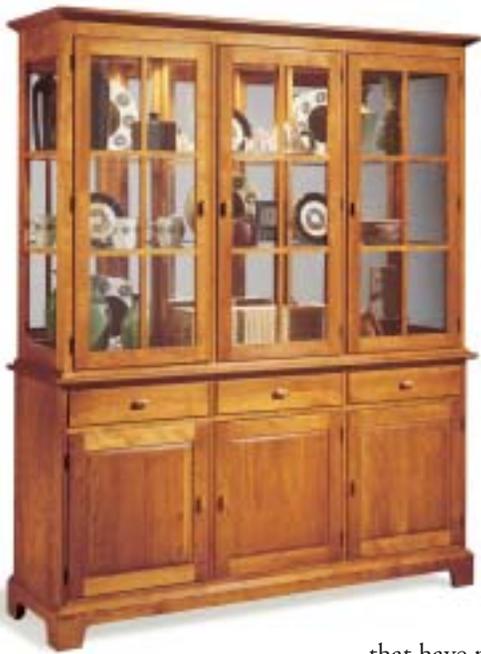
Almost 70 percent of all the trees harvested in Pennsylvania are used to produce lumber. Lumber is simply pieces of wood, such as boards or beams, cut from trees. More than 700 sawmills across Pennsylvania produce lumber. Most of our state's lumber (about 95 percent) is from *hardwood* trees. Hardwood trees have broad flat leaves that drop every fall. They include red oak, sugar



**Wood is an incredibly versatile and environmentally friendly material.**



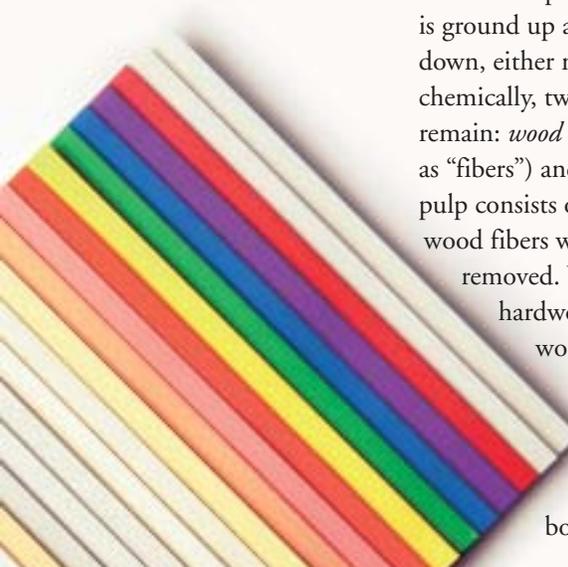
**Wood is a truly renewable natural resource. If forests are cared for and managed properly, trees keep producing more wood.**



**Furniture is a major product of the wood industry. From elegant hardwood to economical softwood, wood furniture can be found in nearly every home or office.**

maple, white ash, and black cherry. The lumber from hardwood trees becomes furniture, doors, baseball bats, toys, musical instruments, flooring, cabinetry, paneling, and many other items for which attractive appearance

**Each American uses over 700 pounds of paper, in its various forms, every year!**



and durability are important. Pennsylvania's hardwood lumber is known around the world for its quality and beauty. This valuable product is shipped to many countries in Europe and Asia.

Pennsylvania also produces small quantities of *softwood* lumber. Softwood trees are those

that have needle leaves. Most needles stay green and attached to the tree year-round. Softwood trees include white pine and eastern hemlock. Softwood lumber is largely used for building construction, siding, and paneling.

### PAPER

About 25 percent of all the trees harvested in Pennsylvania go into paper and paper products. There are several large paper mills in Pennsylvania. Paper is made almost entirely from wood pulp. When wood is ground up and broken down, either mechanically or chemically, two main things remain: *wood cells* (referred to as "fibers") and *lignin*. Wood pulp consists of individual wood fibers with the lignin removed. We use both hardwood and softwood trees for making wood pulp. The many uses of paper are mind-boggling. Books,



**Veneer, lumber, sawdust, wood strands, strips, and chips are used in the manufacture of numerous engineered wood products from Pennsylvania's woods.**

tissues, tickets, envelopes, boxes, bags, transfer papers, art supplies, hospital gowns, and newspapers, to name just a few, are all produced from wood.

### HARDWOOD VENEER

Hardwood veneer is a very thin layer of wood sliced or peeled from logs or pieces of lumber. It is usually made from the "highest quality" logs—those that have very few imperfections such as knots and decay. The purpose of veneer is to cover a less attractive or less valuable product with a more attractive wood. Veneer covers tables, kitchen cabinets, doors, and floors. It also covers many musical instruments such as guitars, pianos, and organs. Only about 2 percent of all the trees cut in Pennsylvania are made into veneer.

### ENGINEERED WOOD PRODUCTS

Veneer, lumber, sawdust, wood strands, strips, and chips are used in the manufacture of numerous engi-

neered wood products from Pennsylvania's woods. Engineered wood products are usually a mixture of wood fibers or wood pieces mixed with glues. These products can be made with lower quality trees and sawmill scrap materials. They have many useful applications. Laminated veneer lumber, laminated



**Veneer covers tables, kitchen cabinets, doors, and floors. It also covers many musical instruments such as guitars, pianos, and organs.**

lumber, fiberboard, ceiling tiles, strand board, and particleboard are examples of engineered wood products.

### WOOD CHEMICALS

Wood is also used to produce chemicals. Cellulose, hemicellulose, and lignin are the source of most of these chemicals. Wood chemicals become things like cosmetics, rayon cloth, cellulose sponges, photographic films, food additives, and fillers for many types of plastics. Wood chemicals and components are found in ice cream, salad dressing, shampoo, and toothpaste. Manufacturers often use cellulose gum made from wood to thicken and smooth foods and other items. While very little of Pennsylvania's wood actually ends up in these types of products (our hardwoods are more valuable when used as lumber), many of these wood chemical-using products are produced in the state.

## Wood in ice cream?



**Believe it or not, wood is a component of that creamy ice cream cone and many other products that "wood" surprise you, like cosmetics, rayon cloth, cellulose sponges, photographic films, food additives, salad dressing, shampoo, and toothpaste.**

### FIREWOOD

Wood is also useful as a fuel. Trees capture the sun's energy to produce sugars. These sugars are used to produce cellulose, hemicellulose, and lignin for growing wood. When wood is burned, energy is released as heat. Tens of thousands of homes in Pennsylvania heat with firewood. Wood fuel can also be used to generate electricity. Smaller and crooked trees that are not useful for lumber are the

best to use for firewood. Hardwoods burn longer and give off more heat per unit volume than softwoods.

### INCREDIBLE WOOD

The next time you think about wood, think about all the important products you enjoy and use from it. Wood is beautiful to look at and fascinating to work with. Wood is an incredible material useful in thousands of ways, and it's a truly renewable natural resource.

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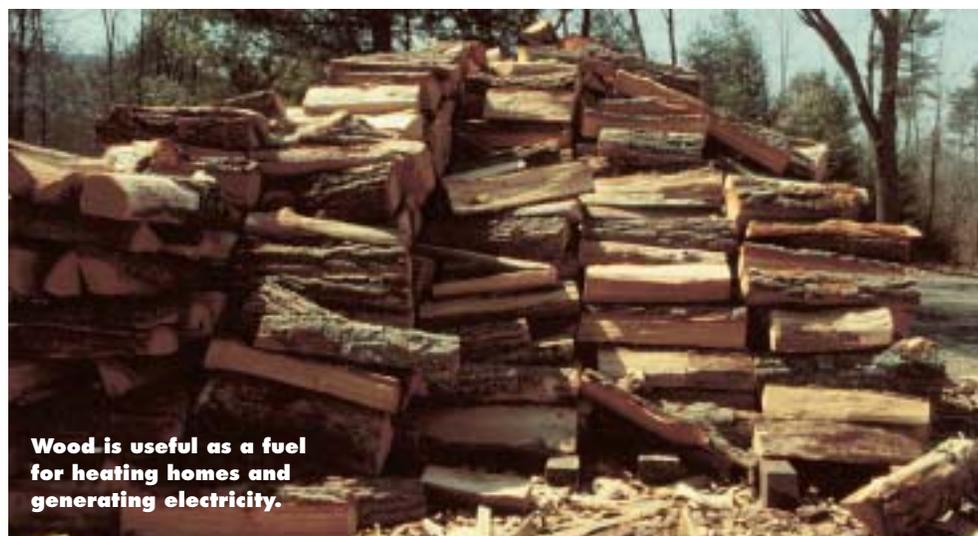
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**Wood is useful as a fuel for heating homes and generating electricity.**

