

Cork, Bamboo, & Hardwood as a Flooring Material

Presented By: First Last
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Course Description



This seminar analyzes the characteristics of cork, bamboo, and hardwood. Design professionals will become more familiar with these materials as a flooring option in an effort to properly specify the material that will perform best in their client projects. Sustainability, indoor air quality, and maintenance for each material will be examined.

Learning Objectives



- Identify the major differences among cork, bamboo, hardwood as a flooring material
- Discuss the growth cycles, sustainability of cork, bamboo, hardwood
- Explain how cork, bamboo, hardwood as flooring material improves indoor air quality
- Describe the routine, long-term care, maintenance of cork, bamboo, hardwood flooring



Characteristics of Wood



Characteristics of Wood



- Organic material
- Responds to environment
- Changes over time
- Proper expectations important to performance





Benefits of Wood



Benefits of Wood



- Adds stability to structure
- Excellent insulation
- Durable
- Long-lasting
- Hypoallergenic
- Beautiful
- Timeless



Hardwood Characteristics



Hardwood Properties



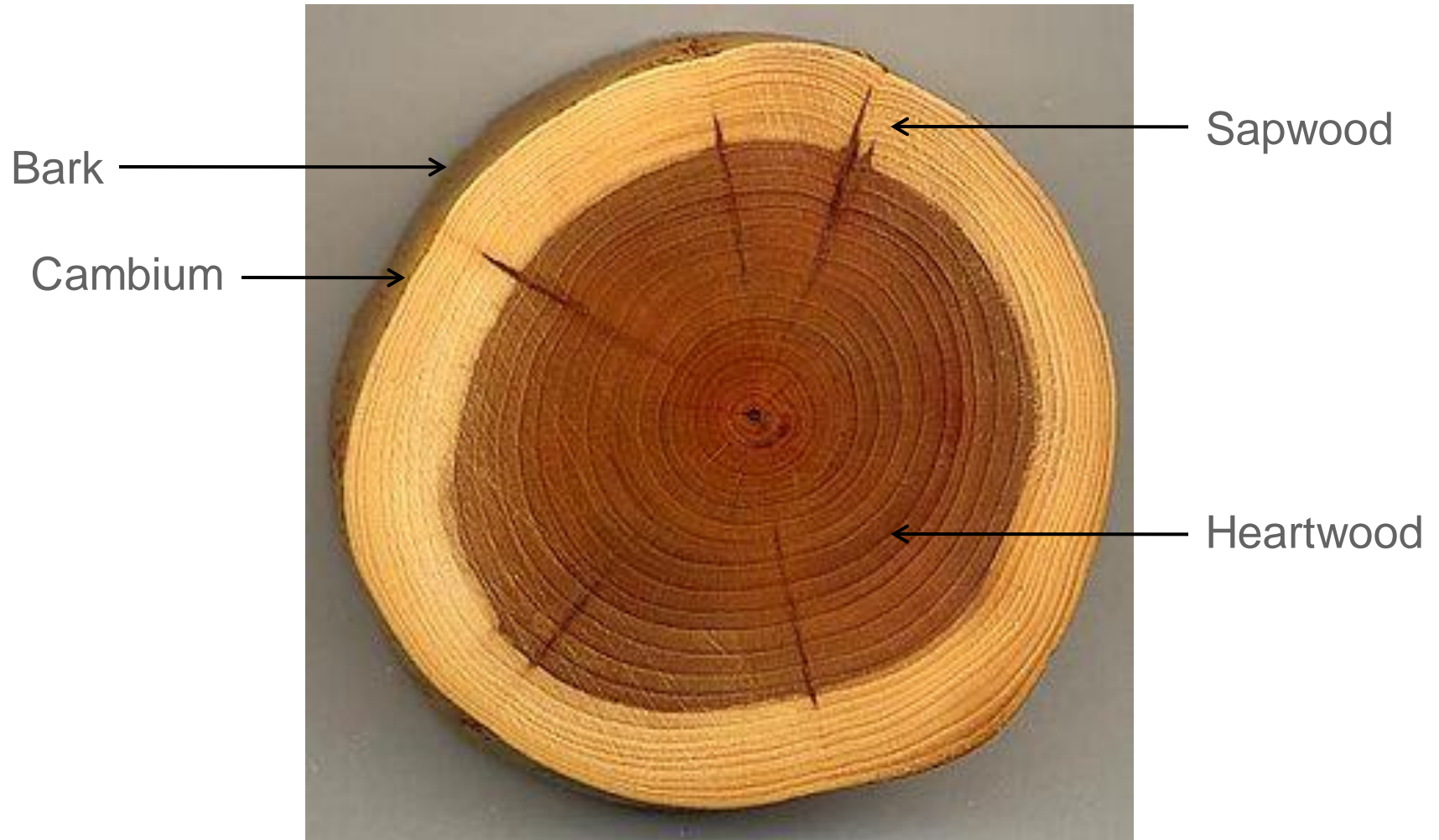
- Heartwood vs. sapwood
- Annual growth rings
- Wood grain, texture



Hardwood Cross Section

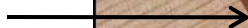


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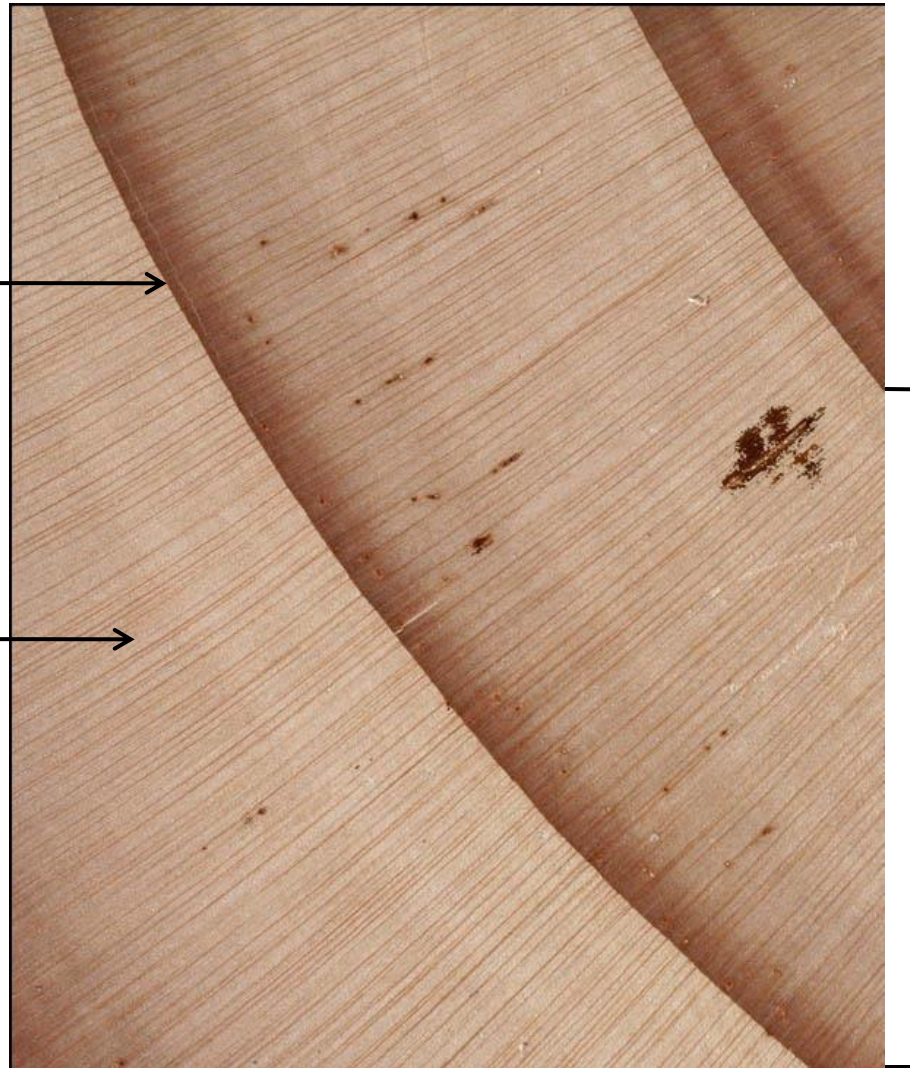


Hardwood Growth Rings

Summerwood



Springwood

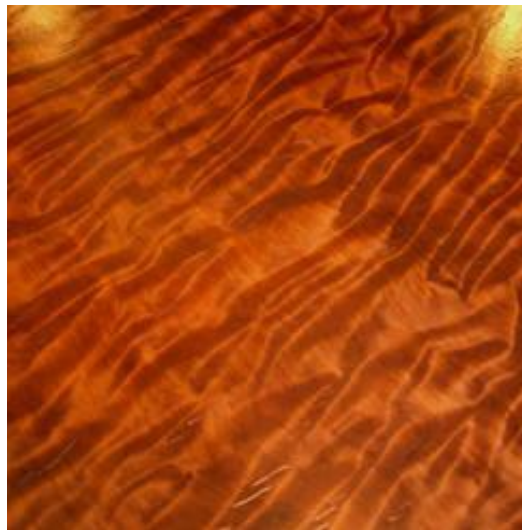


Annual
Growth
Ring

Hardwood Grain & Texture



Straight Grain



Spiral Grain



Curly Grain

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Saw Cuts



Wood Flooring Cuts



- Plainsawn
- Quartersawn
- Riftsawn
- Livesawn



Plainsawn



- Traditional choice
- 2"-3" boards
- Red oak most common
- Homes built early to mid 1900s



Plainsawn



- Series of parallel cuts
- Remaining cuts perpendicular to first set
- Produces wider boards than rift, quartered
- Board length varies



Plainsawn



- Board face has “cathedral” grain
- Contains flat-grain, some vertical-grain
- Contains more variation within, among boards than other cuts
- End grain growth rings between 0-45°

Quartersawn



- Vibrant flecks
- Tight, wavy grain
- Flecks caused by medullary rays
- Medullary rays are trees' life veins
 - Transport sap from pith to outer parts of tree
 - Perpendicular to growth rings
 - Parallel to board surface
 - Pronounced in white oak



Medullary Rays

- Medullary rays perpendicular to growth rings
- Annual growth rings appear as circles
- Medullary rays appear as vertical white lines from roots to leaves



Growth Ring →

Medullary Ray →

Medullary Rays

- Several cuts possible
- Quartersawn annual rings grow perpendicular to surface, medullary rays grow parallel to surface
- Medullary rays create fleck effect
- Pronounced in white oak

Medullary Rays



Quartersawn



- Quarter the log
- Remaining cuts perpendicular to growth rings
- Produces narrow boards
- Vertical grain
- More waste



Quartersawn



- Board face has fleck pattern
- Contains tight, wavy grain
- End grain annual growth rings 45-90° to surface

Riftsawn



- Similar to quartersawn
- Accentuated, vertical grain
- Minimal fleck
- Saw angle adjusted for fewer cuts parallel to medullary rays
- Produces more waste



Riftsawn



- Quarter the log
- Remaining cuts from center face, work out
- Boards 30-60° to growth rings
- Comes from smaller part of wedge, produces more waste
- Hard to produce only wide-width rift



Riftsawn



- Board face has vertical grain
- Contains minimal fleck
- End grain annual growth rings 30-60° to surface



Livesawn



- Combination of plainsawn, quartersawn, riftsawn





- First cut straight through log's center
- Remaining cuts parallel to first
- Yields extremely wide boards
- Produces very little waste





- Board face growth rings work from parallel in center to perpendicular at edges
- End grain annual growth rings 0-90° to surface

Livesawn



- Allows more fleck effect
- Wider planks show more knots holes, natural characteristics
- Saw blade marks show
- Rustic look increasingly popular



Livesawn



- Wider boards
- Random widths
- More fleck
- More knot holes, character marks
- Saw blade marks
- Natural beauty shows through



Performance



- Wood is hygroscopic
- Absorbs, loses moisture depending on environment
- Swells = moisture gain
- Shrinks = moisture loss
- Direction of movement based on growth rings



Plainsawn



- Expands, contracts through width
- Less dimensionally stable

Quartersawn



- Expands, contracts through thickness
- More dimensionally stable

Riftsawn



- Expands, contracts through thickness
- More dimensionally stable



Janka Ratings



Janka Ratings



- Force required to embed a .444-inch steel ball to half its diameter in a piece of solid wood
- Rates all solid wood species
- Northern red oak used as base value due to its prominence in the flooring industry

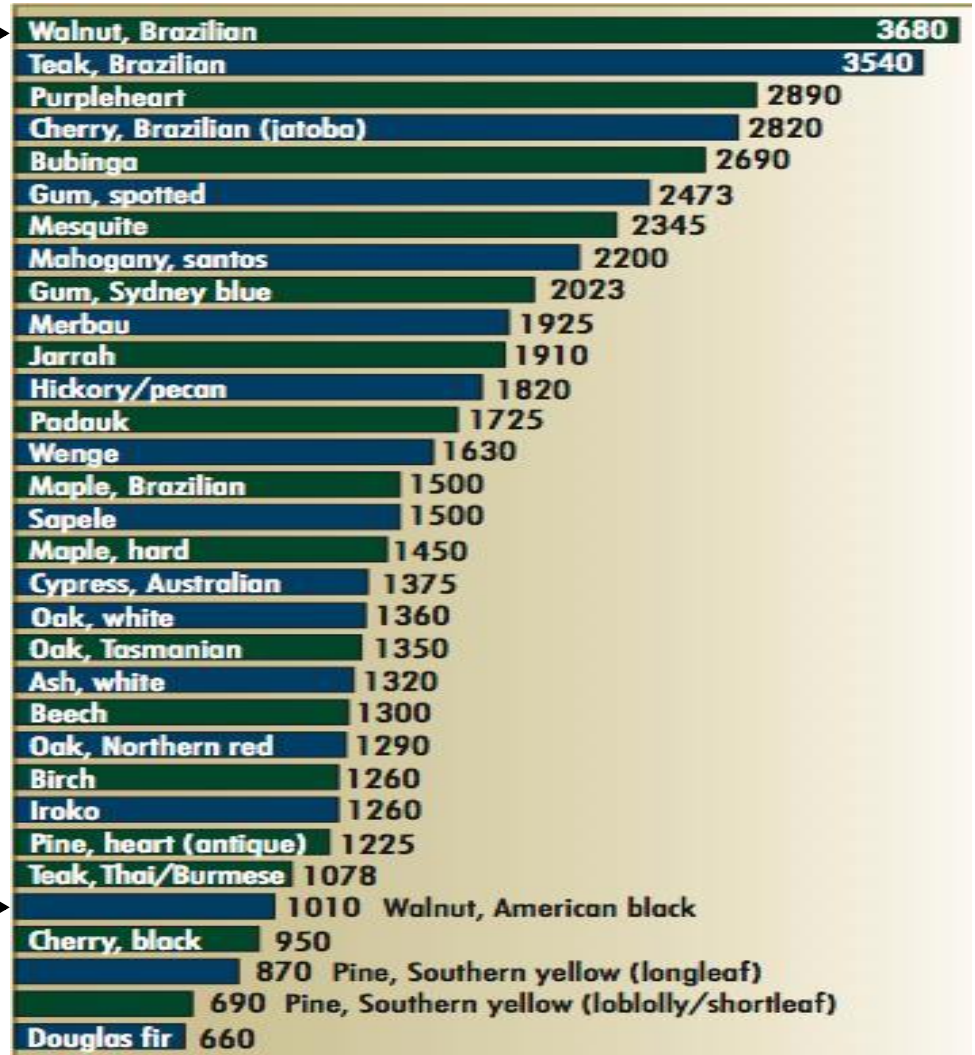
Walnut, Brazilian	3680
Teak, Brazilian	3540
Purpleheart	2890
Cherry, Brazilian (tatoba)	2820
Bubinga	2690
Gum, spotted	2473
Mesquite	2345
Mahogany, santos	2200
Gum, Sydney blue	2023
Merbau	1925
Jarrah	1910
Hickory/pecan	1820
Padouk	1725
Wenge	1630
Maple, Brazilian	1500
Sapele	1500
Maple, hard	1450
Cypress, Australian	1375
Oak, white	1360
Oak, Tasmanian	1350
Ash, white	1320
Beech	1300
Oak, Northern red	1290
Birch	1260
Iroko	1260
Pine, heart (antique)	1225
Teak, Thai/Burmese	1078
Walnut, American black	1010
Cherry, black	950
Pine, Southern yellow (longleaf)	870
Pine, Southern yellow (loblolly/shortleaf)	690
Douglas fir	660

Northern Red
Oak = 1290

Janka Ratings



Brazilian Walnut = 3680

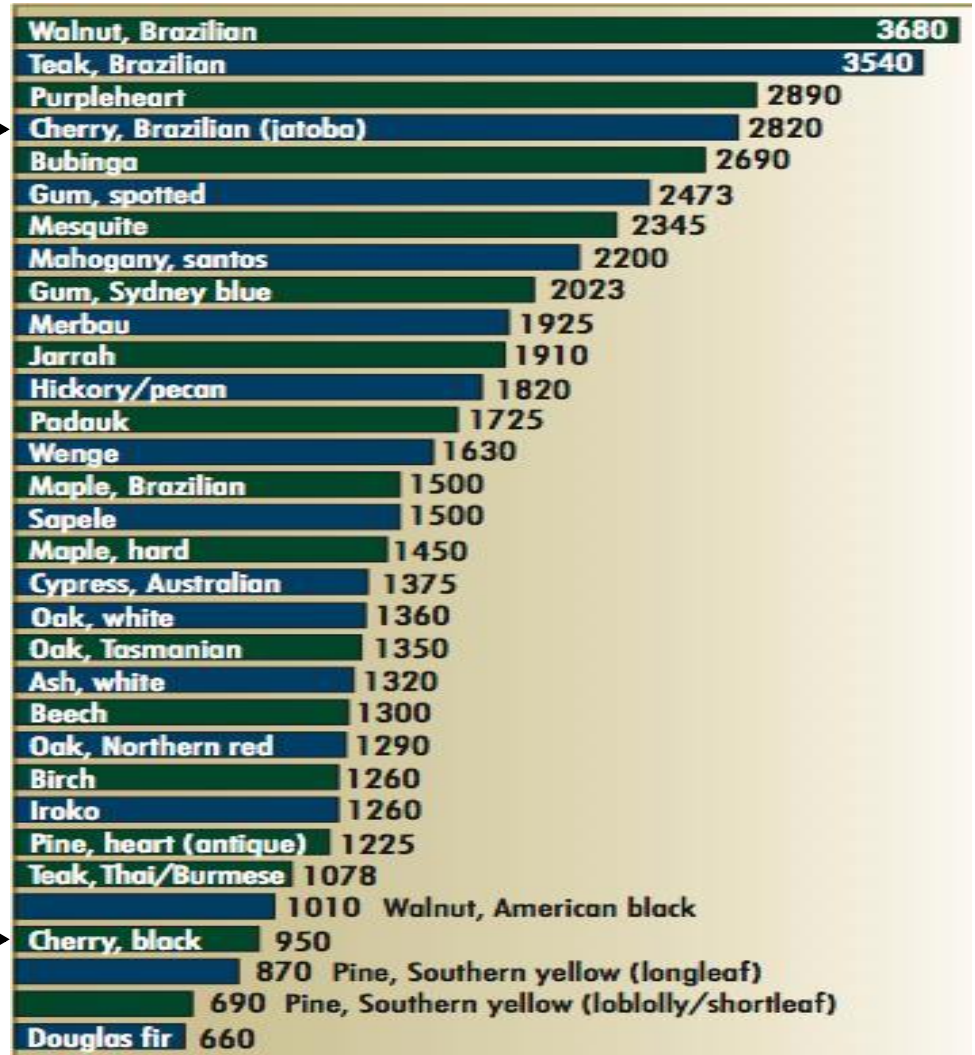


American Black Walnut = 1010

Janka Ratings



Brazilian Cherry
(Jatoba) = 2820



Black Cherry = 950

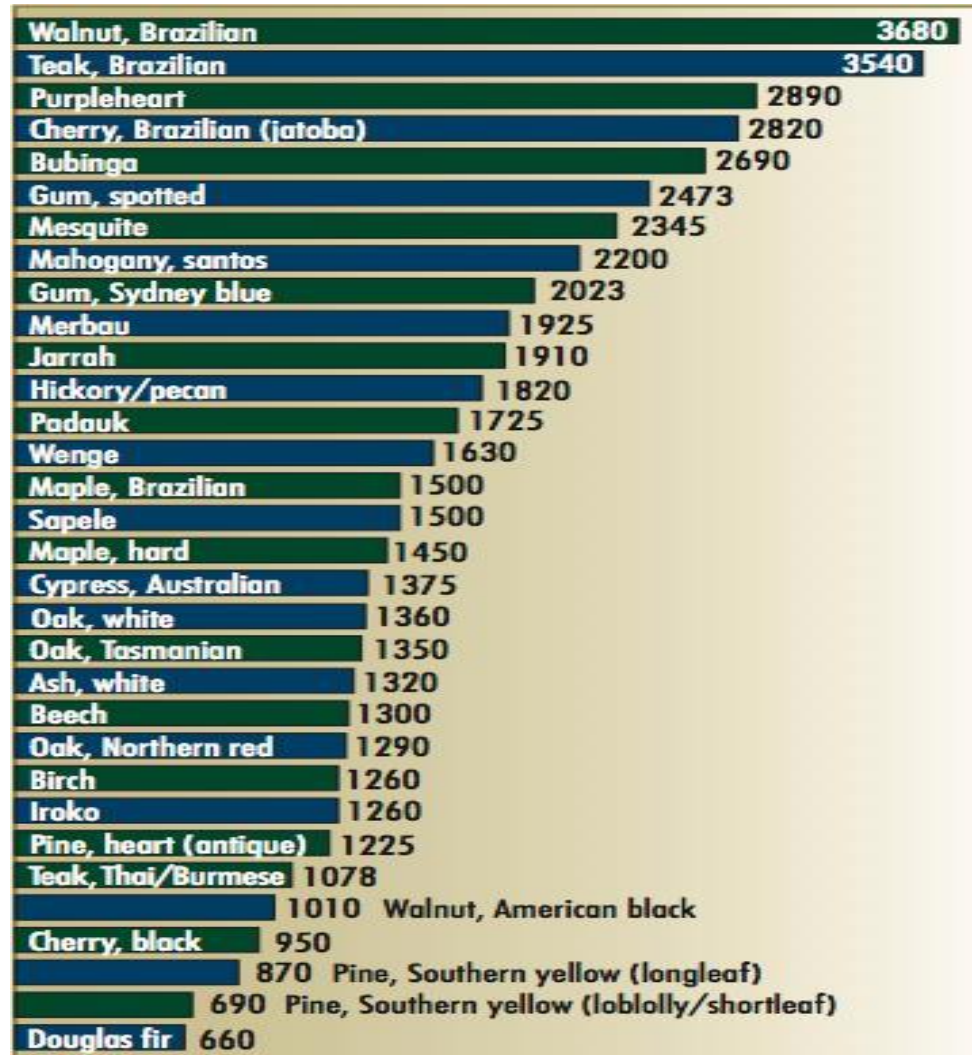


Janka Ratings



- **Hardwood Rating**

- Do not apply to engineered flooring
- Do not apply to cork
- Do not apply to bamboo

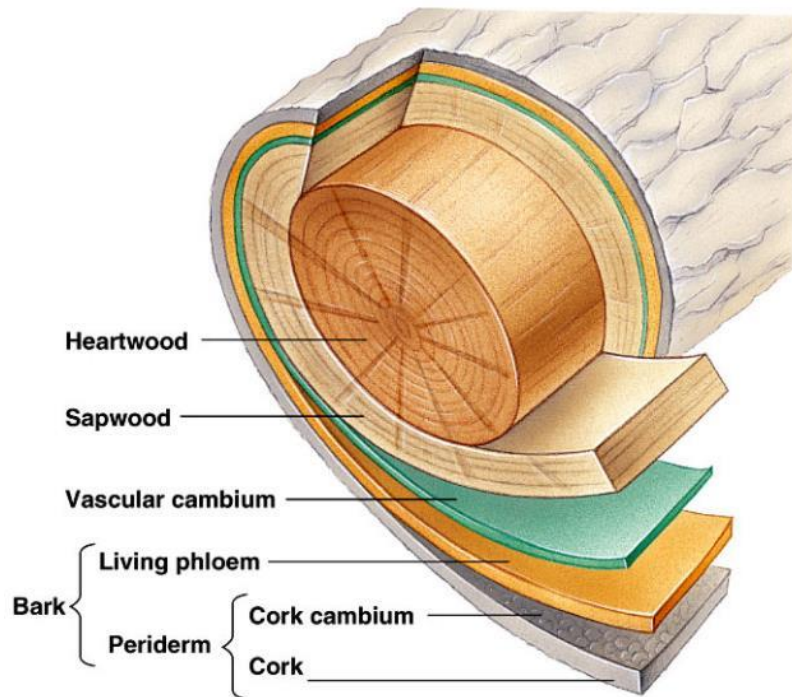




Cork Characteristics



Cork Tree



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- Cork oak tree
- Hardwoods cut down for wood
- Cork is not wood
- Cork is bark

Cork Cross Section



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← Cork

← Wood

Harvesting Cork



- Bark removed in large patches
- Wood beneath unharmed
- Tree continues to grow
- Can live 200+ years
- First harvest at 25 years
 - Harvest every 9 years



Harvesting Cork



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Harvested Cork



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Benefits of Cork



- Unchanged by processing
- Fire resistant
- Provides sound insulation
- Extremely durable
- Resists water damage, mold
- Repels bugs, dust mites
- Excellent insulation material
- Cushioned surface





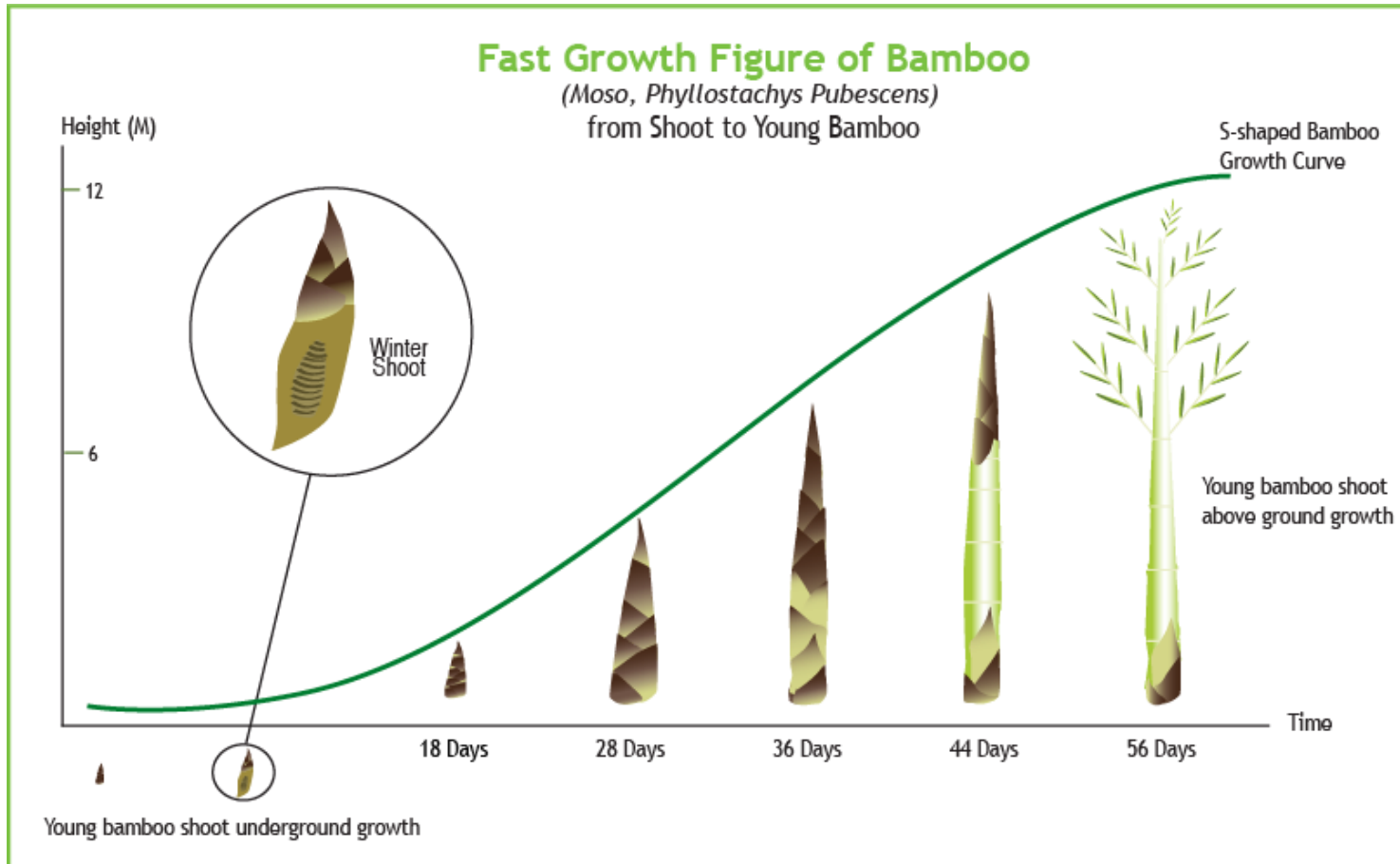
Bamboo Characteristics



Bamboo Plants



- Ancient building material
- Classified as wood, but grass
- Extremely fast growing
 - Can grow 3' per day
- Harvested in ≤ 10 years
- Regrows without replanting
- Highly sustainable resource
- Embraced by environmentalists



Bamboo Performance



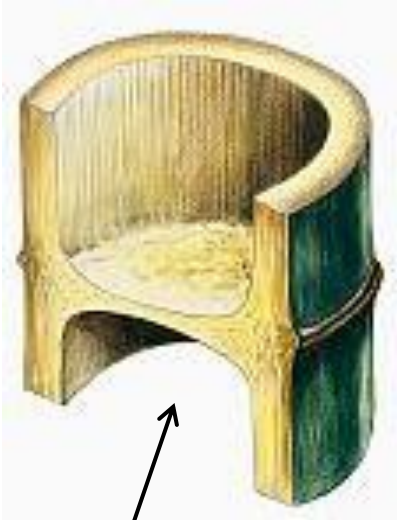
- Not wood
- Will not perform like wood



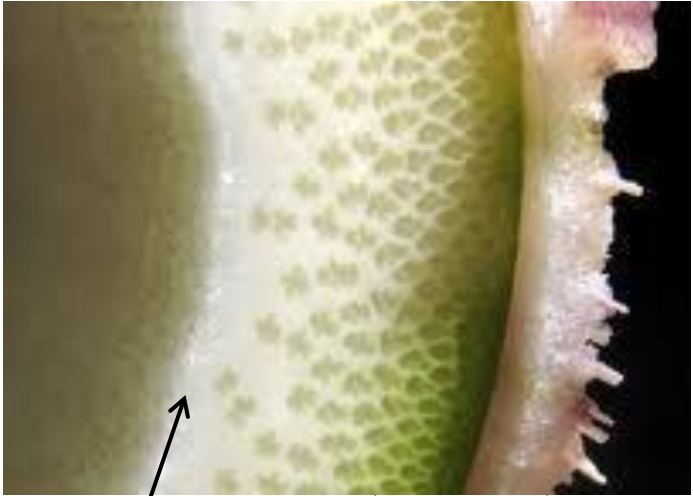
Bamboo Structure



Hollow Center



Vertical Cross Section



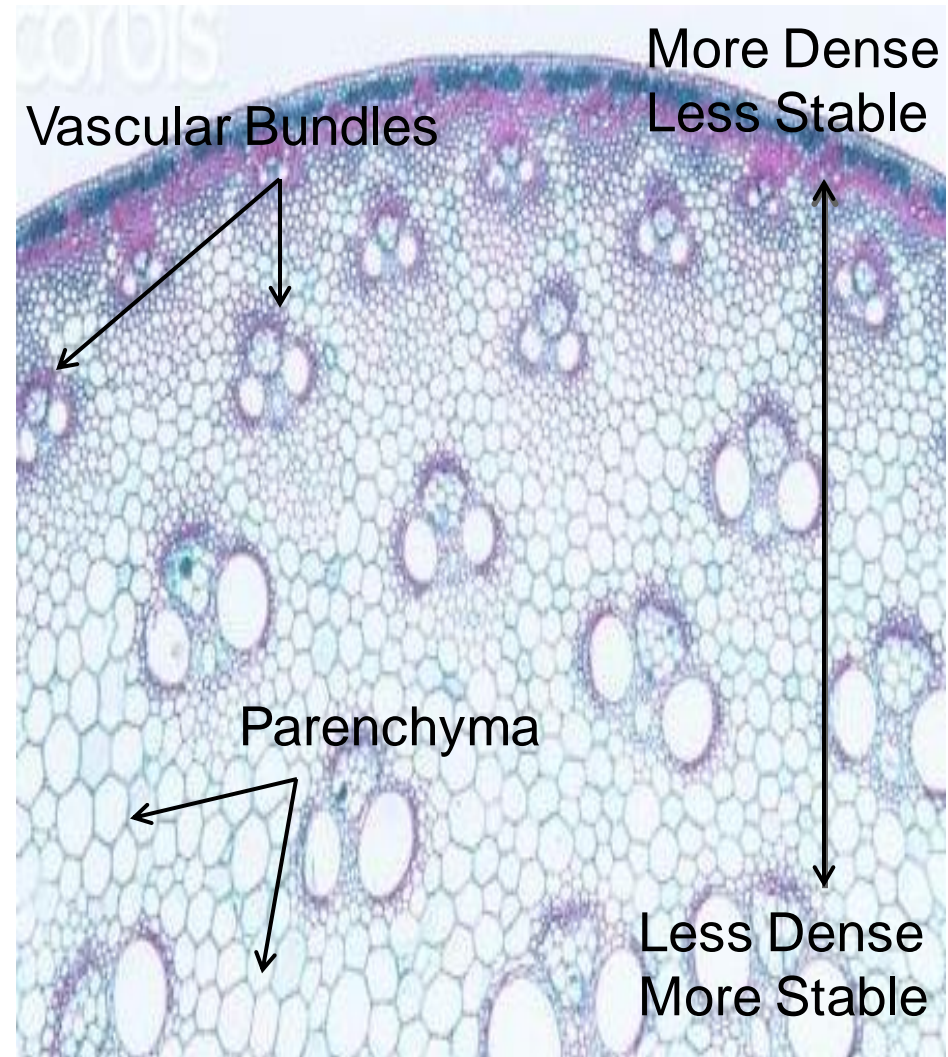
Inner Wall

Outer Wall

Skin

Bamboo Structure

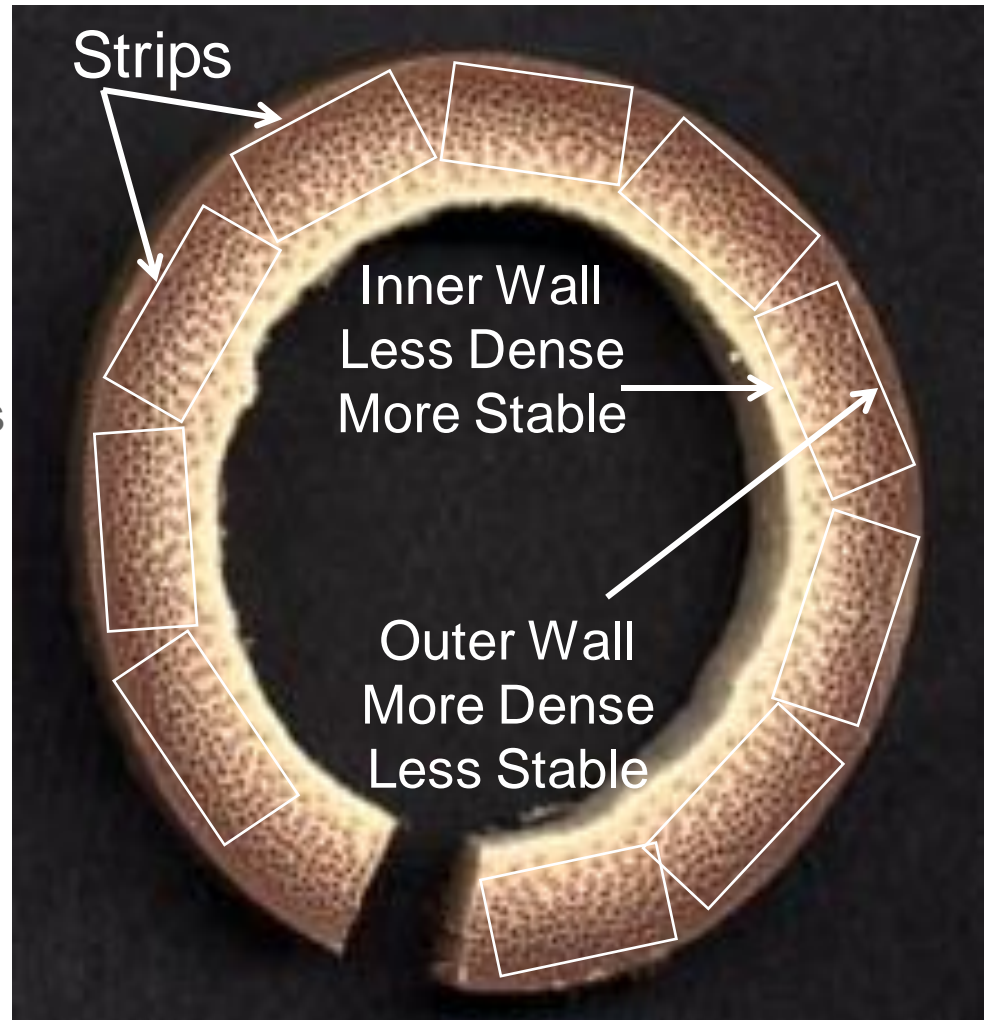
- Lignens provide strength, density
- Lignens in vascular bundles
- Bundles more dense at outer wall
- Very different from wood, which is distributed more evenly
- Produces no growth rings



Bamboo Flooring



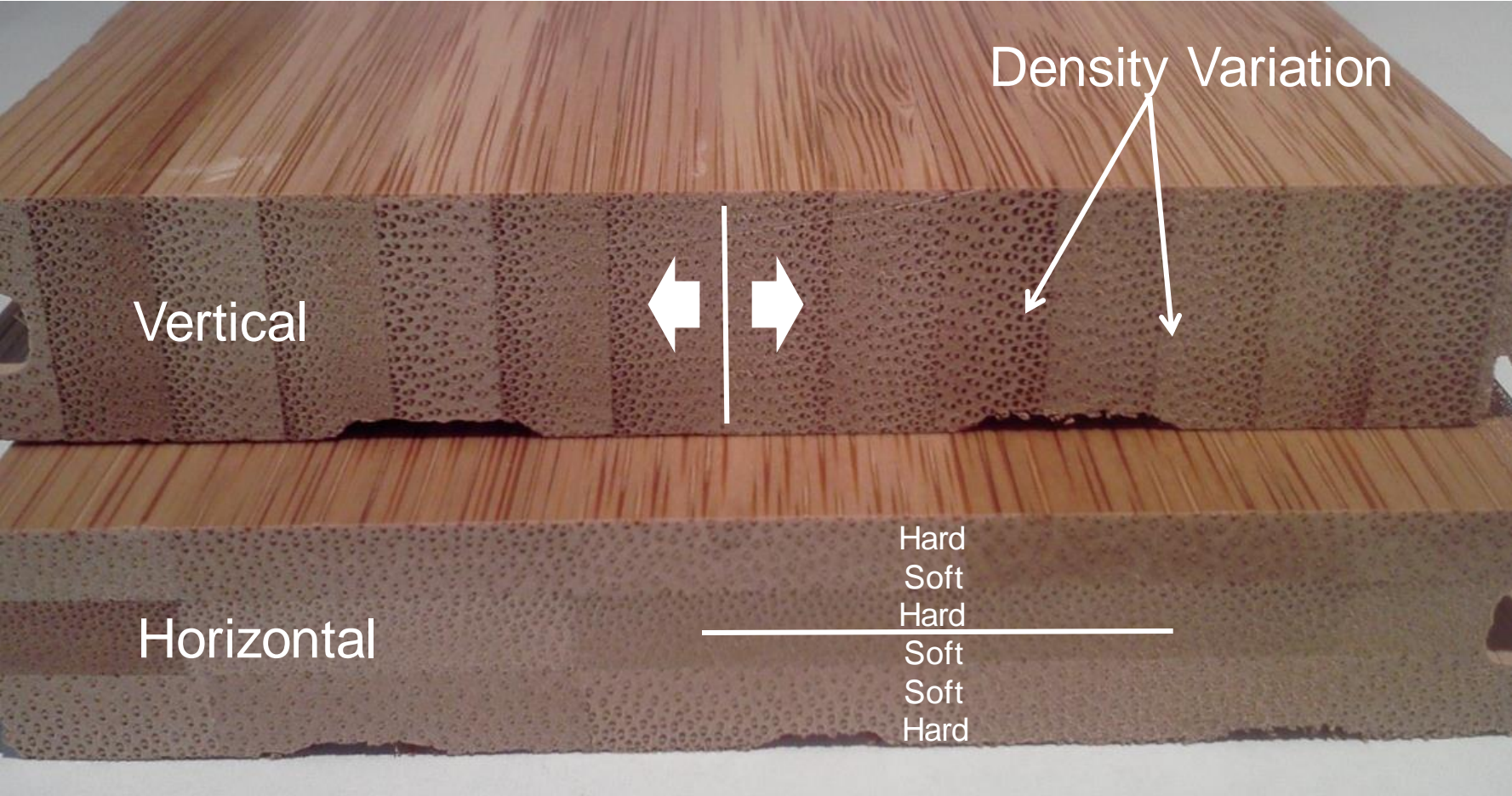
- Strips cut from stalks
- Dimensional instability
- Inner wall more stable than outer wall
 - One side expands, contracts more than other
 - Outer wall can shrink 50% more than inner wall
- Creates challenge as flooring material



Bamboo Flooring



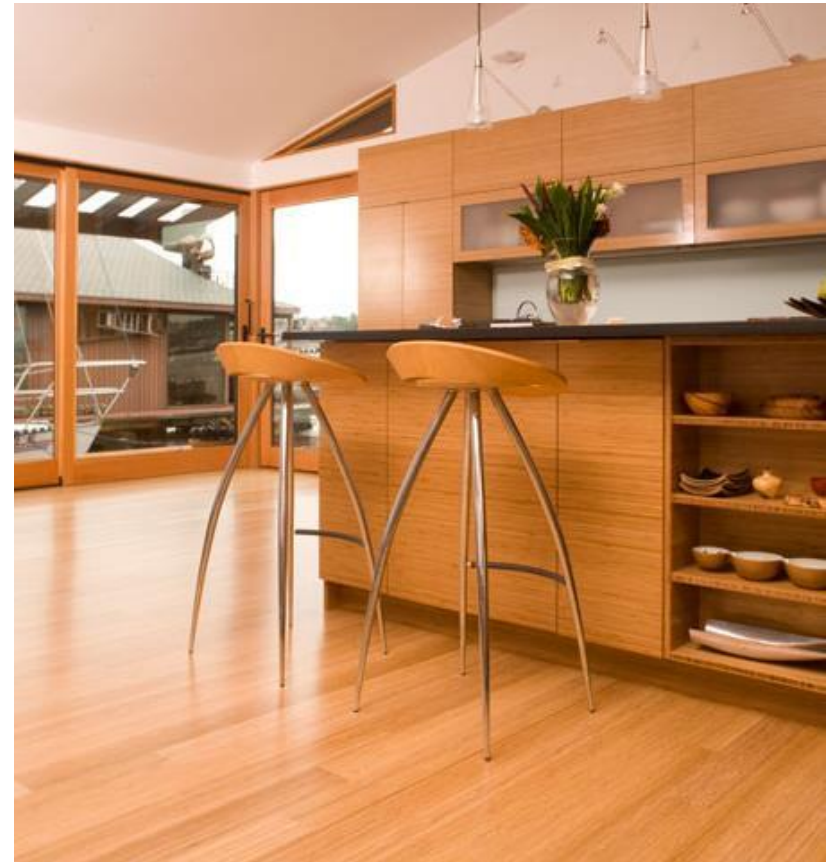
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Benefits of Bamboo



- Rapidly renewable
- High levels of carbon sequestration
- Plant regenerates
- Grows without fertilizer or pesticides
- Little production waste



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Growth Cycles



Growth Cycles



Species	Life Cycle	Per Year	Lifetime	Origin
Hardwood (Red Oak)	40-60 Years	1' – 2'	> 60'	North America
Cork	200 Years	2' – 3'	> 60'	Europe
Bamboo (Moso Bamboo)	7-10 Years	15'	40'	Asia



Sustainability



Hardwood Sustainability



- USDA Forest Service
 - 1.6 trees planted per tree harvested
 - Standing volume more than double since 1950s
 - Responsible forest management
- 40-60 years to mature
- National Association of Home Builders
 - Wood floors last 100+ years
- Inventory not needed for 40-60 years
- Rapidly renewable for life cycle



Cork Sustainability



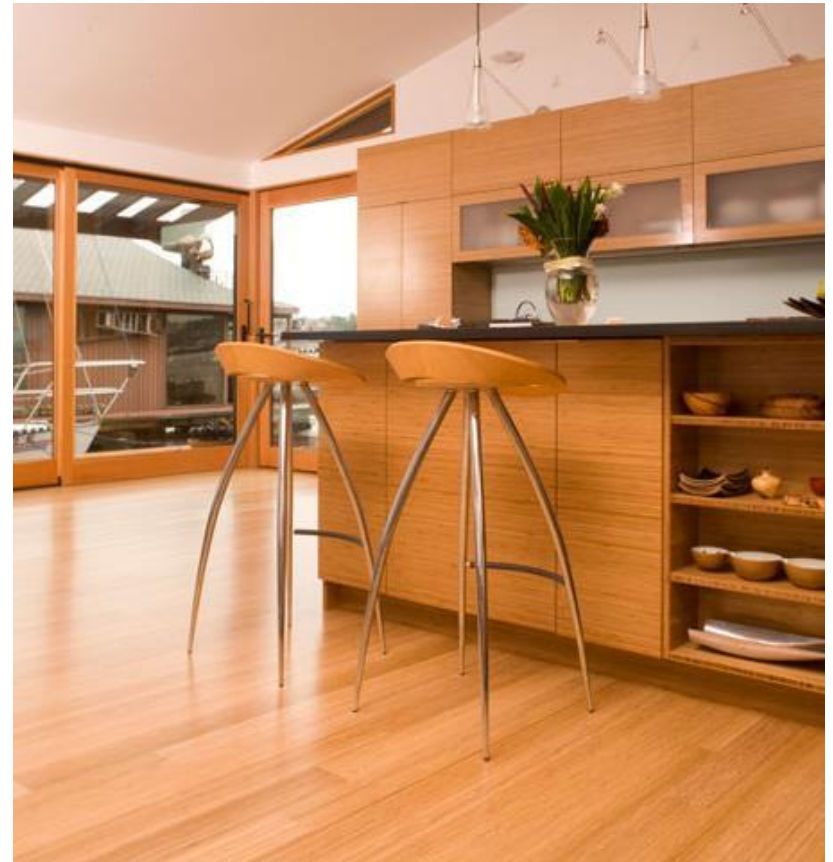
- Responsibly managed forests
- Renewable, recyclable
- Only bark is harvested
- Tree remains intact
- Live 200+ years
- 25 years = first harvest
- 9 years = each harvest
- Bark is regenerated
- Wood not damaged



Bamboo Sustainability



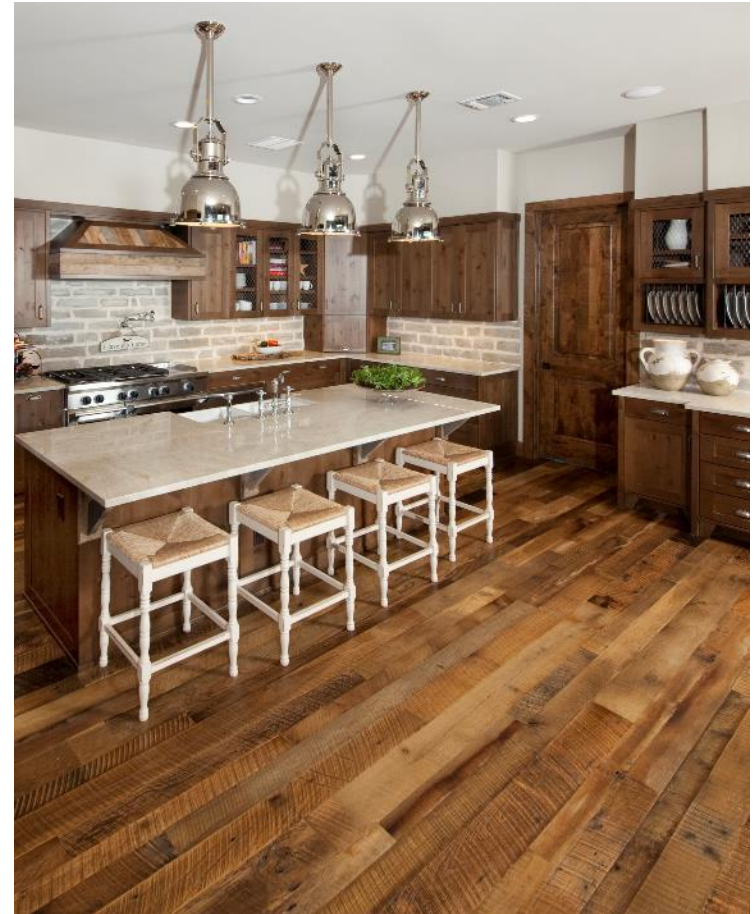
- Matures every 7-10 years
- Extensive root system
- Regrows without replanting
- Habitat not disturbed by harvest
- Requires no fertilizer, pesticides



Environmental Impacts



- Renewable flooring material
- Sustainably managed forests in North America
- Low environmental impact
 - Factory: forest naturally regenerates raw material
 - Sun: renewable energy source
- Carbon neutral
 - Produce oxygen during growth
 - Store carbon during service life
- Less water, energy used manufacturing
- End of service = fuel, recycled
- Last 100+ years
 - Less replacement, raw material



Indoor Air Quality



- Improves indoor air quality
- US EPA
 - Wood doesn't harbor allergens, microorganisms
 - Doesn't collect dust, animal dander, outdoor pollutants, etc.
- Low VOC colorants, finishes
- US formaldehyde laws
- Research your supplier



Maintenance



Routine Maintenance



- Sweep, dust mop
- Vacuum with beater bar off to remove dirt, grit between floor boards
- Avoid water, steam mops which can damage finish, wood



Preventive Maintenance



- Place breathable throw-rugs at entrances
- Put felt pads on furniture in contact with floor
- Avoid walking on floor with sport cleats, high heels in disrepair



Preventive Maintenance



- Elephant = 50-100 PSI
- 125-pound woman in high heels = 2,000 PSI
- An exposed high heel nail head = 8,000 PSI



Preventive Maintenance



- Clean spills immediately with damp cloth
- Allowing liquids to sit damages finish, wood

Preventive Maintenance

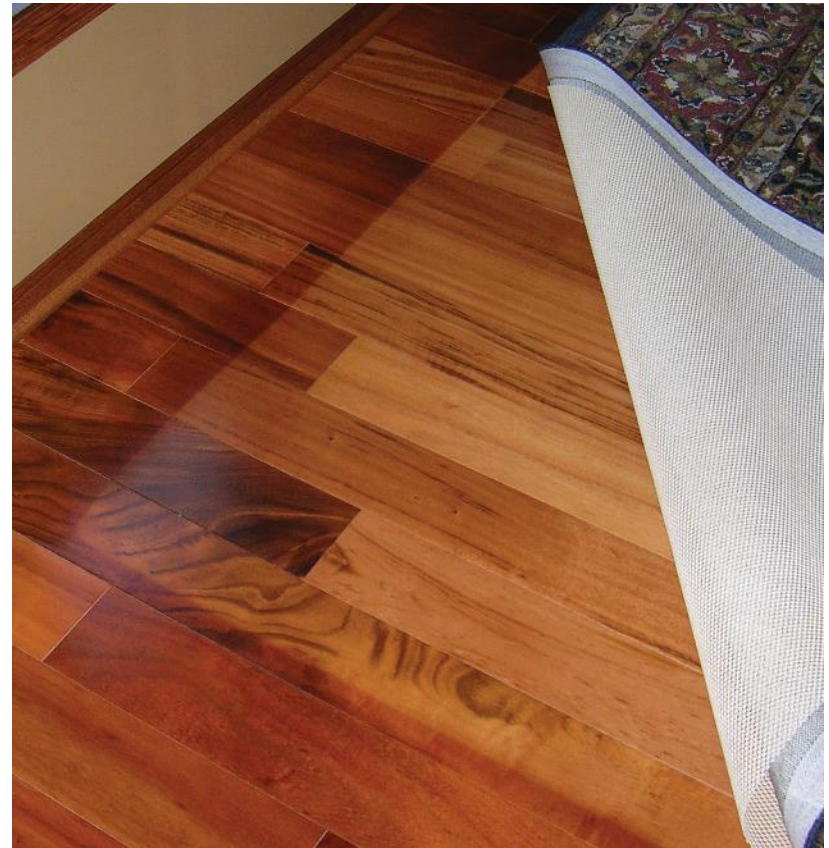


- Clean pet stains immediately
- Urine stains floor when left untreated
- Repair often requires board replacement
- Damage may reach subfloor, requiring replacement

Preventive Maintenance



- Sunlight affects wood floors like skin
- Oxidation, UV exposure
- Periodically move furniture, rugs to minimize exposure



Preventive Maintenance



- Never use household dust cleaners on wood floors
- Use manufacturer recommended cleaner for floor's
- If unsure, wood flooring professional can identify



Long-Term Maintenance



- Maintenance coat
 - Restores luster
 - Repairs small surface finish scratches
 - Lightly abrade surface finish
 - Apply new finish
 - Similar to repainting furniture
- Sand & refinish
 - Repair large scratches, dents
 - Repair exposed wood
 - Sand off finish, some wood
 - 1/32" wood removed
 - Apply new finish



- Hardwood, cork, bamboo classified as wood flooring
- Hardwood requires harvesting entire tree
- Cork requires harvesting bark only
- Bamboo is not wood; it is a grass
- Hardwood, cork, bamboo are sustainable materials, rapidly renewable, improve indoor air quality
- Routine care requires sweeping, vacuuming with the beater bar turned off
- Long-term care requires a maintenance coat, sanding, refinishing

Thank You

The logo for the Northwest Florida Area (nwfa) is located in the top right corner. It consists of the lowercase letters 'nwfa' in a white, sans-serif font, with a small green leaf icon integrated into the letter 'a'. The background of the top right corner of the slide features a photograph of a young child sitting on a couch and reading a book.

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A photograph of a bedroom interior. The floor is made of dark wood planks. On the left, a bed with a white and grey plaid sheet is visible. In the background, there is a dark nightstand with a lamp and a white curtain. The word "Questions?" is written in white text on the floor.

Questions?