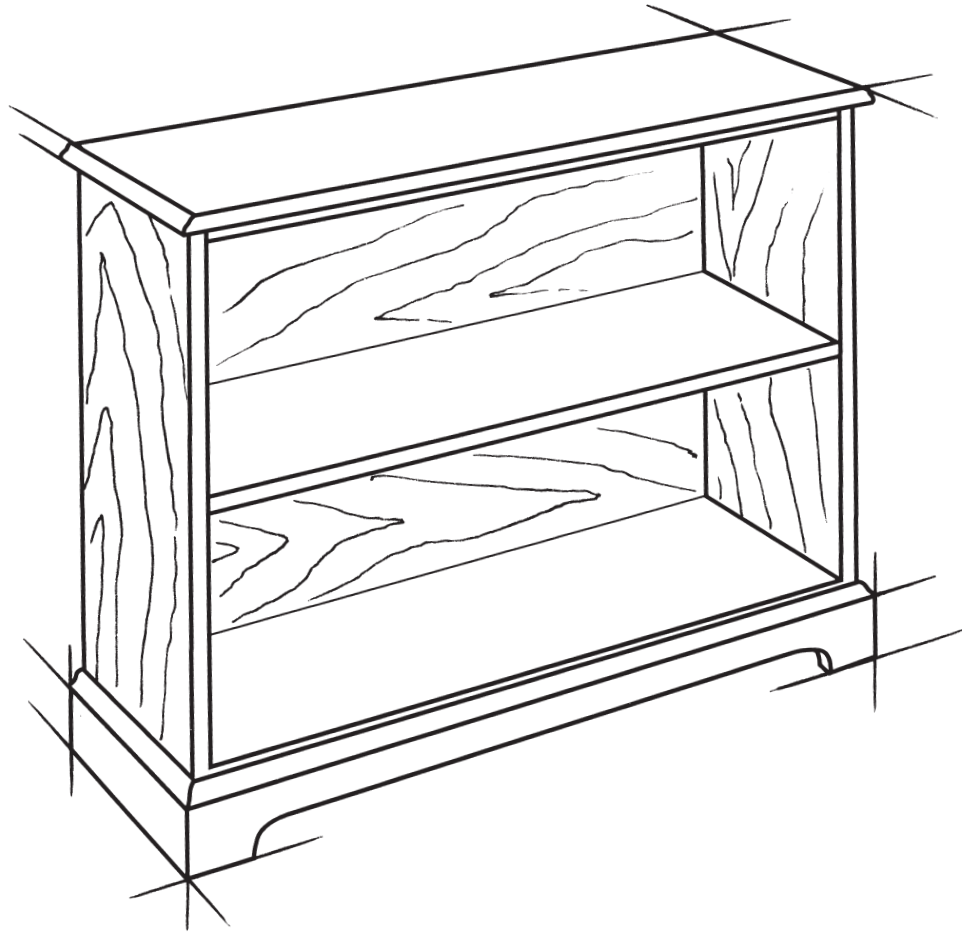




WOODWORKS: INTERMEDIATE PROJECT 2001-2002 TRADITIONAL BOOKCASE



Here's a project that's a lot easier than it may look and when completed provides a sturdy, great-looking place for your favorite books.

- It's simple to build because all the pieces are screwed together, and store-bought moldings artfully cover the screwheads. There are no dado or dowel joints.
- After studying the measured drawing, you can adjust the length, depth or height to suit your specific needs. You can also use a different wood besides the oak or pine recommended in this project.

This bookcase gives intermediate woodworking students the opportunity to learn a number of important, basic skills, including measuring, cutting, marking, drilling, gluing, clamping and mitering. And after you build the bookcase, you'll learn how to apply stains and finishes to protect the wood and keep it looking beautiful.

TOOLS REQUIRED

Hand tools

- Small crosscut saw
- Block plane
- Pipe or bar clamps at least 4' long
- Combination square
- Carpenter's square
- Screwdriver
- Nail set

Power tools

- Table or radial arm saw
- Router
- Belt sander
- Saber saw
- Electric drill
- Power screwdriver or screwdriver bits for drill

Miscellaneous

- Pencil
- Carpenter's glue
- Safety glasses
- Utility knife

SHOPPING LIST

Item	Quantity
3/4" x 4' x 8' oak- or pine-veneer plywood	1 sht.
1/4" x 4' x 4' oak- or pine-veneer plywood	1 pc.
4/4 oak or pine lumber	1 pc. 6" x 48", 1 pc. 4" x 48"
1/2" x 1/2" oak or pine cove molding	12 ft.
#6 x 2" drywall screws	12
#6 x 1-1/4" drywall screws	20
1" brads	40
1/4" brass shelf pins*	4

*Available at home centers and hardware stores or from Rockler Woodworking and Hardware, Dept. HW, 4365 Willow Dr., Medina, MN 55340; (800) 279-4441. Stock #30437.

CUTTING LIST

A	1	3/4" x 11-1/2" x 36" oak- or pine-veneer plywood (top)
B	2	3/4" x 11-3/8" x 27-1/4" oak- or pine-veneer plywood (sides)
C	3	3/4" x 11-1/8" x 34-1/2" oak- or pine-veneer plywood (top, bottom, shelf)
D	1	1/4" x 35-1/2" x 24-1/4" oak- or pine-veneer plywood (back)
E	1	3/4" x 3" x 37-1/2" oak or pine (base front)
F	2	3/4" x 3" x 12-1/4" oak or pine (base sides)
G	1	3/4" x 2" x 34-1/2" oak or pine (edging strips)
H	1	3/4" x 3/4" x 37-1/2" oak or pine (top front edging)
J	1	3/4" x 3/4" x 34-1/2" oak or pine (base cleat)
K	2	3/4" x 3/4" x 12-1/4" oak or pine (top side edging)

WOOD FINISHING PRODUCTS

(Choose the recommended stain/finish or create your own combination)

Recommended Finish

- Prep: Minwax® Pre-Stain Water-Based Wood Conditioner
- Stain: Minwax® Water-Based Wood Stain Rosewood (or a Minwax® Water-Based Custom Mixed Stain chosen from more than 60 colors)
- Finish: Minwax® Polycrylic® Protective Finish Semi-Gloss

Alternate Finishes

- Minwax® Wood Conditioner (if using pine)
- Minwax® Gel Stain Mahogany (or any of the seven other wood-tone colors)
- Minwax® Fast-Drying Polyurethane
- Or, a one-step finish: Minwax® Polyshades® Pecan (or any of the eight other wood-tone colors)

Miscellaneous

- Sandpaper
- Gloves
- Clean, lint-free rags
- Mineral spirits (for oil-based finishes)
- Minwax® Wood Putty
- Minwax® Finishing Brushes
- Water-filled metal container with tight-fitting lid

BEFORE YOU BEGIN

Good craftsmanship begins and ends with good work habits, so make the following steps part of your routine workshop practice. If you have any doubts or questions about how to proceed with a project, always discuss them with your shop instructor:

- Carefully and fully review plans and instructions before putting a tool to the project lumber.
- Work sensibly and safely. Wear safety goggles when doing work that creates flying chips and sawdust; wear the appropriate mask or respirator whenever making sawdust or working with thinners or other solvents.
- At the end of every work session, clean up your shop area and put away all portable tools.

CUTTING AND ASSEMBLY PROCEDURE

Refer to the project illustration shown on page 6.

1. Cut the 3/4" plywood pieces (A, B and C) to the sizes given in the Cutting List.

Woodworker's Tips: Many people have trouble cutting hardwood plywood cleanly, especially across the grain. For this bookcase, you'll have to master this skill, because some of the cuts will show on the finished piece. Here are a few tricks:

- Be aware of which side of your plywood is the good side, and keep it facing up while cutting on the table saw.
- Adjust your saw so the fence is exactly parallel to the blade, and the miter gauge slots are exactly perpendicular to it. If not, the blade will tear up fibers where it touches the wood behind the cut.
- For the smoothest cuts, use a 10" carbide-tipped saw blade with 60 to 100 teeth.
- If you're still not getting clean cuts, score the cutting line deeply with a sharp utility knife before you saw.

2. Cut the solid wood pieces (E, F, G, H, and K) a couple of inches longer than the dimensions given, so they can be trimmed to exact size later. Part J can be cut to the specified size now.

3. Rip part G into 1/8" strips for gluing to the front edge of pieces B and C. Your saw blade will be close to the fence, so use a push stick to guide the wood.

4. Glue the strips (G) to the front edges of pieces B and C using yellow carpenter's glue. After the glue is dry, cut or sand the strips so they're flush with the plywood. You can do this with a block plane or belt sander. If you use a sander, be careful not to cut or sand through the thin veneer of the plywood. If you've never tried this operation before, you may want to experiment on some scrap plywood first. When the strips are flush with the veneer, trim the ends with a small handsaw.

Woodworker's Tip: Use strips of masking tape as clamps for the edge strips. Tape is strong enough for this job and less cumbersome than bar clamps. Apply a tape strip about every 3-4".

5. Cut mitered ends on the 3/4" edging (H, K) that is used for the top (A). Cut the front piece (H) first, so that the miters are exactly flush with the corners of the plywood, then cut the side pieces (K). Clamp them to be sure they fit, then glue. The sides can be long in back and trimmed after the glue is dry. When the glue has dried, sand the edging flush with the plywood.

6. Cut the profile on the edge of the top with a router, using a 1/2" round-over bit with a pilot bearing.

7. Mark where the screws will go into the sides of the case, the top and the cleats. Drill the countersinks, then the clearance holes for the screws. Note that these holes are slightly off-center (about 1/16"), so the cove molding you add later will completely cover them.

Woodworker's Tip: Drilling first and countersinking second can result in a rough, chatter-marked hole, especially on oak plywood, which tears easily. Drill the countersink first, or use a combination drill/countersink bit.

8. Carefully lay out and then drill the shelf pin holes into the inside face of the sides (B).

Woodworker's Tip: A common mistake is to drill the shelf-pin holes inaccurately, resulting in a shelf that wobbles because it's not sitting on all four corners. To avoid this, mark out the holes very carefully; use an awl to prick the surface where you want the drill bit to start; and use a brad-point drill bit, which won't easily wander off the mark.

9. Cut the rabbets on the back edges of the sides (B). The easiest way to do this is with your table or radial arm saw, making two cuts and adjusting the fence after the first cut. Or, install a dado blade and set up the saw to make the rabbets in one pass.

10. Finish-sand all the pieces you've made so far. Start with 120-grit paper and finish with 220-grit.

Woodworker's Tip: It's a good idea to do as much of your sanding as you can before any pieces are assembled. That way, you eliminate having to sand inside corners. The same goes for finishing: If you can finish parts separately and then assemble them, do it. Remember, however, that glue won't stick to a finished surface, so don't put finish on the surfaces of glue joints.

11. Dry-clamp the pieces to be joined with screws and drill the pilot holes, using the countersunk clearance holes as your guide.

12. Screw the bookcase together. Start by screwing the top and bottom shelves (C) to the sides (B). Then screw the base cleat (J) to the bottom shelf (C). Next, screw the top (A) to the case.

13. Hold the base front piece (E) to the front of the bookcase and mark on its inside surface where the miters should be cut. Cut these miters, then cut the miters on the base sides (F).

Woodworker's Tip: Test your miter cuts on a couple of pieces of scrap (plywood works fine) before making the final cuts.

14. When the three base pieces (E and F) fit well, cut the curved opening at the bottom of the base front (E). Give all the base pieces a final sanding, then screw them onto the case. Use yellow carpenter's glue on the miter joints and other surfaces that meet. Trim the ends of the side pieces (F).

15. Mark the cove moldings for cutting the miter joints, and fit them on as you did with the edging and base pieces—the front first and then the sides. Drill pilot holes for the brads, not just into the cove molding, but into the bookcase as well. Nail on the molding, sink the nailheads

slightly with a nail set, push putty into the nail holes. When the glue is dry, trim the ends of the molding and sand them smooth.

16. Cut the back (D) to size and sand it, but don't nail it on until you've completed the finishing.

17. To prepare for finishing, slightly break all sharp edges on the bookcase with sandpaper.

STAINING AND FINISHING

Woodworker's Tip: *Though you may be tempted to cut short your sanding and wiping time, don't do it. Both of these tasks are very important steps in obtaining a high-quality finish.*

Remember, it is the finish, just as much as the fit and smoothness of the parts, that will have great bearing on how people judge your craftsmanship. To ensure an excellent result, follow the steps listed below and also the instructions the finish manufacturer puts on its products.

FINISHING TIPS

- Use scraps of wood to test the stains and finishes you are planning to use. On the back of the scrap, mark the stain/finish combination and the type of wood. Allow all samples to dry thoroughly before making your final finish selection. Save your samples for quick reference on future projects.
- All stains and finishes must be allowed to dry thoroughly between coats. Remember that drying times can vary due to humidity and other climate conditions.
- If you have some leftover stain or finish, wipe the can rim so that stain or finish in the rim won't dry out and prevent the lid from forming a tight seal.
- Brushes used for oil-based finishes must be cleaned with mineral spirits; for water-based products such as Minwax® Polycrylic® Protective Finish, clean brushes with warm water and soap.

1. For this bookcase, you have the option of finish-sanding and applying stain and finish to some pieces before they're assembled. Whenever you do the sanding, sand with the grain to remove any marks or scratches that may have occurred during assembly. Start with 150-grit paper and finish with 220-grit. Dust off the piece and wipe it carefully with a water-dampened rag.

2. Apply Minwax® Water-Based Pre-Stain Wood Conditioner following the directions on the label. After 5 minutes, wipe off all excess Conditioner using a clean, lint-free rag. Use 150-grit paper to sand off any "whiskers" raised by the Conditioner. Proceed to the staining within 2 hours.

3. Apply the Minwax® Water-Based Wood Stain you've chosen, using either a rag or a nylon/polyester brush. Allow stain to penetrate no longer than 3 minutes. While stain is still wet, wipe off all excess with a clean cloth that's been lightly dampened with stain. Allow the piece to dry for 2 hours before applying a second coat, if desired. Allow the piece to dry overnight before applying the clear finish.

Woodworker's Tip: *Minwax® Water-Based Wood Stain is available in six factory (wood-tone) colors, a White Wash Pickling Stain and 60 custom colors. This means that you are not limited to just wood colors (pine, oak, walnut, etc.). Instead, you can actually pick and apply a color to complement the décor of the*

room in which the bookcase will stand. For this reason, make sure you look over all of the Minwax® color charts before making your final selection.

4. Apply Minwax® Polycrylic® Protective Finish following the directions on the can. Stir the can contents thoroughly before starting and periodically repeat the stirring during your work session.

5. Working a small area at a time to maintain a wet edge, apply the first coat. Work quickly and finish each newly coated section using with-the-grain brushstrokes.

6. Allow the finish to dry a minimum of 2 hours. Then sand lightly with 220-grit sandpaper wrapped around a soft backup block.

Thoroughly dust off and wipe all surfaces with a water-dampened rag.

7. Repeat steps 4, 5 and 6 to apply the second coat.

8. Repeat these steps to apply a third and final coat of Polycrylic® Protective Finish. Allow the bookcase to rest for about a week before using it.

If you opt for an oil-based finish:

1. If using pine, apply Minwax® Pre-Stain Wood Conditioner, which evens out surfaces to be stained and assures that the wood will accept stain evenly (i.e., prevents blotching). Follow the directions on the label. After 15 minutes, wipe off all excess Conditioner using a clean, lint-free rag. Proceed to the staining within 2 hours.

2. Apply the Minwax® Gel Stain you've chosen, using a clean, lint-free rag. Allow the stain to set for about 10 to 15 minutes then wipe off any excess. Allow the stain to dry for 24 hours before applying the finish.

Woodworker's Tip: *When wiping off stain, make certain that your last wipe with the cloth goes with the grain of the wood. This way, any stain you might miss during wipe-off will be visually minimized by the wood grain.*

3. Apply Minwax® Fast-Drying Polyurethane following the directions on the can. To obtain the look of hand rubbing, use Satin finish. If more shine is desired, use Semi-Gloss or Gloss, and make sure you use a brush intended for use with Polyurethane. Allow the first coat to dry overnight.

4. The next day, sand all surfaces lightly with 220-grit paper using with-the-grain strokes. Dust off and wipe all surfaces with a rag dampened with mineral spirits. Apply a second coat of Polyurethane and set the piece aside to cure overnight.

5. The next day, sand all surfaces lightly with 220-grit paper. Dust off and wipe the piece with a rag dampened with mineral spirits and apply the third and final coat of Polyurethane. Allow the piece to cure for several days before using the bookcase.

If you opt for a one-step finish:

A one-step finish such as Minwax® Polychades® can speed up your finishing process. This product allows for staining and finishing in one step. When you have a project with multiple surfaces, this product requires less drying time. Two coats are recommended for maximum beauty and finish durability.

1. After sanding wood smooth, to the 150-grit stage, dust off and carefully wipe with a rag dampened with mineral spirits to remove all traces of dust.

2. For superior results, treat softwoods like pine with Minwax® Pre-Stain Wood Conditioner, which evens out surfaces to be stained and assures that the wood will accept stain evenly (i.e., prevents blotching).
3. Brush on the Wood Conditioner, wait 15 minutes, then wipe with a clean, lint-free rag to remove any excess remaining on any surface. Proceed to the next step within 2 hours.
4. Brush on a thin even coat of Polyshades®. As you work each section, make certain your final brushstroke is in a with-the-grain direction.
5. Once you begin the staining process, do not stop. It is especially important with this product that you maintain a wet edge at all times. You do not want to have visible brush or "lap" marks on your project.
6. Allow the finish to dry at least 8 hours or overnight, if possible.
7. The next day, rub the surface lightly with steel wool, taking care to keep the steel wool in the shape of a flat pad. If you press too hard you not only will cut through the finish, but you also run the risk of rubbing in very obvious finger marks. Dust off the piece and wipe carefully with a rag dampened with mineral spirits to remove every particle of dust or steel wool.
8. Apply a second, thin coat of Polyshades® as you did the first coat. Allow the finish to dry for several days before putting the piece into service.

PRODUCT SAFETY

For your safety and the safety of those you work with, always read the safety warnings, which manufacturers print on their labels, and follow them to the letter. Typical safety advice and instructions will contain information such as the following:

DANGER! MINERAL-BASED PRODUCTS ARE HARMFUL OR FATAL IF SWALLOWED. SKIN IRRITANT. COMBUSTIBLE. KEEP OUT OF REACH OF CHILDREN. DANGER: Contains mineral spirits. Harmful or fatal if swallowed. Do not take internally. Skin irritant. Avoid contact with skin and eyes. Wear rubber gloves and safety glasses when handling. Combustible. Do not use or store near heat, sparks, flame or other source of ignition. Close container after each use. Avoid inhalation and use only with adequate ventilation. If using indoors, open all windows and doors to make sure there is fresh air movement. If you experience light-headedness, dizziness or headaches, increase fresh air movement or leave the area. Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage. Intentional misuse by deliberately concentrating and inhaling the contents may be harmful or fatal.

FIRST AID: If swallowed: Do not induce vomiting. Call physician immediately.

FOR SKIN CONTACT: Wash thoroughly with soap and water. If irritation persists, get medical attention.

FOR EYE CONTACT: IMMEDIATELY flush eyes thoroughly with water, then remove any contact lenses. Continue to flush eyes with water for at least 15 minutes. If irritation persists, get medical attention.

IF AFFECTED BY INHALATION: Immediately move to fresh air. If symptoms persist, call physician.

When using Minwax® Polycrylic® Protective Finish:

VAPOR HARMFUL. Use only with adequate ventilation. To avoid overexposure, open windows and doors or use other means to ensure fresh air entry during application and drying. If you experience eye watering, headaches or dizziness, increase fresh air supply or wear NIOSH-

approved respiratory protection or leave the area. Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage.

DO NOT TAKE INTERNALLY.

FIRST AID. In case of eye contact, flush thoroughly with large amounts of water for 15 minutes and get medical attention. For skin contact, wash thoroughly with soap and water. In case of respiratory difficulty, provide fresh air and call physician. If swallowed, get medical attention immediately.

DELAYED EFFECTS FROM LONG-TERM OCCUPATIONAL OVEREXPOSURE.

Contains solvents that can cause permanent brain and nervous system damage. Intentional misuse by deliberately concentrating and inhaling the contents may be harmful or fatal.

SAFE DISPOSAL OF RAGS AND WASTE.

Please be mindful of the safe way to dispose of rags and other waste. Rags, steel wool and other waste products soaked with oil finishes or solvents may spontaneously catch fire if improperly discarded. Place rags, steel wool and other waste immediately after use in a water-filled metal container. Tightly seal and dispose of the waste materials in accordance with local trash removal regulations. Be sure to keep the waste out of reach of children.

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