

Activity 13-We All Need Trees

Alternative Activity

Materials needed: two (or more) of each product (make sure they are identical), paper bags, student direction sheet (below), envelopes (optional) and product information sheet

Activity preparation:

Put one product in each bag. You will need a bag with product for each student. You can have students complete this activity in groups of two, three or four. There should be no more than four students per group. When selecting products, choose those that are not typically associated with trees. Cellophane, plastic, pharmaceutical, beauty, and beauty products are especially good choices. Seal the bags so that students may not peek at the product. Have information sheets duplicated and placed in envelopes (optional).

Doing the activity:

Ask students to list tree products they typically use. Pass out and go over the directions for the activity. Allow students to move about the room and find others who have the same product. When they think they have found their matches, the students may open the bags and see if they are correct.

When the students have found their matches, they should find a place to work and follow the directions on their sheets. When all groups are finished, they should share their products with the rest of the class.

When all groups have shared their products, discuss the following questions with the students:

*What surprised you most about these products?

*What similar products have you used?

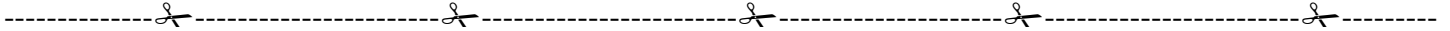
*From where did you think these products came?

Alternatives and extensions:

1. Instead of giving the students the information sheets, allow them to search reference materials and the internet to find the source of the ingredients or resources for their product. Have them create a poster showing the creation of their product.
2. Have students survey products in their homes to see how many tree-related products they use. Use this information to create charts and graphs.
3. Classify the activities according to category. Some categories could be based on what part of the tree is used for the product, where the tree is grown, products of historic significance or recent discovery, or type of product.
4. Have students create a survey to conduct with family and other students to see what they know about the source of these products.
5. Compare the technology and resources used from other resources to those from trees. For example, compare tree products to petroleum products.
6. For younger students, you can do this as a whole class activity. Have a large bag with products in it. Pull one product at a time from the bag and discuss it with the students.

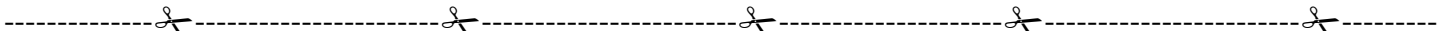
DIRECTIONS

Once you have found others who have the same product as you, spend a few minutes looking at your product. Unless other labeled, you are concerned with the product, not the packaging. Spend some time looking at the ingredient list, if you have one for your product. Try to guess how this product is related to trees. When you have finished guessing, get an envelope from your teacher and open it. Read the information in the envelope and then guess how your product is related to trees. When time is called, you will introduce one another, share your product and describe to the group how your product is related to trees.



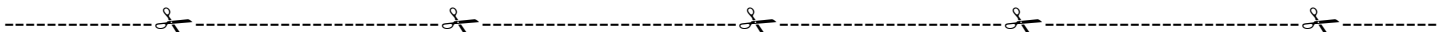
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Shampoo

The purpose of a shampoo is to clean the hair, but the shampoo must not clean too well, or all of the protective oils in the hair would be stripped out. Despite the bad smells of the detergents of which it is made, the shampoo must not make the hair smell bad. Furthermore, to sell well, the shampoo must look good, feel thick or creamy in the hands, not be too expensive and produce a nice feeling lather. Shampoo, therefore, has detergents (to clean the hair), surfactants (to create the suds), thickeners, humectants (to attract moisture from the air), emulsifiers (to keep everything mixed together), preservatives and additives (like honey or perfume) to make the shampoo more appealing to the consumer. One of the thickeners often added to shampoo is cellulose based substances derived from trees and other woody plants. Occasionally, other tree products, such as avocados, are added to the shampoo to make consumers want to buy it.

Lipstick or Lip Balm

Lipstick contains a variety of waxes, oils, pigments, and emollients. The wax gives lipstick its shape and makes it easy to apply. Among the waxes added are beeswax, carnauba wax (which is exuded from the pores of leaves of Brazilian wax palm trees), and candelilla wax (which is obtained from the candelilla plant).

The oils and fats used in lipstick include olive oil, mineral oil, castor oil, cocoa butter, lanolin, and petrolatum. More than 50% of lipsticks manufactured in the U.S. contain substantial amounts of castor oil, a large shrubby annual. It forms a tough, shiny film when it dries after application. However, ingestion of large amounts of castor oil may cause frequent rest-room visits.

In recent years, ingredients such as moisturizers, vitamin E, aloe vera, collagen, amino acids, and sunscreen have been added to lipstick. The extra components keep lips soft, moist, and protected from the elements. Lipstick gets its color from a variety of added pigments. Among them are bromo acid, D&C Red No. 21, and related dyes. Other common lipstick dyes are D&C Red No. 27 and insoluble dyes known as lakes, such as D&C Red No. 34, Calcium lake, and D&C Orange No. 17. Pink shades are made by mixing titanium dioxide with various shades of red. Most pigments are chemicals derived from geological compounds.

Aspirin

Our story begins with the willow tree. Since ancient times, people have known about its ability to reduce pain and high body temperature. More than two thousand years ago, the Greek doctor Hippocrates advised his patients to chew on the bark and leaves of the willow.

The tree contains a chemical called salicin. From salicin, researchers in the eighteenth century discovered how to make salicylic acid. And in eighteen ninety-seven, a chemist named Felix Hoffmann at Friedrich Bayer and Company in Germany created acetyl salicylic acid.

Later it became the active substance in a new medicine that Bayer called aspirin. The "a" came from acetyl. The "spir" came from the spirea plant, which also produces salicin. And the "in"? Well, that is a common way to end medicine names.

Charcoal

If you've ever been to a campfire, then you've probably realized that the charred remains of big pieces of wood look awfully similar to charcoal - that's because they are. Charcoal is basically burned wood, carbonizing it, and then packaged into briquettes or simply as loose bits.

The process is pretty straightforward as well. You pile the wood on their ends so that they form a sort of cone, and cover the whole thing with turf or moistened clay. You then just fire it up at the bottom and slowly cook the wood in your makeshift cone and eventually the wood burns.

Some charcoal "briquettes" are formed by pressing sawdust leftover from other wood processing and binders together and burning them until blackened like the loose wood charcoal. The advantage of this type of charcoal is that it lights more quickly and burns longer.

Cellophane

From Wikipedia, the free encyclopedia

Cellophane is a thin, transparent sheet made of processed cellulose. Cellulose fibers from wood, cotton or hemp are dissolved in alkali to make a solution called viscose, which is then extruded through a slit into an acid bath to reconvert the viscose into cellulose. A similar process, using a hole (a spinneret) instead of a slit, is used to make a fiber called rayon.

Cellophane was invented by Jacques E. Brandenberger, a Swiss textiles engineer in 1908. After witnessing a wine spill on a restaurant tablecloth, Brandenberger initially had the idea to develop a clear coating for cloth to make it waterproof. He experimented, and came up with a way to apply liquid viscose to cloth, but found the resultant combination of cloth and viscose film too stiff to be of use. However, the clear film easily separated from the backing cloth, and he abandoned his original idea as the possibilities of the new material became apparent. Cellophane's low permeability to air, grease and bacteria makes it useful for food packaging.

Whitman's candy company initiated use of cellophane for candy wrapping in the United States in 1912 for their Whitman's Sampler. They remained the largest user of imported cellophane from France until nearly 1924, when DuPont built the first cellophane manufacturing plant in the US.

Cellulose film has been manufactured continuously since the mid-1930s and is still used today. As well as packaging a variety of food items, there are also industrial applications, such as a base for self-adhesive tapes like Sellotape and Scotch Tape, a semi-permeable membrane in certain types of battery, and as a release agent in the manufacture of fibreglass and rubber products. Typically, however, the use of the word "cellophane" has been genericized, and is often used informally to refer to a wide variety of plastic film products, even those not made of cellulose.

Cellophane sales have dwindled since the 1960s because of the fact that Viscose creates pollution from carbon disulfide and other by-products of the process. However, the fact that cellophane is 100% biodegradable has meant it is returning in popularity as a food wrapping.^{[1][2]}

Chewing Gum

Chewing gum is a type of confectionery which is designed to be chewed rather than swallowed. Traditionally, it was made of chicle, a natural latex product made from the sap of the chicle tree, although for reasons of economy and quality many modern chewing gums use petroleum-based polymers instead of chicle. Chicle is nonetheless still the base of choice for some regional markets, such as in Japan.

Chewing gum, in various forms, has existed since at least Ancient Greece. The Greeks chewed mastic gum, made from the resin of the mastic tree. Betel, a mild narcotic, has enjoyed popularity in India for millennia. Many other cultures have chewed gum-like substances made from plants, grasses, and resins. The American Indians chewed resin made from the sap of spruce trees. The New England settlers picked up this practice, and in the early 1880s attempts were made to commercially market spruce gum. Around 1850 a gum made from paraffin wax was developed and soon exceeded the spruce gum in popularity.

Modern chewing gum was first developed in the 1860s when chicle was imported from Mexico for use as a rubber substitute. Chicle did not succeed as a replacement for rubber, but as a gum it soon dominated the market. William Semple filed the first patent on chewing gum, patent number 98,304, on December 28, 1869. Chicle gum, and gum made from similar latexes, had a smoother and softer texture and held flavor better. Most chewing gum companies have switched to synthetic gum bases because of its low price and availability. According to their website, Glee Gum is the last gum manufacturer in the United States to produce gum using all-natural chicle.^[1]

Toothpicks

Remarkable as it may seem in this synthetic age, the modern toothpick is made out of unreconstituted virgin white birch, just as its predecessors have been since after the Civil War, when Charles Forster invented the automatic toothpick-making machine. Toothpick manufacturers (most of them are in Maine) steam birch logs to make them easier to cut, then "veneer" them, which means they peel each log into a thin sheet, sort of like unrolling a roll of paper towels. Flat toothpicks are simply stamped out of the sheets, while round toothpicks are first cut into oversized blanks, then fed into a milling machine called a "rounder," which grinds them down into little javelins. No reconstituted toothpick has ever been made that matches birch for strength and low cost. You see plastic toothpicks occasionally, but they are hard on the gums and periodontists discourage their use--as do the makers of wooden toothpicks, not surprisingly.

Latex Gloves

Brazil provided the world with the rubber tree, *Hevea Brasiliensis*, but that country no longer plays any significant part in the world's natural rubber trade. Seeds were exported from the lower Amazon area of Brazil to London by Henry Wickham, a local planter acting for the British Government in 1876. The seeds were germinated at the Tropical Herbarium in Kew Gardens, London later that year. From there seedlings were exported to Ceylon (now Sri Lanka). In 1877, 22 seedlings were sent from Ceylon to Singapore, where they grew strongly, and the technique of tapping was developed. Prior to this, the trees had to be felled before the latex could be extracted.

Latex Is Not Made From Sap: Latex is often described as the sap of the Hevea tree. This is not an accurate description. The sap runs deeper inside the tree, beneath the cambium. Latex runs in the latex ducts which are in a layer immediately outside the cambium. This highlights the skill of the tapper. If the cambium is cut, then the tree is damaged, because the cambium is where all the growth takes place. Too much damage to the cambium, and the tree stops growing and stops making latex.

Methods Of Latex Rubber Tapping: All natural rubber originates in the Hevea tree, and it starts its journey when the tree is tapped. Trees are rarely tapped more often than once every two days.

A tapper starts the trek around the plantation before dawn. At each tree a sharp knife is used to shave off the thinnest possible layer from the intact section of bark. The cut must be neither too deep, nor too thick. Either will reduce the productive life of the tree. This starts the latex flowing, and the tapper leaves a little cup underneath the cut.

In ordinary circumstances, this latex will normally coagulate into a lump in the bottom of the cup, called 'cup lump.' If the plantation manager wants to make latex, then the tapper must add a stabilising agent to the cup. Usually this is ammonia, which prevents the latex from coagulating.

The tapper returns a few hours later and collects the stuff in the cup -- either cup lump or latex. The double round trip usually finishes at about 2 pm.

Processing Of Latex - Cup Lump or Liquid Concentrate: If solid rubber is required, the cup lump, together with tree lace (the remnants of the latex flow from the cut down to the cup) and other bits and pieces are collected together and processed. That processing involves quite a lot of heat, which destroys many (but not necessarily all) of the proteins. It ends up as solid rubber. Depending on the method of processing and the final purity of the material, the industry refers to it either as TSR (technically specified rubber), or sometimes sheet rubber.

When latex is required--which covers about 10 percent of all natural rubber produced--the material is gathered on the tapper's return journey, poured into containers and delivered to a processing station where it is strained and concentrated. At no stage in the process is the latex heated. This means most of the proteins remain in the latex. More stabiliser is added and the latex goes into a centrifuge to remove some of the water, and increase the rubber content of the latex. After centrifuging, the material is known as latex concentrate, and contains roughly 60 percent solid rubber and 40 percent other stuff (water, proteins etc.). This latex concentrate is what is used in the dipping process when making gloves.

Shoe Polish

Shoe polish (or **boot polish**), usually a waxy paste or a cream, is a consumer product used to shine, waterproof, and restore the appearance of leather shoes or boots, thereby extending the footwear's life.

Various substances have been used as shoe polish for hundreds of years, starting with natural substances such as wax (from bee's wax or petroleum by-products) and tallow (animal fat). Modern polish formulae were introduced early in the 20th century and some products from that era are still in use today.

Today, shoe polish is usually made from a mix of natural and synthetic materials, including naphtha (a petroleum by-product), turpentine, dyes, and gum arabic. **Turpentine** (also called spirit of turpentine, oil of turpentine, wood turpentine, gum turpentine) is a fluid obtained by the distillation of resin obtained from trees, mainly pine trees. **Gum arabic**, a natural gum also called **gum acacia**, is a substance that is taken from two sub-Saharan species of the acacia tree, *Acacia senegal* and *Acacia seyal*. Shoe polish can be toxic, and, if misused, can stain skin.

All About Cinnamon

by Sandra Bowens

Have you ever had a cassia roll? Technically, you probably have. Most of what we call cinnamon is actually cassia. In the United States we use approximately six times more of the milder tasting cassia than "true" cinnamon. Both are basically the same plant, cassia is native to Vietnam and the eastern Himalayas while cinnamon is native to Ceylon (AKA: Sri Lanka) and southern India. The Food, Drug and Cosmetic Act of 1938 permits spice traders to label cassia as cinnamon.

Like so many of the great spices, they are harvested from evergreen trees but in the case of cinnamon and cassia, the bark is harvested rather than the fruit. A special knife is used to cut strips of bark. The outer, cork-like, layer of the bark is scraped off and the strips are left to dry. As they dry, they curl into the "quills" we know as cinnamon sticks. The finest cinnamon comes from Ceylon; the finest cassia, from Saigon. Most of our cassia is imported from Indonesia. When ground, true cinnamon takes on a tan color and cassia becomes the familiar reddish brown powder.

One of the oldest spices known to man, cinnamon is also one of the most important. It can be found in nearly every cuisine from Chinese Five Spice Powder and Indian curries to Mexican hot chocolate and our own beloved cinnamon rolls. It became essential in the embalming process of ancient Egyptians and is mentioned frequently in the Bible. Cinnamon and cassia have been used medicinally throughout history, documented back to 1500 BC.

How Rubber Bands are made

Step 1:

The rubber is formulated. Combining the latex from **the rubber tree, *Hevea Brasiliensis*** (except in latex-free applications) plus other additives achieves specific qualities for the end compound. Compounds vary according to the desired properties for the rubber bands.

Step 2:

The rubber compound is processed through a machine called an "**extruder**" to form it into tube shape. It's very similar to the way that manicotti noodles or other "hollow" pastas are made...only the end result is a lot chewier!

Step 3:

A round pipe or "mandrel" is placed into a length of the extruded tubing, and then it is subjected to heat in a pressurized steam autoclave. This pipe forms the round shape of the rubber band, and the heating process is referred to as "**vulcanization**." Vulcanization causes a complex chemical change to occur in the rubber. But in layman's terms, vulcanizing gives rubber its elasticity and other desirable properties so that it's useful.

Step 4:

The rubber sleeves are removed from the mandrel, and the vulcanized tubing is cut into "**rings**" using a high-speed cutter. These rings are "**rubber bands**."

Step 5:

The rubber bands are thoroughly washed and dried to remove chemicals used in the processing steps above. After quality inspection, rubber bands are packed into bags or boxes for distribution. Today, many rubber bands are also imprinted or receive other "secondary" operations to improve their utility.

Maple syrup

Maple syrup is a sweetener made from the sap of maple trees. In the U.S. and Canada, it is most often eaten with pancakes, waffles, cornbread or French toast. It is sometimes used as an ingredient in baking, the making of candy (confection), preparing desserts, or as a sugar source and flavoring agent in making beer. It was first collected and used by Native Americans, though was later adopted by European settlers.

Usually, the maple species used are the sugar maple (*Acer saccharum*) and the black maple (*Acer nigrum*), because of a high sugar content in the sap of roughly two percent. Traditionally, maple syrup was harvested by tapping a maple tree through the bark and into the wood phloem, then letting the sap run into a bucket, which required daily collecting; less labour-intensive methods such as the use of continuous plastic pipelines have since superseded this in all but cottage-scale production.

THE HISTORY OF TOILET PAPER

Obviously, toilet paper hasn't been around forever. We can be pretty sure that those living before the late 19th Century weren't able to drop by their local quickie mart mega stores to pick up a case of Charmin. Rather, the innovation of the roll of toilet paper is a very modern product and convenience, in which today, has arguably become a household commodity. Official" toilet paper - that is, paper which was produced specifically for the purpose - dates back at least to the late 14th Century, when Chinese emperors ordered it in 2-foot x 3-foot sheets. It is believed that although the earliest form of toilet paper on a roll wasn't introduced until 1880, people made do with many various items that stemmed from their environments. Evidence seems to suggest that original material used in place of toilet paper ranged anywhere from leaves and sticks, to cobs of corn, or linen.

TOILET PAPER IN PERSPECTIVE:

Regardless of what was used, or how gross our associations of toilet paper and the bathroom are, the product itself has made life easier for everyone. Today there are over 5,000 different companies producing bathroom tissue around the world.

The average sheet of toilet paper is 4.0625 inches per square, reaching approximately 338.5 feet per roll. Furthermore, Americans skip to the loo an average of 6 times per day, adding up to as much as 47 minutes in a single 24 hour time period. On average, consumers use 8.6 sheets per trip - a total of 57 sheets per day. That's an annual total of 20,805 sheets. The pentagon uses, on average, about 666 rolls of toilet paper every day. With a little over 6 billion humans living on earth, that calls for the daily production of 83,048,116 rolls per day with no days off and no vacations or 2.7 rolls per second. Strangely enough, that's 80% greater than our daily consumption or use of salt, 63% greater than our average use of milk, and 84 billion more people served annually than McDonald's fast food restaurants. Yet, still we often times remain oblivious to toilet paper and take advantage of the convenience it provides for us.

MORE INTERESTING FACTS ABOUT TOILET PAPER:

Approximately 5.8 million tons of tissue grades, consisting of toilet and facial tissue, paper napkins, towels, diapers, and various other sanitary products are produced in the U.S. annually. In 1992, approximately 3.5 million tons of scrap paper was used to manufacture these products. (American Forest and Paper Association) Originally, the Scott Company was too embarrassed to put their name on their product, as the concept of toilet paper was a sensitive subject at the time, so they customized it for their customers... hence the Waldorf Hotel became a big name in toilet paper.

In 1935, Northern Tissue advertised "splinter-free" toilet paper. Yep, you read that right; early paper production techniques sometimes left splinters embedded in the paper. And you thought you had it tough!

File

File comes from ground sassafras leaves, scientific name *Sassafras albidum* and is commonly used in Creole and Cajun dishes, both for its flavor and thickening properties. Sassafras leaves do not contain safrole, the carcinogen found in the roots and bark of the tree. Unless sold in a safrole-free form, the roots, bark and extracts made from them may not be sold as food in the USA. Since file' is naturally safrole-free, there is no restriction on its sale and it can be found in most supermarkets in the spice or fish section. File' should be added to a dish near the end of cooking, as it tends to get tough and stringy with prolonged cooking.

Did You Know?

Sassafras was used extensively for food and medicine by Native Americans long before European settlers arrived. Sassafras bark was one of the first exports of the New World. Sir Walter Raleigh took sassafras back to England from Virginia. In what were called the Great Sassafras Hunts from 1602-1603, ships were sent from England to collect the roots. Sassafras roots then were converted into a tonic that smelled like root beer and supposedly kept its drinkers youthful and healthy. In the southern U.S., the roots were boiled, then combined with molasses, and allowed to ferment into the first ROOT BEER.

Sassafras has many other uses as well. It can be used as dye to give fabric an orange tint. The young leaves can be added to salads and have a mild aromatic flavor. Sassafras tea made from the root bark is refreshing and tonic. An infusion of the bark and root is used to treat gastrointestinal complaints, colds, liver and kidney ailments, rheumatism skin eruptions and as a blood purifier. The essential oil (Safrole) from the root bark was used as an antiseptic and anodyne in dentistry. The production of sassafras oil by distillation of the root and root bark is a small industry in the southeastern section of the country. A sassafras tree also repels mosquitoes and other insects.

Cork

Just about every tree has an outer layer of cork bark, but the **cork oak** (*Quercus suber*) is the primary source of most cork products in the world, including wine bottle stoppers. These trees primarily grow in countries that run along the coast of the Mediterranean Sea, where there's plenty of sunshine, low rainfall and high humidity. The countries that produce the most cork include Portugal, Algeria, Spain, Morocco, France, Italy and Tunisia. So, why does the cork oak have a thicker layer of cork bark than other trees? The tree evolved to protect itself from the harsh conditions of the forests near the Mediterranean. These forests experience frequent droughts, brush fires and temperature fluctuations. Cork is actually made of water-resistant [cells](#) that separate the outer bark from the delicate interior bark. Cork has been used as bottle stoppers for more than 400 years. It is possibly the best suited material to use as a bottle stopper because it contains a natural waxy substance, called **suberin**. This substance makes cork impermeable to liquids and gas, and prevents the cork from rotting. It is this unique set of properties, not found in any other naturally existing material, that makes it lightweight, rot resistant, fire resistant, termite resistant, impermeable to gas and liquid, soft and buoyant. It's these properties that make it ideal for stopping wine bottles and tile flooring. Here is how cork is processed:

- **Stripping the bark** -- A cork oak must be at least 25 years old before its bark can be harvested. Its cork can then be stripped every 8 to 14 years after that for as long as the tree lives. The cork is stripped off during June, July and August using a long-handled hatchet to cut sections out of the bark. These sections are then pried away from the tree. Workers must be careful not to damage the inner layer of the bark, otherwise the bark won't grow back.
- **Washing the cork** -- The cork slabs that are cut away from the tree are boiled and the rough outer layer of the bark is stripped away. Boiling the cork also softens it, making it easier to work with.
- **Punching Bottle Stoppers** -- From the slabs of cork, holes are punched out to make bottle stoppers. This leaves the slabs full of holes. These bottle stoppers are then sorted and shipped to various destinations. The stoppers can at this time be printed or branded with names or logos.
- **Uses for Scrap Cork** -- Once the bottle stoppers have been punched out of the cork slabs, there is some leftover cork scrap. This scrap is ground up, molded into large blocks and baked in ovens to make other cork products, such as cork tile flooring and cork message boards.

Vanilla

Vanilla comes from the orchid *vanilla planifolia*. The vanilla bean is the seed pod of the orchid and the flavor comes from its many tiny seeds inside the pod. The seed pods go through extensive processing and curing before they become the substance so familiar to most of us. There are many kinds of vanilla products marketed in grocery stores.

Pure Vanilla Extract: Pure implies natural not artificially derived. Pure vanilla extract is made by "percolating" chopped vanilla beans with ethyl alcohol and water. Manufacturers may use a variety of types and qualities of beans. The process of extraction takes about 48 hours then the mixture is placed in tanks from anywhere from a few days to several weeks. The aged mixture is then filtered, placed in holding tanks and eventually bottled. Pure extracts may still contain some sugar, corn syrup, caramel, colors as well as stabilizers. Pure vanilla extracts must contain at least 35% alcohol. FDA requirements are a minimum of 13.35 ounces of vanilla beans to a gallon of a minimum of 35% alcohol to 65% water mixture.

Natural Vanilla Flavoring: A natural vanilla flavoring is derived from vanilla beans but has little or no alcohol typically a maximum of 2% - 3%. This is a product preferred by many people not wanting to use alcohol based extracts. Flavorings may also have some sugar and a glycerin or a propylene (polypropylene) glycol base. Flavorings are commonly used in cooking and baked goods both at home as well as in commercial establishments.

Natural Vanillin : Vanillin is an organic crystal that forms on the outside of the vanilla bean and it is the compound that gives vanilla its characteristic flavor.

Artificial Vanilla Flavoring : U.S. manufactured artificial vanilla is produced from synthetic "vanillin", **Lignin Vanillin**, which is made from a by-product of the paper producing industry. This by-product is chemically treated to mimic the flavor of vanilla. The product helps take care of an ecological problem with paper producers and created an "affordable" vanilla flavoring for the public.

The other synthetic common in Mexican artificial flavorings is **Ethyl Vanillin** derived from coal tar.

Sponges

Synthetic sponges are made of three basic ingredients: cellulose derived from wood pulp, sodium sulphate, and hemp fiber. Other materials needed are chemical softeners, which break the cellulose down into the proper consistency, bleach, and dye.

The Manufacturing Process

1. The cellulose used for sponges arrives at the sponge factory in large, stiff sheets. Workers take the sheets and soak them in a vat of water mixed with certain chemical softeners. The cellulose becomes soft and jelly-like. Then workers load the cellulose into a revolving mixer, which is a large rotating metal drum. Workers add the sodium sulphate crystals, cut hemp fibers, and dye, and close the mixer. The mixer is set to rotate, and it churns the ingredients so that they are thoroughly amalgamated.
2. From the mixer, workers pour the material into a large rectangular mold that may be 2 ft (61 cm) high, 2 ft (61 cm) wide, and 6 ft (1.8 m) long. The mold is heated, and the cellulose mixture cooks. As it cooks, the sodium sulphate crystals melt, and drain away through openings in the bottom of the mold. It is their melting that leaves the characteristic pores in the finished sponge. The size of the pores is determined by the size of the sodium sulphate crystals. A rough sponge used for washing a car, for instance, is made with coarse crystals, while a fine sponge of the type used for applying makeup is made with very fine crystals. As the cellulose mix cooks, then cools, it becomes a hard, porous block.
3. The sponge block is then soaked in a vat of bleach. This removes dirt and impurities, and also brightens the color. Next the sponge is cleaned in water. Additional washings alter the texture, making the sponge more pliable. The sponge is left to dry, to prepare it for cutting.
4. Some manufacturers make the sponge and cut and package it themselves. Others produce the raw blocks of sponge, and then sell them to a company known as a converter. The converter cuts the sponges according to its customers needs, and takes care of the packaging and distribution. Whether at the first manufacturing facility or at the converter, workers cut the sponges on an automatic cutter. They load each big rectangle of sponge into a machine that slices it into the desired size. Because the sponge block is rectangular, it can be cut into many smaller rectangles with little or no waste.
5. Many household sponges have a textured plastic scouring pad attached to one side. This is attached in a process called laminating, after the sponge is cut. The scouring pad, which is cut to the same size as the sponge, is affixed to the sponge in a laminating machine that uses a specialized sponge glue made of moisture-cured polyurethane. Next, the sponges move to a packaging area where they are sealed in plastic. The packaged sponges are boxed, and the boxes sent to a warehouse for further distribution.

Camphor

Camphor is a waxy, white or transparent solid with a strong, aromatic odor found in wood of the **camphor laurel** (*Cinnamomum camphora*), a large evergreen tree in Asia and in some other related trees in the laurel family, notably *Ocotea usambarensis*. It can also be synthetically produced from oil of turpentine.

Uses

Modern uses include as a moth repellent, an antimicrobial substance, in embalming, and in fireworks. Solid camphor releases fumes that form a rust-preventative coating and is often stored in tool chests to protect tools against rust. Camphor crystals are used to prevent damage to insect collections by other small insects. Since camphor is readily absorbed through the skin, produces a feeling of cooling similar to menthol, and acts as slight local anesthetic and antimicrobial substance, it is often used as a topical. A form of anti-itch gel currently on the market uses camphor as its active ingredient. Camphor is an active ingredient (along with menthol) in vapor-steam products, such as Vicks VapoRub, and it is effective as a cough suppressant. It may also be administered orally in small quantities (50 mg) for minor heart symptoms and fatigue. Currently, camphor is mostly used as a flavoring for sweets in Asia. In India, where it is known as *Pachha Karpooram* or "Edible Camphor," it is widely available at Indian grocery stores. In Hindu ceremonies, camphor is burned in a ceremonial spoon for performing aarti.

Toxicology

In larger quantities, it is poisonous when ingested and can cause seizures, confusion, irritability, and neuromuscular hyperactivity. In 1980, the United States Food and Drug Administration set a limit of 11% allowable camphor in consumer products and totally banned products labeled as camphorated oil, camphor oil, camphor liniment, and camphorated liniment (but "white camphor essential oil" contains no significant amount of camphor). Since alternative treatments exist, medicinal use of camphor is discouraged by the FDA, except for skin-related uses, such as medicated powders, which contain only small amounts of camphor.

Methylcellulose

Cellulose is the major constituent of paper and cardboard and of textiles made from cotton, linen, and other plant fibers. Cellulose can be converted into cellophane, a thin transparent film, and into rayon, an important fiber that has been used for textiles since the beginning of the 20th century. Both cellophane and rayon are known as "regenerated cellulose fibers"; they are identical to cellulose in chemical structure and are usually made from viscose, a viscous solution made from cellulose.

Cellulose is used in the laboratory as the stationary phase for thin layer chromatography. It is the raw material in the manufacture of nitrocellulose (cellulose nitrate) which was historically used in smokeless gunpowder and as the base material for celluloid used for photographic and movie films until the mid 1930s.

Cellulose is used to make hydrophilic and highly absorbent sponges, water-soluble adhesives, and binders such as methyl cellulose and carboxymethyl cellulose which are used in wallpaper paste. Microcrystalline cellulose and powdered cellulose are used as an inactive filler in tablets and as thickeners and stabilizers in processed foods.

Methylcellulose (or methyl cellulose) is a chemical compound derived from cellulose. It is a hydrophilic white powder in pure form and dissolves in cold (but not in hot) water, forming a clear viscous solution or gel. It is sold under a variety of trade names and is used as a thickener and emulsifier in various food and cosmetic products, and also as a treatment of constipation. Like cellulose, it is not digestible, not toxic, and not allergenic.

Uses

Thickener and emulsifier: Methylcellulose is often added to hair shampoos, tooth pastes and liquid soaps, to generate their characteristic thick consistency. This is also done for foods such as ice cream or whipped cream. Methylcellulose is also an important emulsifier, preventing the separation of two mixed liquids.

Artificial tears and saliva: Solutions containing methylcellulose or similar cellulose derivatives are used as substitute for tears or saliva if the natural production of these fluids is disturbed.

Paper and textile sizing: Methylcellulose is used as sizing in the production of papers and textiles. It protects the fibers from absorbing water or oil.

Glue and binder: Methylcellulose can be employed as a mild glue which can be washed away with water. This is used for example in the fixation of delicate pieces of art. Methylcellulose is the main ingredient in many wallpaper pastes. It is also used as a binder in pastel crayons. Methylcellulose is used in book conservation to loosen and clean off old glue from spines and bookboards.

Construction materials: Methylcellulose finds a major application in construction materials. It is added to mortar dry mixes to improve the mortar's properties such as water retention, viscosity, adhesion to surfaces etc.

Nutritional Supplement Capsules: Methylcellulose is also used in the manufacture of vegetarian capsules in nutritional supplements, its edible and non-toxic properties provide a safe alternative to the use of gelatin.

Special effects: The slimy, gooey appearance of an appropriate preparation of methylcellulose with water, in addition to its non-toxic, non-allergenic, and edible properties, makes it popular for use in special effects for motion pictures and television wherever vile slimes must be simulated. In the film *Ghostbusters*, for example, the gooey substance that supernatural entities used to "slime" the Ghostbusters was mostly a thick water solution of methylcellulose.

Cellulose-based plastics

People experimented with plastics based on natural polymers for centuries. In the nineteenth century a plastic material based on chemically modified natural polymers was discovered: Charles Goodyear discovered vulcanization of rubber (1839) and Alexander Parkes, English inventor (1813—1890) created the earliest form of plastic in 1855. He mixed pyroxylin, a partially nitrated form of cellulose (cellulose is the major component of plant cell walls), with alcohol and camphor. This produced a hard but flexible transparent material, which he called "Parkesine." The development of plastics has come from the use of natural materials (e.g., chewing gum, shellac) to the use of chemically modified natural materials (e.g., natural rubber, nitrocellulose, collagen) and finally to completely synthetic molecules (e.g., epoxy, polyvinyl chloride, polyethylene).

Cellulose-based plastics: celluloid and rayon

All Goodyear had done with vulcanization was improve the properties of a natural polymer. The next logical step was to use a natural polymer, cellulose, as the basis for a new material. Inventors were particularly interested in developing synthetic substitutes for those natural materials that were expensive and in short supply, since that meant a profitable market to exploit. Ivory was a particularly attractive target for a synthetic replacement.

An Englishman from Birmingham named Alexander Parkes developed a "synthetic ivory" named "pyroxlin", which he marketed under the trade name "Parkesine", and which won a bronze medal at the 1862 World's fair in London. Parkesine was made from cellulose treated with nitric acid and a solvent. The output of the process hardened into a hard, ivory-like material that could be molded when heated. However, Parkes was not able to scale up the process reliably, and products made from Parkesine quickly warped and cracked after a short period of use.

Englishmen Daniel Spill and the American John Wesley Hyatt both took up where Parkes left off. Parkes had failed for lack of a proper softener, but they independently discovered that camphor would work well. Spill launched his product as Xylonite in 1869, while Hyatt patented his "Celluloid" in 1870, naming it after cellulose. Rivalry between Spill's British Xylonite Company and Hyatt's American Celluloid Company led to an expensive decade-long court battle, with neither company being awarded rights, as ultimately Parkes was credited with the product's invention. As a result, both companies operated in parallel on both sides of the Atlantic. Celluloid/Xylonite proved extremely versatile in its field of application, providing a cheap and attractive replacement for ivory, tortoiseshell, and bone, and traditional products such as billiard balls and combs were much easier to fabricate with these plastics. Some of the items made with cellulose in the nineteenth century were beautifully designed and implemented. For example, celluloid combs made to tie up the long tresses of hair fashionable at the time are now highly-collectable jewel-like museum pieces.

Hyatt was something of an industrial genius who understood what could be done with such a shapeable, or "plastic", material, and proceeded to design much of the basic industrial machinery needed to produce good-quality plastic materials in quantity. Some of Hyatt's first products were dental pieces, and sets of false teeth built around celluloid proved cheaper than existing rubber dentures. However, celluloid dentures tended to soften when hot, making tea drinking tricky, and the camphor taste tended to be difficult to suppress.

Celluloid's real breakthrough products were waterproof shirt collars, cuffs, and the false shirtfronts known as "dickies", whose unmanageable nature later became a stock joke in silent-movie comedies. Corsets made with celluloid stays also proved popular, since perspiration did not rust the stays, as it would if they had been made of metal.

Toothpaste

The earliest known reference to a toothpaste is in a manuscript from Egypt in the 4th century AD, which prescribes a mixture of powdered salt, pepper, mint leaves, and iris flowers. It is not known whether these early toothpastes were used alone, were to be rubbed onto the teeth with rags, or were to be used with early toothbrushes such as tree twigs.

Modern toothpaste: An 18th century American toothpaste recipe containing burnt bread has been found.

Another formula around this time called for dragon's blood (a resin), cinnamon, and burnt alum.

By 1900, a paste made of hydrogen peroxide and baking soda was recommended for use with toothbrushes.

Pre-mixed toothpastes were first marketed in the 19th century, but did not surpass the popularity of tooth-powder until World War I.

Ingredients: Fluoride in various forms is the most popular active ingredient in toothpaste to prevent cavities. Although it occurs in small amounts in plants and animals and has effects on the formation of dental enamel and bones, it is not considered to be a dietary essential and no deficiency signs are known. Sodium fluoride (NaF) is the most common form; some brands use sodium monofluorophosphate ($\text{Na}_2\text{PO}_3\text{F}$). Other ingredients are less commonly used, including Hydroxyapatite nanocrystals and calcium phosphate for remineralization, and strontium chloride or potassium nitrate to reduce sensitivity.

In addition to fluoride, the other fundamental ingredient in most toothpastes is an abrasive. Studies have shown that abrasives in toothpaste reduce the time needed to remove plaque from the teeth by approximately 50%. Abrasives, like the dental polishing agents used in dentist's offices, also cause a small amount of enamel erosion which is termed "polishing" action. The polishing of teeth removes stains from tooth surfaces, but has not been shown to improve dental health over and above the effects of the removal of plaque and calculus.

Many, though not all, toothpastes contain sodium lauryl sulfate (SLS) or another of the sulfate family. SLS is found in other personal care products as well, such as shampoo, and is largely a foaming agent although it also acts as a powerful antimicrobial. Ingredients such as baking soda, enzymes, vitamins, herbs, calcium, calcium sodium phosphosilicate, mouthwash, and/or hydrogen peroxide are often combined into base mixes and marketed as being beneficial. Some manufacturers add antibacterial agents, for example triclosan or zinc chloride, to prevent gingivitis.

The last of toothpaste's main ingredients is a binder, which helps the paste keep its shape when on the brush. Many different binders are used including gum tragacanth and seaweed or cellulose derivatives. Toothpaste comes in a variety of flavors, most often being some variation on mint (spearmint, peppermint, regular mint, etc). Other more exotic flavors include: anise, apricot, bubblegum (marketed mostly to children), cinnamon, fennel, neem, ginger, vanilla, lemon, orange, pine. Flavors which have been introduced but discontinued due to poor reception include peanut butter, iced tea, and whiskey.

The Tasty Pecan

By Jeff Ball

Whether you pronounce it "pih KAHN" or prefer "PEE kan" the pecan tree (*Carya illinoensis*) is about as American as a tree can get. Archeological evidence shows Native Americans in the area of Texas used pecans more than 8,000 years ago. The name comes from the Algonquin word "pacane" meaning "nut so hard as to require a stone to crack."

Pecans are native only in the United States, and crows may have contributed to their selection and distribution by carrying the thin-shelled nuts over several miles. George Washington had pecans at Mount Vernon and, not to be outdone, gardener and connoisseur Thomas Jefferson had several trees imported from Louisiana for his orchards at Monticello. The pecan is a member of the Juglandaceae family, as is the walnut, but it is more closely related to hickories than to walnuts. Leaves and fruits contain the allelopathic juglone, which means they contain substances that are toxic to some other plants. Many plants will not grow in soil with juglone in it; especially tomatoes and other members of the nightshade family. Be sure not to use pecan leaves or shells as mulch in the vegetable garden.

For 150 years growers have managed and harvested nuts from pecan "groves" found throughout the tree's native territory. Nuts from native trees are small but have excellent flavor and so retain their value in the marketplace. Yields from a well-managed native grove can average about 600 pounds per acre; in fact, yields of 1,000 pounds per acre are not that unusual.

About 100 years ago, breeding and grafting techniques designed to help growers improve quality resulted in varieties that produce more nuts and nuts with a greater percentage of meat. These are planted in pecan "orchards." There are hundreds of pecan cultivars available today, but only a few dozen make up the commercial industry. Sometimes these improved varieties are grafted onto native rootstock, but just as often the breeding process produces new, improved rootstock.

New orchards can begin harvesting pecans about four to six years after transplanting, although maximum yields may not be achieved for 10 years or more. Starting a brand new pecan orchard takes some serious patience and major financial security, but it does pay off. Orchard yields generally range from 800 to 1,200 pounds per acre but can reach as high as 2,500 pounds.

Because pecans require well over 200 frost-free days for nuts to reach maturity, pecan production in the United States is restricted pretty much to southern states and California, those that fall within growing Zones 6 to 9. The top five pecan producers, including both native and improved stock, are Georgia, Texas, New Mexico, Arizona, and Louisiana.

Homeowners can grow pecans up into Maryland, and some of the more adventurous are known to grow pecans as far north as Wisconsin in very protected settings.

Pecans are usually harvested from mid-October through November when the shuck loosens from the shell or splits. The trees in commercial production are harvested with trunk or limb shakers that literally shake the nuts off the tree to be collected by various means.

Homeowners usually use a long cane pole to whap the nuts down or find some 10-year-old kids willing to spend an entire afternoon throwing baseball gloves or old sneakers up into the tree to knock nuts down. Wait to pick up the nuts that fall to the ground naturally, and you're competing with the wiley squirrel-and may well lose. Squirrels can be a real barrier to successful back yard pecan growing. It has been estimated that a single squirrel can consume about 50 pounds of pecans in a single season-the total production of two trees.

The pecan is definitely an American institution; only about 15 percent of the crop is exported, and most of that goes to Canada. Why has Europe not embraced the pecan? Theories abound, but probably it is because the walnut found its place in the European diet centuries ago.

Consider, too, that pecans are big trees that require a lot of space, and that commodity is pretty uncommon in Europe. Adding another complication, the growing conditions required by pecans are scarce there. Personally, I suspect that the pecan has not caught on in Europe because those deprived folks have not yet been exposed to pecan pie.

Next time you log onto the Internet, do a search for pecan pie recipes. Your search will turn up more than 1,000 different versions from as many as 10,000 hits. Looking for the best pecan pie recipe is akin to searching Texas for the best chili recipe. There is no such thing as a bad pecan pie. . . some just taste better than others. In my biased view, as long as there is pecan pie, there will be a thriving pecan industry in the United States.

Latex Paint

Latex paint is a water-based dispersion of sub-micron polymer particles. The term "latex" in the context of paint simply means an aqueous dispersion; latex rubber (the sap of the rubber tree that has historically been called latex) is not an ingredient. All paint consists of three kinds of materials: pigments, binders and solvents.

Pigment: Pigments are granular solids incorporated into the paint to contribute color, toughness or simply to reduce the cost of the paint. Pigments can be classified as either natural or synthetic types. Natural pigments include various clays, calcium carbonate, mica, silicas, and talcs. Synthetics would include engineered molecules, calcined clays, blanc fix, precipitated calcium carbonate, and synthetic silicas.

Binder: The binder, or resin, is the actual film forming component of paint. It is the only component that must be present; other components listed below are included optionally, depending on the desired properties of the dried paint. The binder imparts adhesion, binds the pigments together, and strongly influences such properties as gloss, exterior durability, flexibility, and toughness. Binders include synthetic or natural resins such as acrylics, polyurethanes, polyesters, melamine resins, epoxy, or oils (such as walnut, poppy, hempseed, pine nut, castor, linseed, beeswax, and turpentine). Today, oils from bladderpod, sandmat, ironweed, and calendula plants are used to increase resistance or to decrease drying time. Turpentine (also called spirit of turpentine, oil of turpentine, wood turpentine, gum turpentine) is a fluid obtained by the distillation of resin obtained from trees, mainly pine trees.

Solvent: The main purpose of the solvent is to adjust the viscosity of the paint. It can also control flow and application properties, and affect the stability of the paint while in liquid state. Its main function is as the carrier for the non volatile components.

Additives: Besides the three main categories of ingredients, paint can have a wide variety of miscellaneous additives, which are usually added in very small amounts and yet give a very significant effect on the product. Some examples include additives to modify surface tension, improve flow properties, improve the finished appearance, improve pigment stability, or impart antifreeze properties. Other types of additives include catalysts, thickeners such as methylcellulose, stabilizers, emulsifiers, texturizers, adhesion promoters, UV stabilizers, flatteners (de-glossing agents), and biocides to fight bacterial growth.

Nature's Treasure Chest

Many people know that furniture, lumber for building houses, paper, and books are wood products. But did you know that over 5,000 different products come from trees? Some of them are pretty surprising. Through the magic of modern science, man has learned how to take the fiber from trees and create wonderful items that make our everyday lives better and more enjoyable. How do they do it?

A tree is like any other plant, only bigger. It is built of plant CELLS made of CELLULOSE that are held together by LIGNIN. The lignin acts as a type of glue holding all the cells together in bundles of fibers. If the wood is cut into chips and then cooked into PULP, the lignin dissolves. The cellulose can now be separated out and cooked again. Soon it is a stew of fibers and a liquid called CELLULOSE ACETATE.

Some wood products come directly from the tree. Some come from the cellulose pulp, the lignin, or the cellulose acetate. Many medicines, clothing, foods, cosmetics, paints, even some "plastics" are wood products. So the next time you use a bowling ball, put on your new rayon dress, rinse with mouthwash, eat a cookie, or play your drums-THANK A TREE.

TREE-RRRR-FIC!

HANDRAIL, STAIRS, STEPS, FLOOR, DOOR, CUPBOARDS: Many homes have stair parts and floors made of oak, pine, or fir because these woods are sturdy and attractive. Sometimes maple is used for a highly polished wood floor. Doors are most often made of pine and fir, but sometimes they are made of oak or even redwood. Many kitchen cabinets are made of pine or oak. Some are made of cherry. Make a tour of your house. Do you have a wood floor, or does carpet cover it? What kind of front door do you have? Are your cupboards wood? Are they painted or are they natural colored?

RAYON: This fabric is very popular because it is light and comfortable and can be made into clothes used for fancy occasions or clothes made for fun. Rayon is produced from cellulose acetate. Check the closets and drawers in your house. How many things do you and your family use that are made from rayon?

BENCH, CHAIR, TABLE: Furniture comes in all shapes and sizes and is made from many different materials. Today, it is often made from pine, oak, and teak. Makers of fine wood furniture like using walnut, cherry, and mahogany. These woods do not splinter easily and look beautiful when they are sanded smooth and polished.

VANILLA: Artificial vanilla is used in many baked goods that are found in the stores or are baked at home and is sometimes called vanillin. It is made from lignin. Lignin is used in some baby foods, pet foods, and deodorants to help hold the ingredients of these products together. Some medicines that help with high blood pressure and Parkinson's disease also come from lignin.

PANCAKES, COOKIES: Baked goods sometimes contain an ingredient called torula yeast. It comes from the wood sugars that are produced when pulp is made. Torula contains lots of protein. It has five times more iron in it than Popeye's spinach or good old California raisins. Torula yeast is also found in baby foods, cereals, imitation bacon, beverages, and many diet foods. Torula even seems to make bees and lobsters grow faster! What products in your kitchen have torula yeast or artificial vanilla in them?

SAUSAGES: No, the meat inside the sausage is not made from wood! But the casings that hold the meat in links are usually cellulose, a wood product. Cellulose is tasteless and comes in several varieties. Sausage casings are made from ethyl cellulose. So are hard hats, combs, brushes, luggage, and fishing floats.

MAPLE SYRUP: The ingredient that soaks into our hot pancakes and shines on top of our puddings is the forest product we call maple syrup. It is the sap that flows through the cells of the sugar maple tree. This wonderful treat is tapped from the tree in early spring when the sap begins to move through the tree again after a winter rest.

CARTON, NEWSPAPER, REPORT, TICKETS, NAPKIN, BOX, BOOKS, SACKS: Ordinary paper is most often made from softwoods such as pine and fir. In paper mills, wood chips are cooked break down and soften the fibers. Next, they are washed clean and put into a beater. Beating makes the fibers fluffy so that they will hold together better. The mixture is now called wood pulp. At this point, dyes are often added to the pulp to give it color. Then it is spread out very thinly on a wide, wire screen. The pulp moves along a conveyor belt where most of the water drains out through the mesh. The rest is squeezed out by a series of rollers. As the fibers dry, they bind themselves together and become paper. Many paper products that are manufactured today are made from recycled paper. What does recycled mean? The next time you buy greeting cards, toilet paper, paper towels, facial tissues, cereal and other grocery boxes, check to see if they are made from recycled paper. What is printed on your paper grocery store bags? Does it show how much of the paper used to produce these bags is recycled? Making recycled paper is easy and fun.

APPLE JUICE, ORANGES: Most of the fruit we eat comes from a tree. We squeeze fruits into juice, cook them to make jams, jellies, and syrups, use them to help flavor other foods such as pies, and eat them fresh. What is your favorite way to enjoy fruit? What job does the fruit do for the tree? Here is a hint: What do we find hidden inside the fruit?

FOOTBALL HELMETS: Though they don't look like it, plastics are sometimes made by using wood. Wood flour is mixed together with other ingredients to form the plastic parts to many household appliances, like coffee makers, and sports equipment, like hockey helmets and baseball hard hats. Scientists believe that using wood fiber strengthens the plastic.

TIRES, RUBBER MATS: Rubber trees originally came from South America, but now large rubber tree plantations are also found in the tropical areas of Africa and Asia. Workers make a cut into the bark of the tree and set a cup beneath it to catch the sap called latex. The latex is then made into rubber. What other items can you think of that are made from latex rubber? Can you think of another wood product that comes from tapping into the bark of the tree to catch its sap?

PHOTOGRAPHIC FILM, CELLOPHANE, TOOTHBRUSH, EYEGLASSES: These everyday items are made from cellulose. VCR tapes, sponges, and cellophane tape are also made from cellulose. Look at the knives and tools in your kitchen and workshop. Many of the handles are made from regular wood or from the wood product, cellulose.

NAIL POLISH, HAIRSPRAY, LIPSTICK, PEPPERMINT CANDY, GUM: The cosmetic and food industries make use of wood oils to give their products scent and flavor. Sandlewood is used in many perfumes and incense sticks. Eucalyptus is the smell we recognize in ointments, cough drops and syrups. Chewing gum uses both of these oils for fragrance along with chicle, an ingredient that is found in the forests of Central America. The drops of chicle that ooze out of the tree are what we find so much fun to chew!

PLANTER BOXES, HOUSES, FENCES, SIGNS, TELEPHONE POLES, BUS STOP BENCHES: The strong smelling oils in the wood are what makes redwood and cedar ideal for outdoor furniture, decks, planter boxes, and fences. These oils help protect redwood and cedar products from insects and also from damage by the rain, sun, and wet soil. Carpenters love to build with redwood and cedar because they have no knots in them. Their grain is straight and smooth. Some houses are made entirely out of wood. In other houses, the framework, the outside covering, and the shingles on the roof are made of wood. Douglas fir, white fir, and ponderosa pine are most often used to build houses. Douglas fir is also used to make telephone poles and bus-stop benches, while ponderosa pine is used to make most wood signs.