Wood products...

This puzzle explores common and uncommon products from wood. Up to half—or even more—of a tree is lignin, a complex natural chemical that glues fibers in a tree together. Lignin and other silvichemicals (chemicals from trees) are used in over 5000 products. The best part about silvichemicals is we won't run out of them, because trees are renewable!

C P H O T O G R A P H I C F I L M A T O O T H P A S T E
E B D G M A S C E D A H S O A T L A S C I T E M S O C N
L C I D E R E F H O I H W O L O H O C L A E I R I P S A
L L K L D T I R E O R C I P P D E C O Y S M E N P L P M
O O S O I I V P Q R S L N M L A D H E S I V E S A Y A E
P C W M C F O C T S P U G A A S T U K V O I F E L W C L
H K A U I I M E S W R M S H T N L C X C A T I N L O E A
A S S G N C A M E R A C A S E V I E D Z R A R I E O C N
N A E G E I S E L B Y D C M S P S R S E S M E Z T D R D
E R E N I A T N O C K L I M H R O S I K S I L A S H A W
I J S I N L F T P H K L T T A C E T O N E N A G L S F O
K M B W O F A D G A N A O D E L A E D O V S D A L B T O
E R O E I L R I A R B O N R I X O R E S I N D M A I R D
X O O H T A P S L C T E N B F N Y Q W R T R E S B R E S
P O K C A V H P F O L P A O A W T U W A A T R U G C E T
L F S E L O A E X A C G R C A N D Y B O X Y G E N Y N A
O S E R U R N R C L S M S L E N N E K Z A E O A O G T I
S B K A S I D S N I S C L M D R E B M U L E S N P U R N
I D A M N N L A D I A P E R S F S K C O T S N U G M Y S
V I R I I G E N U T S C G A H R E P A P Y L F I N M S P
E C J C S U S T K L R H R F U N G I C I D E S M I E H U
S A D S T I U R F E R T I L I Z E R S L I C N E P D I C
A C E T A T E N U A P S E R U T I N R U F O B O A T E G
X I S P M A Q Q C E P D O O F Y B A B U T T O N S A L N
E T K F P R A K N A R B S D R A O B E L C I T R A P D I
S E S U S L S S M T M E T R O N O M E U S P O N G E S K
V C W E S E I D N A C T N I M R E P P E P S O A P S X A
R A I L R O A D T I E C A R D S K C I T S Y E K C O H B

1. ACETATE
2. ACETIC ACID
3. ACETONE
4. ADHESIVES
5. ALCOHOL
6. ART PENS
7. ARTIFICIAL FLAVORING
8. ATLAS
9. AXES
10. BABY FOOD
11. BAGS
12. BAKING CUPS
13. BAT (Baseball)
14. BOAT
15. BOOKS
16. BUTTONS
17. CALENDARS
18. CAMERA CASE
19. CANDY BOX
20. CANOE
21. CARDS
22. CELLOPHANE
23. CEMENT DISPERSANT
24. CERAMICS
25. CHARCOAL
26. CHEWING GUM
27. CIDER
28. CLOCKS
29. CORK
30. COSMETICS
31. CRIBS
32. DECOYS
33. DESKS
34. DIAPERS
35. DOORS
36. DRY WALL
37. EXPLOSIVES
38. FERTILIZERS
39. FIRE LADDER
40. FLAG POLES
41. FLYPAPER
42. FRUIT
43. FUEL
44. FUNGICIDES
45. FURNITURE
46. GUITAR
47. GUMMED TAPE
48. GUNSTOCKS
49. HAIR SPRAY
50. HANDLES
51. HOCKEY STICKS
52. INSULATION
53. KENNELS
54. LACQUER
55. LAXATIVES
56. LUMBER
57. MAGAZINES
58. MAPS
59. MEDICINE
60. MENTHOL
61. METRONOME
62. MILK CONTAINER
63. MOVIES
64. MULCH
65. NUTS
66. OARS
67. OXYGEN
68. PALLETS
69. PARTICLE BOARD
70. PENCILS
71. PEPPERMINT CANDIES
72. PHOTOGRAPHIC FILM
73. PING PONG BALLS
74. PLATES
75. PLYWOOD
76. RACKS
77. RAFTS
78. RAILROAD TIE
79. RAKES
80. RAYON
81. RECORD COVERS
82. RESIN
83. ROOFS
84. SEESAWS
85. SHADE
86. SHAMPOO
87. SKIS
88. SOAPS
89. SPONGES
90. STAMPS
91. SWINGS
92. TAX FORMS
93. TIRE
94. TOOTHPASTE
95. TOOTHPICKS
96. VARNISH
97. VITAMINS
98. WAXES
99. SPACE CRAFT REENTRY SHIELDS
100. ENAMEL AND WOOD STAINS

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6/93

Idaho Forest Products Commission
www.idahoforests.org

Chemicals and Products From Trees

The forest industry is making great strides in using all of the tree. Lumber, plywood and paper are essential products made from the wood fiber in trees. But up to half—or even more—of a tree is lignin, the complex natural chemical that binds the fibers in the tree together. This and other "silvichemicals" from trees are used today in thousands of products important to people. This exhibit presents some of those 5000 products. The best part about silvichemicals is that we will never run out of them, because trees—unlike coal and petroleum sources of chemicals—are endlessly renewable.

Turpentine and tall oil are resinous materials reclaimed from the paper-pulping process. They are important ingredients in paint, varnish, adhesives, asphalt, lube-oil additives, resins, menthol, lacquer, camphor, printing inks, carbon paper, fungicides, rubber and latex products, soaps, disinfectants and polishes. Synthesized essential oils are used in chewing gum, mouthwash, peppermint candies and toothpaste, menthol cigarettes, lime aftershave, detergents, soaps and shampoo.

Wood flour and melamine resins using cellulose filler are principal components of dinnerware, electrical receptacles and parts, toys, caster wheels, toilet seats, handles for cooking utensils, telephone housings, camera cases, washing-machine impellers, radio and TV cabinets and other appliance housings. Wood flour and resins are also used as adhesives in the paper industry.

Ethyl cellulose and other chemical based cellulose are used in making tool handles, photographic films, packaging films, glasses frames, molded packages, combs, brush and mirror backs, sponges, acetate filament yarns, sausage casings, cellophane, knobs and handles, luggage, gunstocks, fishing floats, toothbrushes, plastic pens, football helmets and hard hats, electrical tape, coatings, lampshades and a host of other products. Acetate filament yarns from cellulose include rayon fiber and other textile products such as clothing, drapes and rugs.

Nitrocellulose is used in making solid rocket propellants and other explosives.

Torula yeast is a high-protein product made from wood sugars spent in the pulping process. It has 17 nutritional trace elements, including four to five times the amount of iron found in uncooked spinach or raisins. Type S Torula is used in baby foods, cereals, imitation bacon, baked goods, beverages, vegetarian food and dietary preparations. Type F Torula is used in feed supplements for cattle, hogs, fish, chickens and mink, and Type FP Torula goes into pet foods. Torula has been found to make bees and lobsters grow faster.

Lignosulfonates from spent sulphite pulping liquor are used in cleaning compounds, insecticides, cement, ceramic products, oilwell drilling muds, cosmetics, artificial vanilla flavoring, gummed tape, deodorants, hair spray, certain pharmaceuticals (Aldomet and Aldoril for hypertension and L-Dopa for Parkinson's disease are examples), fungicides, fertilizer, grouting, tanning agents for leather and a static remover for laundry. Spent sulphite liquor is also used as a binder for animal feed pellets, as an extender for molasses for liquid animal feeds, for linoleum paste, road binder, and as a binder for foundry cores and ore briquettes.

From 13 to 21 percent of a cord of wood may be bark. Much of it is used as fuel in forest industry mills. Bark is also a source of papermaking fibers and chemicals such as resins, fatty acids, tannins, waxes, vitamins and tall oil. Large amounts of bark are used as mulches, soil conditioners and bedding for poultry and livestock. Other uses of bark include plywood adhesives, plastic fillers, lacquers and varnishes, molded products and oil-spill control agents.

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