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WHAT

ABOUT BAMBOO

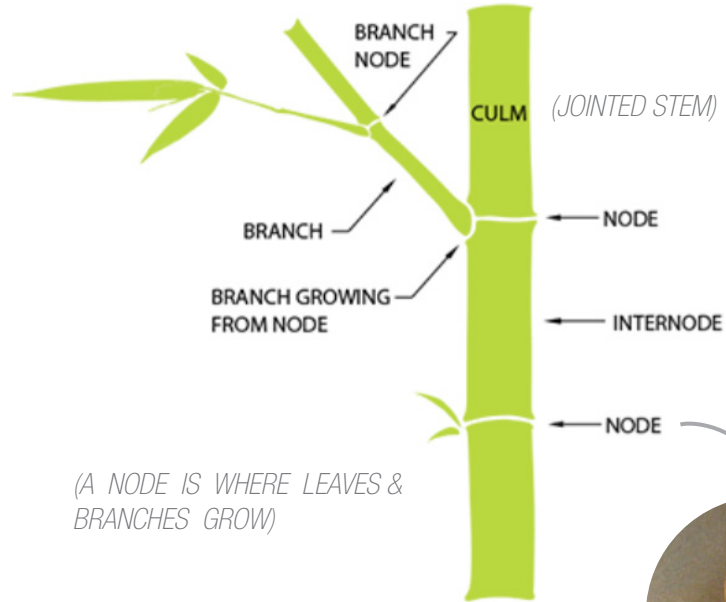
There are more than 10 genera of bamboo, in which 1,450 species have been divided out.

Being evergreen, bamboo is actually a type of grass i.e. Poacea family of grass (a very tall & woody one).

Known for its hardness that can sustain harsh winters, drought, as well as the sweltering humidity of tropical regions, it is also known for being the fastest growing plant on Earth, which is capable of attaining its full height and spread within a single growing season.

- > ANATOMY
- > TYPES & CLOSE-UP
- > GROWING PATTERN

ANATOMY



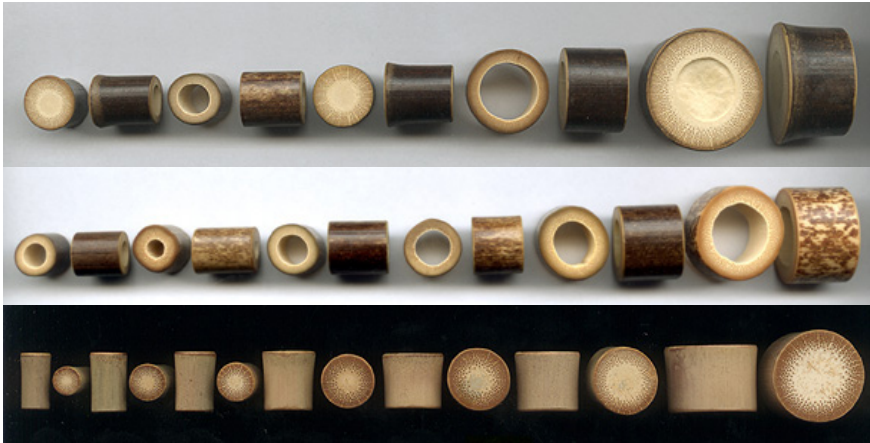
(A NODE IS WHERE LEAVES & BRANCHES GROW)

(BOTH HOLLOW & SOLID NODES EXIST)



TYPES, CLOSE-UP

Unlike regular hardwood trees where the diameter of the trunk gets wider with age, a bamboo culm remains the same thickness for its entire life.



Images on Bamboo Jewelry by Organic LLC, O. Retrieved from <http://www.organicjewelry.com/bamboo.html>

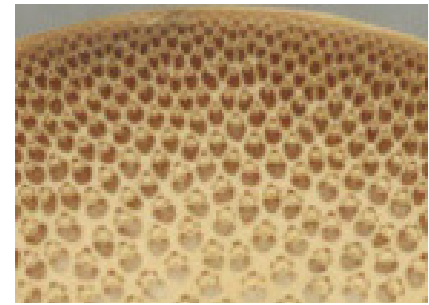
Showcasing bamboo of different diameters & thickness

The diameter of a new shoot somewhat governs the thickness of the new culm. If you have a 1" diameter shoot, the new culm will be 1" diameter. A 6" diameter shoot will produce a 6" diameter culm ... and so forth. As well, the culm never grows any taller throughout its life span.

The large holes ('eyes') are the xylem pores which carry water from the underground rhizome to the leaves. The 'nose' pores are the phloem which bring the carbohydrates manufactured in the leaves down to the the stem and rhizome.

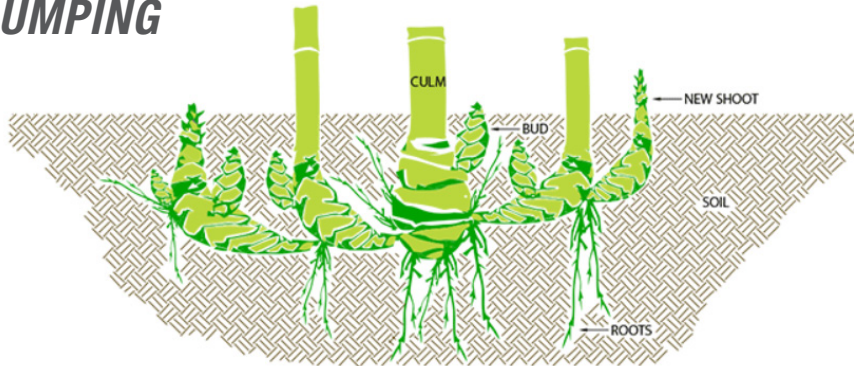
The solid material above and below these pores are fibres which give the cane its great strength.

*Info by Australian National University,
Original image by Roger Heady.
This image has been colour-enhanced.*



GROWTH PATTERN

CLUMPING



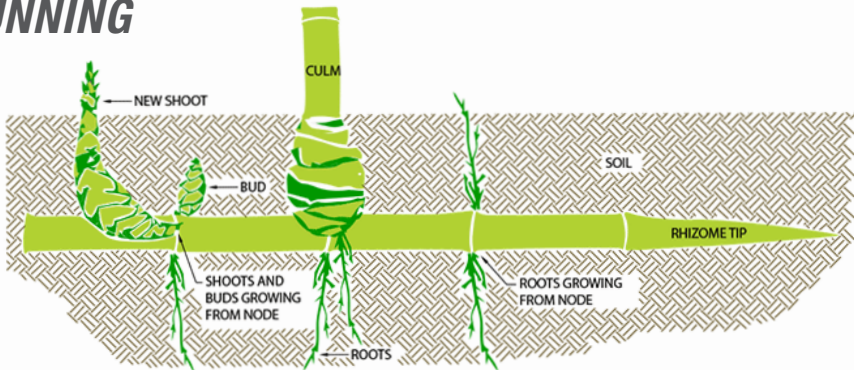
Slow-growing species

Grow in large U-shaped clusters /clumps of culms --> Non-invasive

*Each rhizome produces only a single culm
rhizomes are self-containing and sprout near
the parent plant*

Ideal for urban settings

RUNNING



Fast-growing species

*Spread rapidly and cover vast amount of
ground, invasive in nature*

*Rhizomes grow horizontally and spread ex-
tensively (in search of moisture and sunlight)*

*Can cover more than 15 feet of ground
within a year*

Images by Bamboo Botanicals

Retrieved from <http://www.bamboobotanicals.ca/html/bamboo-care/controlling-bamboo-spread.html>



DOES

BAMBOO PERFORM

*Images of Extension Lamp, by Kai Chi Yao's
Retrieved from <http://www.core77.com/posts/24096/Flotspotting-Kai-Chi-Yaos-Bamboo-Bending-Extension-Lamp>*

HOW . . .

- > *FEATURES, PROPERTIES*
- > *TO WORK WITH - CRAFTING,
MANUFACTURING PROCESS*
- > *COMPARISON (WOOD)*

FEATURES, PROPERTIES

GREEN, ECO- FRIENDLY

Anti- bacterial

Containing a natural bio-agent known as Bamboo Kun, which is naturally anti-bacterial, making the material itself effective in eliminating and preventing over 70% of bacteria that attempt to grow on it, be it in its natural or fabric form.

Grows fast enough

Being the only woody plant that can keep up with the rate of human consumption and deforestation, it can reach full maturity in 3 to 5 years (dependent on species) whereas hardwood trees can take 30 to 40 years.

Absorbs more CO²

Bamboo absorbs carbon dioxide and releases over 30% MORE oxygen into the atmosphere compared to an equivalent mass of trees.

Breathable And Absorbent

Doing excellent at absorbing moisture, keeping the skin cool and dry. Even when moist, it does not cling to skin allowing great breathability.

A Renewable Resource

When it bamboo is harvested, new shoots from its self-sufficient root system still grows while no additional planting, cultivation or materials e.g. chemicals, pesticides or fertilizer is further needed. Every part of the plant can be utilized in one way or another with **zero waste**.

FLEXIBLE, UNLIMITED POSSIBILITES

BAMBOO FIBRE

Sustains Temperature

The insulating characteristics of bamboo fiber make it great for sustaining body temperature. It cools people down when it's hot and it keeps people warm when it's cold.

BAMBOO CHARCOAL

De-odorizing

Extremely porous, which can absorb large quantities of odor and also used in filtering harmful chemicals in water.



"The mechanical properties of bamboo are often twice to three times higher than those of conventional timbers.

FEATURES, PROPERTIES

Possess some of the best stiffness/strength characteristics, and strength-to-weight ratios

Tends to be harder and stronger toward the outside of the culm, gradually getting softer and weaker toward the center of any growth material on the planet

\$2 - \$5 per square foot

More prone to damage, but better at repelling moisture and mold growth

10-25 years, depending on the nature of bamboo and added material. 30-50 years if maintained well and resurfaced as needed

**TENSILE STRENGTH
/ ELASTICITY**

COST

DURABILITY

LIFE SPAN

Differs by direction

Greatest when parallel to the grain

Low when perpendicular to the wood grain, where wood often splits

Generally, the harder the hardwood, the more expensive it is, but also the more durable it is. Including labor expenses for installation, most hardwood floors cost between \$8 and \$15 per square foot

Prone to scratching and to moisture damage

Depends on a number of factors, such as whether the floor is finished, type of wood used, what room it is in, and how well it is maintained. Cannot be installed in basements. Properly finished and well-maintained hardwood floors can last for decades.

PROCESSING

BACKGROUND- MORE PROPERTIES

High shrinkage rate

when initially being dried, amounting to 10-16% in culm diameter and 15-17% in overall wall thickness

Very uniform texture

Density ranges from medium to fine depending.

Tends to split and pull out when being cross-cut, especially in the form of bamboo fibre.

High silica content which may lead to dulling of blades and processing tools. masking tape across the cut line beforehand is recommended to prevent this sort of tearout

12-Step Production Process



Images of bamboo flooring production process, by Kanger Bamboo
Retrieved from https://kbamboo.en.alibaba.com/product/823109520-218407236/outdoor_bamboo_deck-ing_flooring_tiles_eco_friendly_bamboo_flat_sheet_top_selling_household_products_2013.html



WHEN □ □ □

*Image of Bamboo Charcoal, by bamboo import Europe
Retrieved from <https://www.bamboimport.com/en/blog/products-made-from-bamboo>*

The buds that develop into shoots play a dramatic role in the growth of a new culm.

New bamboo shoots can grow at staggering rates. Some species of bamboo have been clocked at growing over 3' (90cm) in one day. That is over 1.5" (3.8cm) in 1 hour! The entire growth period from new shoot to a full height culm can typically be completed in 30 days.

For most bamboos, the shooting season takes place during the spring season through early summer. As the shoot elongates, it develops into a new culm. New branches and leaves grow from the nodes of the new culm.

Leaves from existing older culms drop and grow new leaves during this period as well. Spring is the Autumn season for bamboo as the foliage gets renewed.

- > GROWING SEASON
- > TO USE - APPLICATION



1a



2a



3a



4a



5a



6a



5b



2b



3b



7



4b



4c



4d



8



9a



10a



11



9b



1b



6b



10b



1c



12



6c

1a,b,c

Wood Industry

Plybamboo, veneer, lumber, particle board, strand woven bamboo (SWB), poles, bamboo panels, etc

2a,b

Electronics Industry

3a,b

Fashion Accessory Industry

4a,b,c,d

Automotive Industry

5a,b

Houseware Industry

6a,b,c

Furniture Industry

7

Bioenergy Industry

8

Food and Beverage Industry

9a,b

Sports & Recreation Industry

10a,b

Textile Industry

11

Pulp and Paper Industry

12

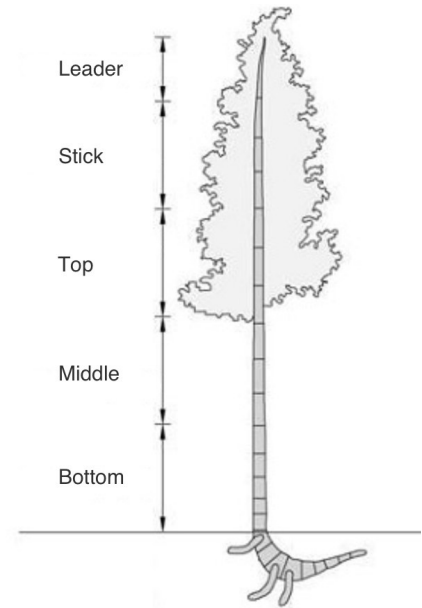
Farming Industry

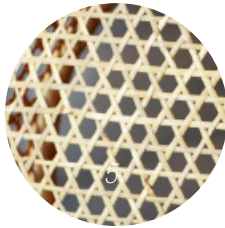
Bamboo panels

especially floors, are more and more in demand all over the world, because they have the texture of marble and the elegance of wood

For construction purposes only the bottom, middle and top part can be used as columns or beams.

The 'leader' and 'stick' part of the bamboo culm are not considered useful in construction because of their small diameter.





BAMBOO STRIPS
i.e. CANE
in different combinations

- 1 Woven
- 2 Strand open weave cane
- 3 webbing
- 4 Vertically dissected
- 5 Rattan matting
- 6 Octagonal mask webbing
- Mixed Honeycomb woven

*Bamboo knife by
 Sabatier*



*disposable bamboo
 toothbrush*



*oudbasstard bamboo
 speaker dock by WWF*





Info from Green Pot Enterprises
Retrieved from <http://greenpotenterprises.com/celebrating-world-bamboo-day/>

IS BAMBOO ?

The majority of today's bamboo flooring products originate in China and other portions of Asia. Indeed, the short bamboo sticks used for experiment are from Chongqing, China, the home to Giant Pandas (which were used to hold steam rice inside)!

In Hong Kong, we can source bamboo in Tai Kok Tsui, Fan Ling, and traditional home products in Yuen Long.

WHERE

- > TO GROW
- > TO SOURCE



September 18th

Inaugurated in 2009 by the World Bamboo Organisation, World Bamboo Day is celebrated annually on the 18th of September. The purpose of this celebration is to increase awareness of the importance of bamboo around the world.

Bamboo geographical zones



Most bamboo are native to warm and moist tropical and warm temperate climates. However, many species are found in diverse climates, from hot tropical regions to cool mountainous regions and highland cloud forests.

Bamboo in Africa

Much of sub-saharan Africa has indigenous bamboo and suitable conditions for planting other species. East Africa's bamboo is largely untapped and contributes only 1% to the global bamboo market despite the region accounting for around 3-4% of the world's total known bamboo coverage. Still, Ethiopia has the largest bamboo resource and sector in Africa.

*Anji County of China, known as the "**Town of Bamboo**", provides the optimal climate and soil conditions to grow, harvest, and process some of the most valued bamboo poles available worldwide.*