BASICS They're easy to learn if you follow the grain

Here are some other terms you'll run across:

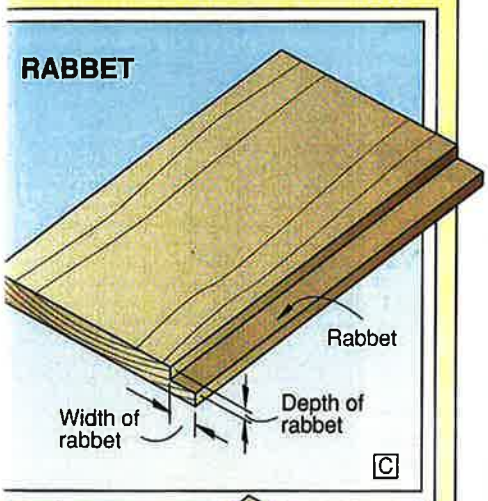
Dado: A flat-bottomed channel that runs across the grain, open from edge to edge, as shown in drawing B.

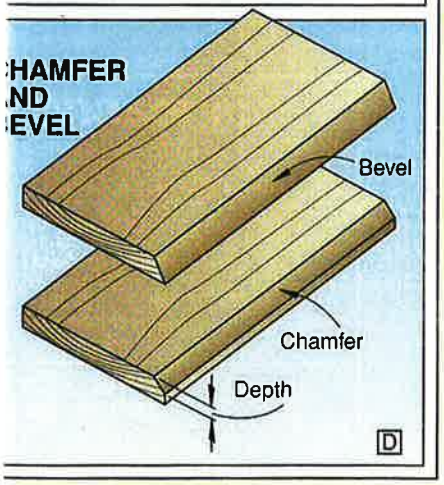
Groove: A similar channel running with the grain. Stock with a groove in it is sometimes called *plowed* or *ploughed* stock.

Rabbet: A channel along an edge or end of a piece of stock, shown in drawing C.

Bevel: An angled cut across an entire edge, end, or face, shown in drawing D.

Chamfer: An angle cut on a portion of an edge, end, or face.



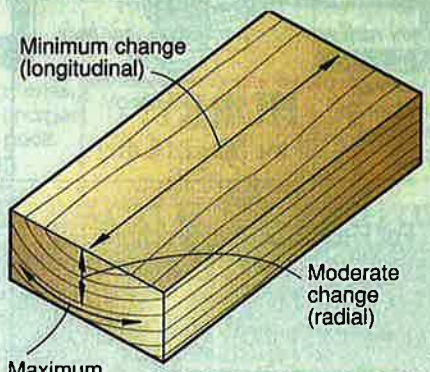


Warps and size changes

As humidity changes, so does the size of a piece of wood. Exposed to high humidity, wood swells, only to shrink when the humidity decreases. This movement, which varies in degree among species, also relates to grain.

Only the slightest dimensional change occurs with the grain, or lengthwise. But thickness and width can vary considerably. Going from green to oven-dry (a testing standard, not to be confused with kiln dry), some woods shrink by almost 13 percent in width, or more than ¾" on 6"-wide stock. Since you'll ordinarily build projects from dried stock, you won't experience such extreme variations. Also, wood once dried doesn't expand to that degree when exposed to normal humidity changes.

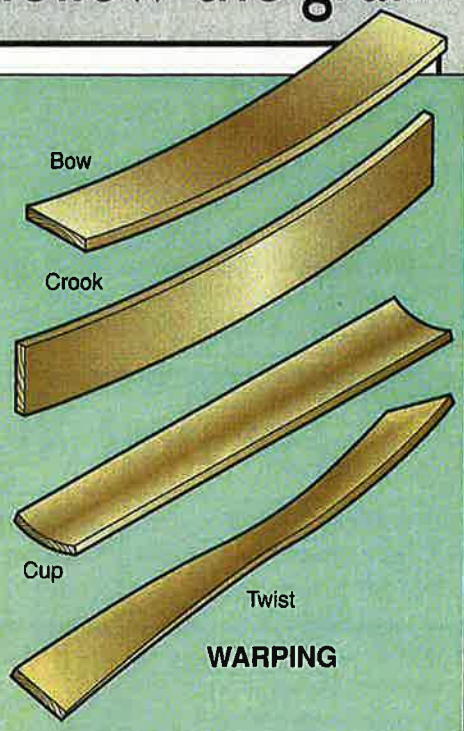
A look at the end grain will give you some clues as to how a piece of wood will react to humidity. Movement will be greatest in the direction of the stripes or arcs, or *tangential* to them, shown *below*.



WOOD EXPANSION AND CONTRACTION

Radial growth and shrinkage—across the arcs—will be less, probably in the range of 40-80 percent of the tangential value, depending on the species.

This uneven shrinkage can set up stresses in a piece of wood, causing it to warp. Here and shown *above* are four common warps you'll encounter:



WARPING

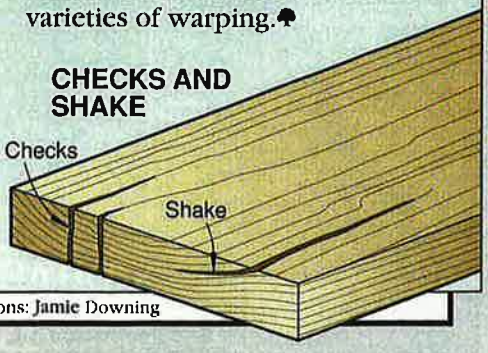
Bow: A curve from end to end, resulting in a board that rocks from end to end on one face.

Crook: An edge curvature from end to end, resulting in a board that rocks on one edge.

Cup: Edge-to-edge curvature, resulting in a board that rocks from side to side on one face.

Twist: A warp that lifts one corner, resulting in a board with ends that aren't parallel.

Checks (cracks across growth rings) and *shakes* (cracks between growth rings), shown *below*, often accompany warping, too. And, of course, if things are going really badly, you could find a board that combines two or more varieties of warping.



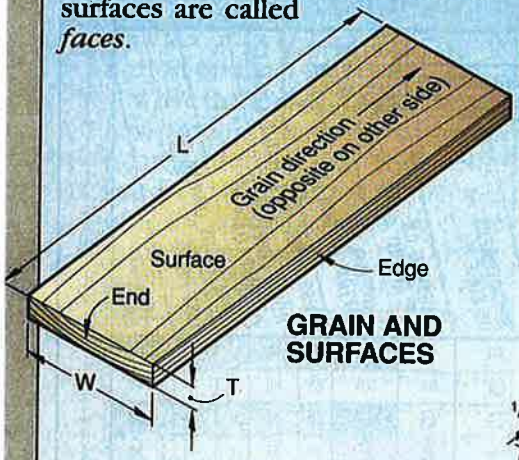
Illustrations: Jamie Downing

What woodworkers need to know BOARD

When is a groove a dado? What's the difference between ripping and resawing? And why would anyone give dimensions as ½×4×2" when it sounds so much more correct to say ½×2×4"? The answers to these and other woodworking questions depend on one thing—which way the grain runs.

Let the grain guide you

When you start talking about grain, you have to think about the log the stock comes from. The concentric growth rings visible on the ends of the log form those stripes—often arc-shaped—that you see on the ends of a board. This distinctive *end grain* provides a convenient reference point for identifying the six planes on a board, shown *below*. When thickness equals width, all four surfaces are called *faces*.



GRAIN AND SURFACES

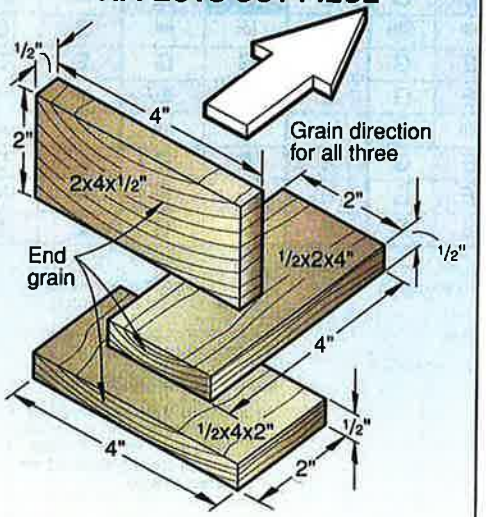
As simple as *edge*, *surface*, and *end* seem, confusion arises because these planes on the stock may not correspond to directional terms for the part. For instance, on a box with the grain running horizontally, references to the front and back edges of an end piece will indicate the ends of your stock. So, be sure you're clear whether directionals and terms such as edge or end refer to the stock or the project part.

Keep dimensions in order

Measurements can lead to confusion, too. Wood dimensions are customarily given in a specific order—thickness, width, and length (T×W×L). Thickness is normally the smallest dimension on the end of the board; width, the measurement *across* the grain; and length, the measurement *along* or *with* the grain, as shown in the drawing *left*.

If you swap given dimensions when you cut a piece for a project, the part will fit, but it might not look right. Rearranging dimensions also could affect the strength or durability of a project. The illustration *below* shows three ways a piece could be cut simply by changing the order of the dimensions.

HOW DIMENSION ORDER AFFECTS CUT PIECE



A glossary of cuts

To cut stock to size, woodworkers rely on three basic sawing operations, all defined in relation to grain direction. The sizing cuts, shown in drawing A, are:

Crosscutting: Sawing across the grain to reduce a board's length. (Also called *trimming*.) A crosscut at an angle other than 90° to the board's edge is a *miter cut*.

Ripping: Sawing in the grain direction to reduce a board's width. A surface or face will rest on the saw table.

Resawing: Sawing in the grain direction to reduce thickness. An edge of the piece being resawn will rest on the saw table.