

How to Choose Lumber for Woodworking {7 Simple Steps}

[Home/Posts/How to Choose Lumber for Woodworking {7 Simple Steps}](#)



When I got started in woodworking I was incredibly confused about choosing wood. In the above video, and in the article below, I share what I've learned about the basics of choosing lumber for woodworking. I want to save you time and head aches in trying to understand lumber!



The topic of lumber confused me mainly because I couldn't find a simple summary of the topic. I found a lot of complex discussions with different terms used by different "experts". I am by no stretch of the imagination a lumber expert, but I'm very good at simplifying complex topics so that everyone can understand. As a result, this is a simple practical guide to help you understand how wood moves, what wood to buy, how to buy it, and where to buy it.



After you learn the basics from this video and article I encourage you to look at the bottom of this article for a list of links, books, and DVDs that will expand your understanding beyond the scope of this article. But this book is the best resource I have found so far: [“Understanding Wood: A Craftsman’s Guide to Wood Technology” by R. Bruce Hoadley.](#)

So let’s get started with the 7 simple steps below!

1. CHOOSE HARDWOOD OR SOFTWOOD?



Question: For your woodworking projects, should you choose a hardwood lumber like Hard Maple or Lignum Vitae? Or softwood lumber like Southern Yellow Pine or Red Alder?

Answer: That depends entirely on what you are building.



Some projects even require a mix of both hardwoods *and* softwoods, like a violin or a workbench. For example, violin makers use a soft Spruce for the soundboard and a harder Maple for the back, sides (ribs) and neck.



Many craftsmen of the past built the bases of their workbenches with less-expensive pine (softwood) and the tops & vices with hardwoods like beech or maple. The base of the workbench wouldn't take a beating, so soft pine would work just fine. But the top of the workbench and the vice needed to be more durable.



Just use your brain to determine what type of wood you should use on different parts of your furniture.

BOOK: I have found this book to be an incredible guide to choosing different types of wood because it shows beautiful grain patterns & discusses woodworking uses for 400 different woods: "[Wood Identification & Use](#)" by Terry Porter.



JANKA WOOD HARDNESS TEST?

The lumber industry uses the “Janka hardness test” to test and rate common woods for hardness. The test involves pressing a steel ball to gauge how much pressure each wood species takes to push the ball half way into the wood. You can [download my free PDF of the Janka chart here](#). {If you can't open a PDF then install the free Adobe PDF Reader [here](#).}

2. CHOOSE DIMENSIONALLY STABLE WOOD WITH VERTICAL END GRAIN



Unless you're set on having a wildly figurative grain pattern on your furniture, you're probably going to want to choose the most stable wood possible; especially if you are building fine furniture or woodworking hand tools that need great stability (e.g. hand planes, straight edges, or try squares):



Yes, wood moves when it dries and also with the changes in seasons and location (temperature and humidity). Wood doesn't really get longer (thank goodness) but it does expand in width as humidity rises:



Even if you are using a beautiful (yet unstable) grain pattern on part of your furniture, it's a good idea to use stable wood on the other parts. For example, look at an old wooden door. The panels usually have more decorative (less stable) wood, but the rails and stiles (parts of the frame) are usually very stable straight grained wood (don't worry, I'll clarify "straight grain" below).

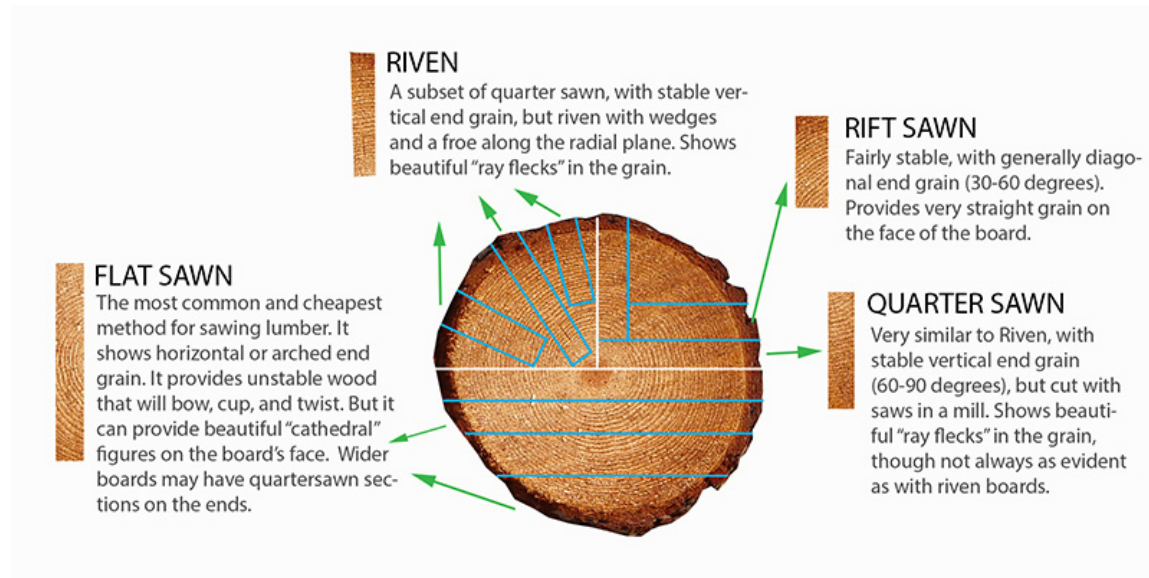


So the key is to find boards that will be as stable as possible during those changes in humidity. But how do you get wood that has stable "vertical grain"? This is the question that confused me for awhile. The answer is: It all depends on how the wood is milled from the tree. This is what I'll cover in step 3:

3. LEARN THE DIFFERENT WOOD MILLING CUTS



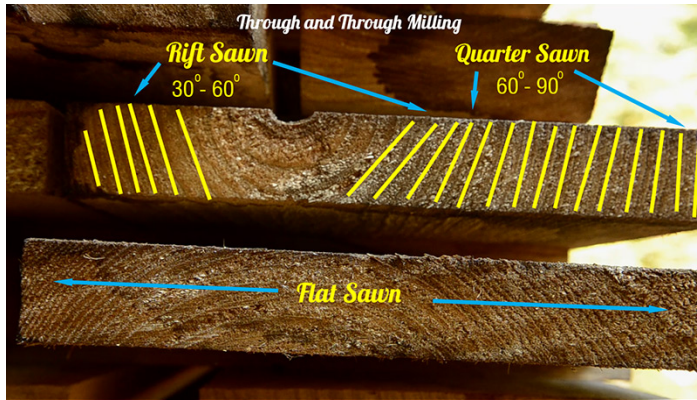
Looking at the board's end grain will tell you how a board was sawn from the log, and how stable it will be. In a minute I'll jump into each of these cuts in a little more detail, but this graphic illustrates how different cuts come from the log:



But mills rarely cut up a board like the graphic above. "Through and through" is the most common method that lumber mills employ when milling lumber. It's simply like slicing horizontal layers along the length of the log:



You've probably seen someone do the same thing with a chainsaw mill at home. Bill Anderson shared some valuable insights with me regarding lumber cut with the "through and through" method: *"Depending on where in the log the boards come from, they will be either flat, rift or quartersawn, or show a transition between these cuts across the width of the board."*



Take special notice, in the above graphic, how stable wood can extract from a wider board.

Lumber sellers don't always label the cut of their boards, so don't hesitate to carry a sharp block plane to the lumber yard to uncover the end grain:



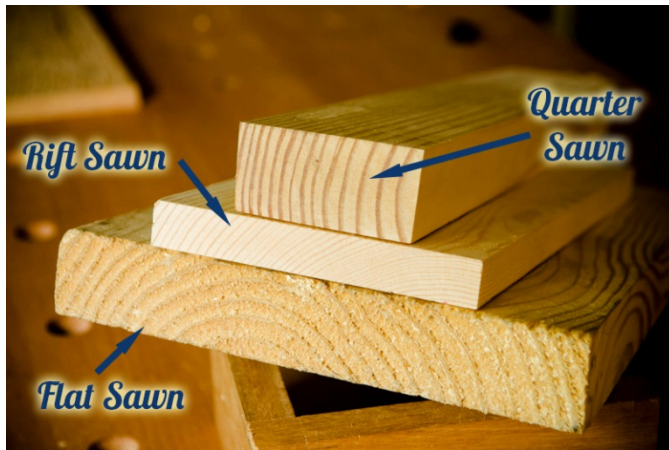
You'll often need to remove the mill marks and the [colored wood end grain sealer](#) to see the end grain.



You should definitely dig through the boards and use your knowledge from this article to select the best you can find. You can also find good "vertical grain" as part of a larger flat sawn board, and just cut it off both edges (leaving the center for fire wood):



Here is what the different main lumber cut types look like after they're cut off of a flat sawn board:



Let's discuss each of them in a tiny bit more detail:

A. FLAT SAWN / PLAIN SAWN (LEAST STABLE)



Most consumer-grade boards are flat sawn, and often display a “cathedral” pattern on the board face:



Lumber companies want to maximize their profits by getting as many boards out of a log as possible. You can definitely use flat sawn boards in your projects, but just realize that the wood will move over time, and may cup or twist and separate your wood joints. Although some joints can be arranged to better accommodate the movement (see [part 1/15 of my dovetail tutorial](#)...skip to 1:41) it's better to start out with wood that isn't going to move as much. In section 4 below you'll see some problems that are common to flat sawn boards (like twist, cupping, bowing, etc.).



If the flat sawn boards have already moved out of square, then you'll have to spend some considerable time flattening & straightening the board right before you use it. So it's best to stick with a more stable cut of lumber, like quartersawn lumber. Or at least keep your flat sawn boards stacked (until the last possible moment) with “stickers” between them and weights on top to prevent movement, then secure them with good joinery or fasteners (e.g. nails) when building furniture.

B. QUARTERSAWN LUMBER (VERY STABLE)



Quartersawn wood is very stable, and less susceptible to movement. The 60-90 degree vertical grain qualifies a board as “quartersawn” within the lumber industry. See how the end grain is running nearly up-and-down? That is called “vertical grain”. Quartersawing also produces fairly straight face grain and usually very beautiful ray flecks (for example, see the flecks on the beech wood above).



But since quartersawing requires more effort and wastes more wood, it is naturally more expensive. But you don't have to run out to your local mill and ask for the quartersawn boards. As mentioned in the last section, quartersawn wood can be cut off the edges wide flatsawn boards. Yes, even from construction lumber!



To produce 12" wide construction lumber (2×12 pine boards), lumber companies have to use the center of the tree. So naturally quartersawn & riftsawn lumber will be on the edges, and just needs to be cut off. This is how Roy Underhill gets nice quartersawn yellow pine at low prices from big box stores like Lowes & Home Depot. He taught me this when I was helping him rip a wide piece of construction lumber for his school teacher's desk tv program ([watch the episode](#)).



Notice how the above 2×12 construction-grade flat sawn board actually has some very stable quartersawn wood on both sides of the wide board? Here's what it looks like after I cut it off with a rip saw and use handplanes to square it up:



C. RIFTSAWN LUMBER (MORE STABLE)



The riftsawn section of a board is similar to quartersawn cuts, but its endgrain is between 30-60 degrees to the face. Riftsawn boards have a characteristically straight face grain pattern. These boards are also pretty stable and can be utilized if your furniture project calls for extremely straight face grain, like modern or Japanese-style projects.

D. RIVEN LUMBER (MOST STABLE)



The most stable boards are “riven” or “rived” directly from a log by you, exploiting the weakness of the grain (like splitting firewood). Riven boards are a subset of quartersawn because they are also split along the radial plane of the log, producing grain lines that are square to the board face and straight down the board.

These boards are not only the most stable, but they can also be some of the most beautiful with maximum “fleck”:



So why do you not hear about this type of lumber very often? Because wood mills and lumber yards don't have it. Their boards are cut with large powerful saws. Riven boards require muscle power and hand tools like a large crosscut saw (or chain saw), wedges, mallets, a froe, an adze, a hewing hatchet & handplanes.



I'll share a riving video tutorial at a later date. But in the meantime, Peter Follansbee shows how to rive your own red oak from logs, as part of his helpful DVD video: “17th Century Joined Chest.”



Here is a very helpful animation (from a professional miller) that clarifies the quartersawn & riftsawn process:

4. LUMBER DEFECTS TO AVOID



Since I do most of my woodworking with antique hand tools, I like my boards to be as easy to work as possible. Wood defects can be even tougher to work with for a hand tool woodworker like me. Some wood defects can be resolved with saws, handplanes, and even epoxy. But if I'm paying for wood I like to find boards that require as little work as possible. So look out for some of these problems:

KNOTS



Knots can cause problems for hand tool woodworkers, especially when passing your handplane over the top. And knots like to fall out over time. Yes, you can mix epoxy and sawdust to solidify the knot, but most of the time I avoid them all together. But you may like the look of them in a rustic piece of furniture. Just be aware.

SAPWOOD & INSECT HOLES

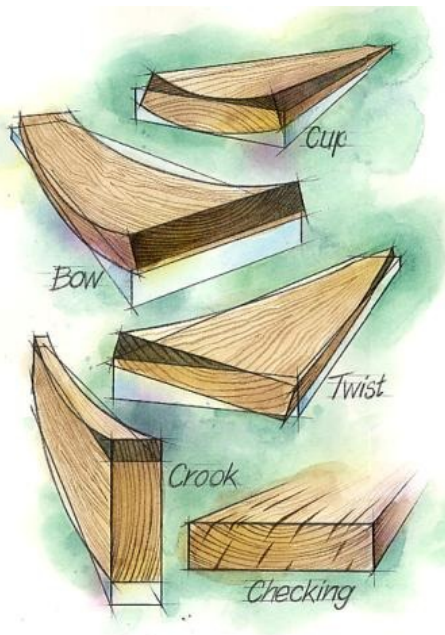


Some people like the rustic look of sapwood & insect holes. But I don't. I avoid it, or cut around it. In the photo below you'll see two boards glued together. The reddish wood is the heart wood. It would be on the inside of the tree. It was dead long before the tree was cut down, so the insects didn't eat it. The sap wood is the white wood with worm insect holes. Insects continue to eat at the sapwood long after the tree is cut down. So I prefer to avoid or remove the sapwood.



WOOD MOVEMENT DEFECTS:

When lumber isn't stacked, sealed, and dried properly it is prone to move in all sorts of strange ways:



CHECKING



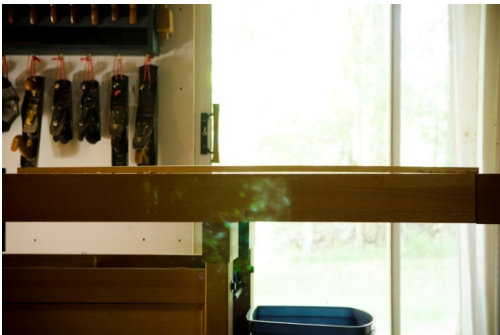
Checking happens when a board dries too quickly or unevenly. The cracks move along the board. So it's best to avoid these boards. If you are cutting your own lumber from a tree, checking can often be prevented by using a good quality [wood end grain sealer](#) (like I mentioned above)...the red stuff painted on the ends of boards in many of the above & below photos. Lumber should also be stacked with "stickers" or spacers of even thickness, with weights on top.

TWIST & CUPPING



When green (wet) boards aren't properly stacked they will cup or twist. Cupping is when the board turns into a cup shape (see above). Twisting is when board ends twist different ways. It takes a lot of work to plane out the twisting or cupping. I don't always turn down free wood that is twisted or cupped, but I won't buy it.

BOWING



Bowed boards are like a bow that you shoot arrows with (see above). To me, this defect is a bit harder to correct for than twisting or cupping. So I avoid these boards...unless they're free (like the above lacewood board was).

CROOK

Crook is similar to bow, but the wood arcs the other way. This is an easier defect to fix because it only involves jointing the board's edges...which I do anyway.

5. LEARN WHERE TO BUY LUMBER



LUMBER FROM LOCAL MILLS OR HARDWOOD DEALERS

For nice hardwoods I like to visit small local wood mills. If I can't find what I'm looking for there, I expand my search to regional "Hardwood" dealers. You'll save money and get better quality wood through local mills and dealers. Some of them even carry a few exotic hardwoods. These companies specialize in furniture grade wood, whereas woodworking supply stores & hardware stores do not.



However, even though some woodworkers warn to "stay away from the big box stores" (e.g. Lowes & Home Depot) there is a place for big box stores. While they don't carry nice hard woods, as mentioned above, you can sift through to find nice wide yellow pine construction boards, from which you can rip out quartersawn boards. These stores also carry nice pre-dimensioned poplar. This is great for people that don't have the skill or time to dimension all their own boards. Bill Anderson and I have been in Lowes to find 1/4" poplar for my tool chest's trays & tills.



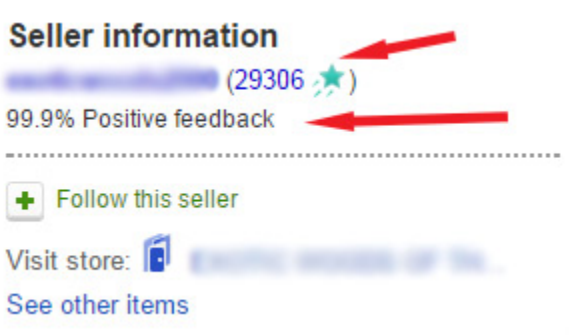
LUMBER FROM WOODWORKING HOBBY STORES

If you live in a larger city, then you may be close to a woodworking supply store, like Woodcraft. Their specialty is selling tools & woodworking supplies, but they usually carry small quantities of hardwoods. They also carry a good selection of small blanks for wood turners. Lumber can be expensive at these types of stores because they don't deal with large volume. But if you live in the city, then this may be your least expensive option.

ONLINE / MAIL ORDER LUMBER

Because I have a lot of lumber near me, mail ordering (or online ordering) lumber is foreign to me. Heck, my neighbors see me dragging fallen oak, beech, and poplar logs from the woods behind my house and riving boards out of them! However, even though I can't touch the wood beforehand, I'm planning on experimenting with online lumber sellers soon. Here's my upcoming experiment ([subscribe to my free articles](#) if you want to be notified of this experiment):

I first plan to order some small quantities of exotic hardwood from a few different [higher rated eBay lumber sellers like these](#) because of eBay's money-back guarantee. I'll be careful to choose eBay lumber sellers who have a high number of sales and a high positive feedback percentage:



I've ordered a lot of tools on eBay and have seen that highly rated eBay sellers usually bend over backwards to keep their high rating.

When I receive the lumber I'll inspect it to see how closely it matches the photos and descriptions, and look at the quality. I'll let you know how it goes!

In addition to eBay, here are some online lumber sellers that are reported (by other woodworkers) to have a good reputation:

- [Bell Forest Products](#)
- [Steve Wall Lumber, Co](#)
- [Constantine's Wood Center](#)
- [Hardwood Board Source](#)
- [Hardwood Store](#)
- [Northwest Timber](#)
- [Hartzell Wood Stock](#)
- [West Penn Hardwoods](#)
- [Groff and Groff Lumber](#)
- [Hearne Hardwoods](#)
- [Gilmer Wood Company](#)
- [Woodworkers Source](#)
- [L.L. Johnson Lumber Mfg. Co.](#)
- [Exotic Lumber Inc.](#)
- [Downes & Reader Hardwood, Co.](#)
- [Foster Lumber Yards](#)
- [Ganahl Lumber Company](#)
- [Jones Lumber Company](#)
- [Bristol Valley Hardwoods](#)
- [Highland Hardwoods](#)

6. LEARN THE LANGUAGE OF THE MILL & LUMBERYARD

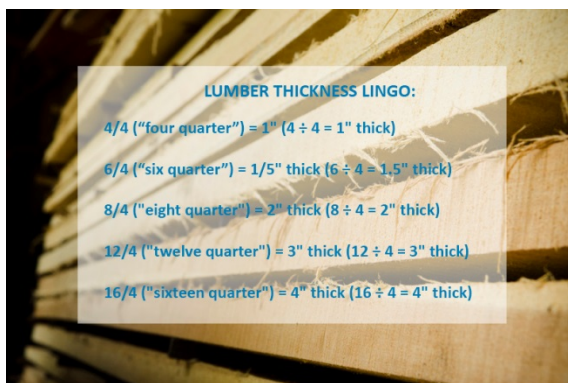


Most beginner woodworkers don't know what to look for when they visit a mill, a lumber yard, or an online lumber store. After reading the above advice, you should now understand how to identify great stable wood. But how do you avoid looking like a moron when you go to buy wood?

LEARN ABOUT BOARD THICKNESS



The first consideration to keep you from feeling stupid at the lumberyard is to understand that lumber people speak of wood thicknesses in "quarters". For example, in the United States:



LEARN HOW TO CALCULATE "BOARD FEET"

Take your tape measure and calculator to the lumber mill because in the United States most lumber suppliers calculate the price of their wood using a very simple "board foot" volume calculation:

$$\text{Board Feet} = \frac{\text{Thickness (inches)} \times \text{Width (inches)} \times \text{Length (inches)}}{144}$$

When I go to the lumber yard I like to take a small tape measure, like [this pocket-sized Stanley 12' tape measure](#) (longest you'll need for a board), but you can use most any tape measure.

MOISTURE METERS



It's a good practice to also carry a lumber moisture meter with you when you buy rough lumber. [This link](#) shows some highly rated, yet affordable moisture meters. I purchased this [General Tools moisture meter](#) and really like it. I think it was around \$25-\$30.



Below I'll discuss the debate about moisture level and acclimating lumber to your workshop.

7. ACCLIMATE YOUR LUMBER TO YOUR SHOP



THE WOOD ACCLIMATION DEBATE

I always believed that lumber moisture needed to be under 10% for building furniture. However, in [this *Popular Woodworking Magazine* discussion](#) Glen Huey said that if your moisture meter registers 22% or lower, then you should buy the hardwood and there won't be much need for acclimating the wood to your workshop's humidity level before shaping the wood.



He experimented to come up with this claim. I'm sure this claim will make many woodworker's blood boil, but it's nice to know that I don't have to be quite as concerned as I once thought.



If your lumber isn't as dry as you would like (over 22% in Glen Huey's opinion...probably over 10-15% in my opinion), then it's a good idea to let it acclimate to your workshop, or a room that's similar to the furniture's final resting place (a room, not the land fill). It's a good idea to use "stickers" between your lumber (even if it's plenty dry) to keep the boards flat. The stickers (thin sticks) should have a uniform thickness. This is one of the few times that I use plywood because of its uniform thickness. I just cut a sheet into a bunch of small strips.

Phew!

Well I hope this wasn't too confusing. But believe me, this is definitely more simple than the hours that I had to study to understand this stuff