

*A.C.E.
School of Tomorrow
Furniture Manual*

for Third World Countries

A.C.E. FURNITURE MANUAL

TABLE OF CONTENTS

	Page
Learning Center Layout	2
Wall Mounted with Chains — "A"	3
Wall Mounted with Legs — "B".	9
Free Standing ————— "C"	15
Free-standing Fold-up ————— "D"	21
Elevated Scoring Table ————— "E".	22
Scoring Table ————— "F".	24

This manual is a supplement to the Administration Manual and is intended as a guide to the carpenter in constructing offices and scoring stations for the Learning Center.

The style you choose will depend upon the particular facilities you have available as well as the need for using the facilities for other activities.

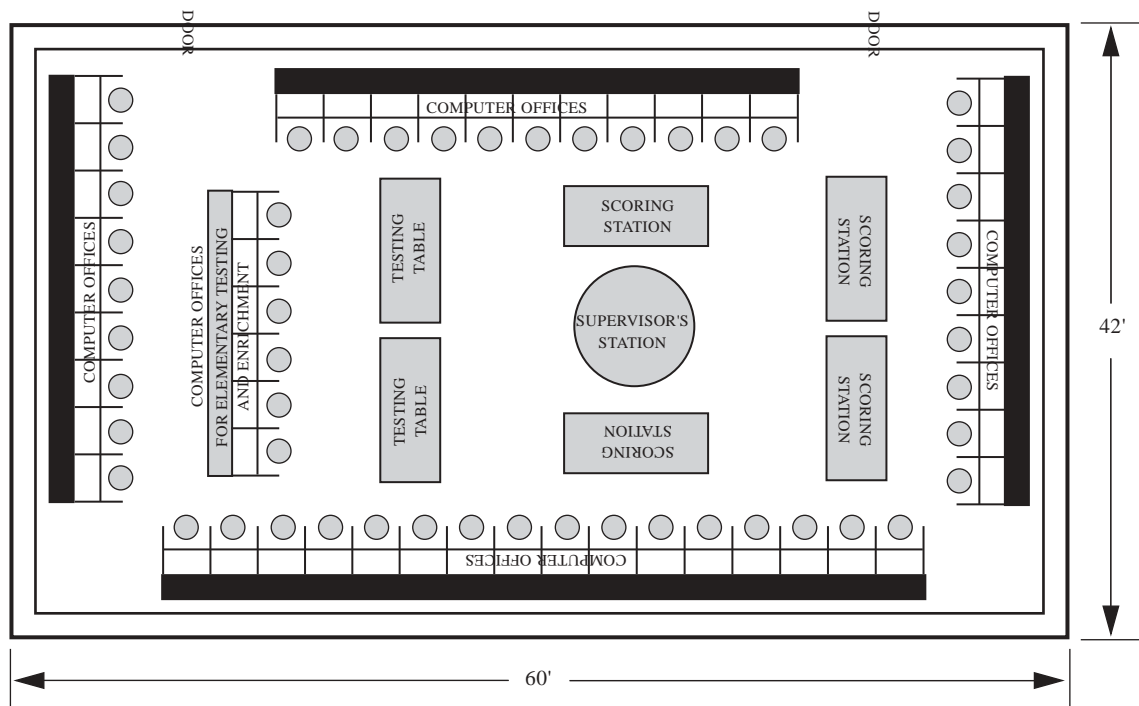
For some schools, it would be advisable to build two or more styles; i.e., wall mounted for the perimeter and portable free-standing for the middle of the floor area.

The care you exercise in the construction will be reflected in the quality of your Learning Center.

LEARNING CENTER LAYOUT

For maximum efficiency, you should use the largest room available and place all students who are Reading-to-Learn in one large, adequate room. For a Learning Center with fifty pupils, a minimum of 2,000-2,500 square feet is recommended.

Layout A (50 Students)



NOTE: Student offices should be placed against the wall around the perimeter of the classroom so that the student faces away from the center of the room. (Do not plan an arrangement where student offices are back to back. This will prove unsatisfactory.) If the room is large enough, a second row of offices can be placed a comfortable distance behind the students on the outside perimeter. Testing and scoring tables, supervisor's desk, resource books, and reading program are arranged in the center of the room for convenience and accessibility.

WALL MOUNTED WITH CHAINS

A

CHAIN-SUSPENDED STUDENT OFFICES

(One unit serves three students)

NOTE: 27 linear feet of 1x6 material of at least #2 grade is required for the following project. Prior to actually cutting parts, select layout of parts to utilize best material.

BILL OF MATERIAL

ITEM NUMBER	QUANTITY	
1	1	5/8" x 3-1/4" x 5-1/2" (to match width of 1x6) cut from excess particle board from dividers
2	2	1x6 x 15-1/4" (see detail)
3	1	1x6 x 96" (see detail)
4	1	1x6 x 96" (see detail)
5	2	1x6 x 16-3/4" (see detail)
6	1	1x6 x 96" (see detail)
7	1	1x6 x 96" (see detail)
8	1	1/2" plywood x 16" x 96"
9	3	1/2" Celotex (six pieces from 4' x 8' sheet)
10	3	5/8" particle board (see page 12, Figure 5)
11	1	1/8" Masonite x 16" x 96"

As required

Hinges - 4 cabinet butt hinges

Chain - #35 sash chain

Screws - #10 c/s, 1" and 2" long

Nails - finish nails 2" long

Wood Glue - all joints

2 - Screen Door Hooks and Eyes

4 - eye bolts and nuts

8 - washers

4 - eye screws

} for mounting chain

HAND TOOLS

Hammer

Saw

Framing Square

Chisel

Straight Edge or Chalk Line

POWER TOOLS

Skill Saw

Sabre Saw

Drill

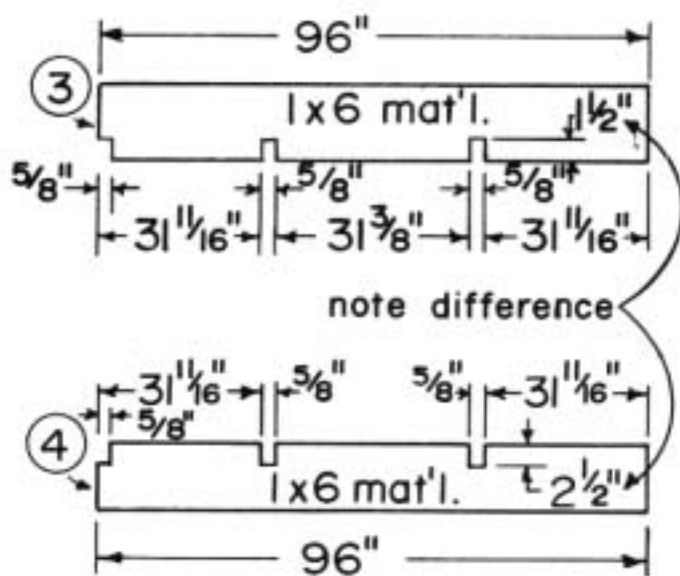
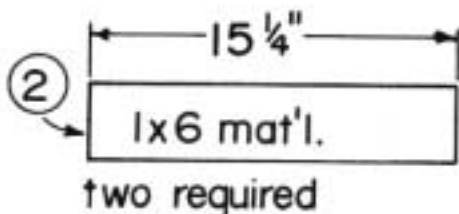
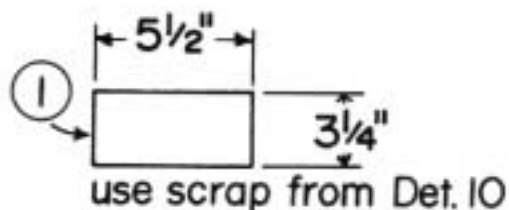
Screw Gun

Disk Sander

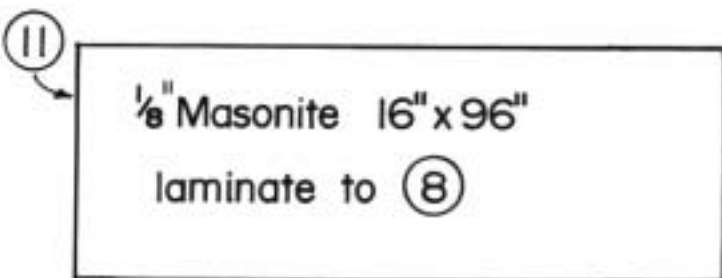
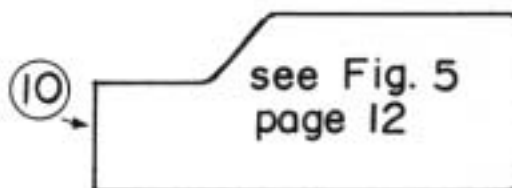
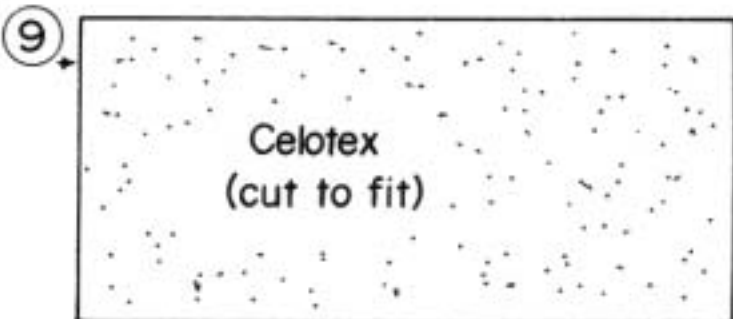
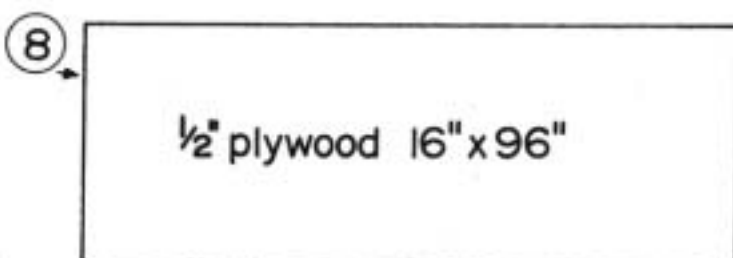
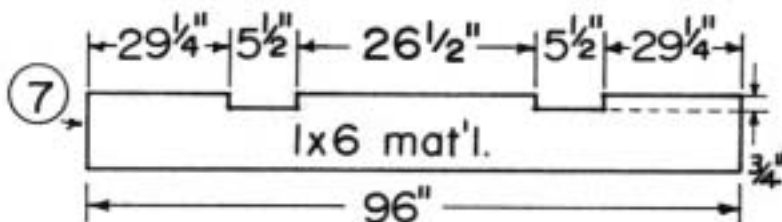
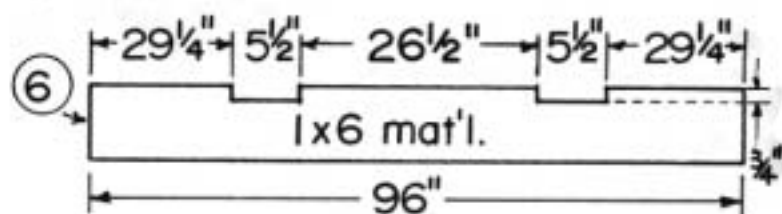
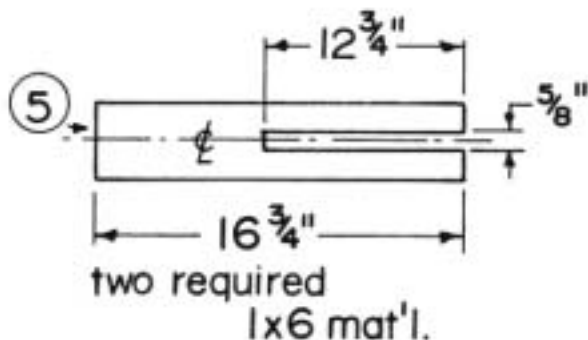
A table saw and radial arm saw will be advantageous and save a lot of time if available.

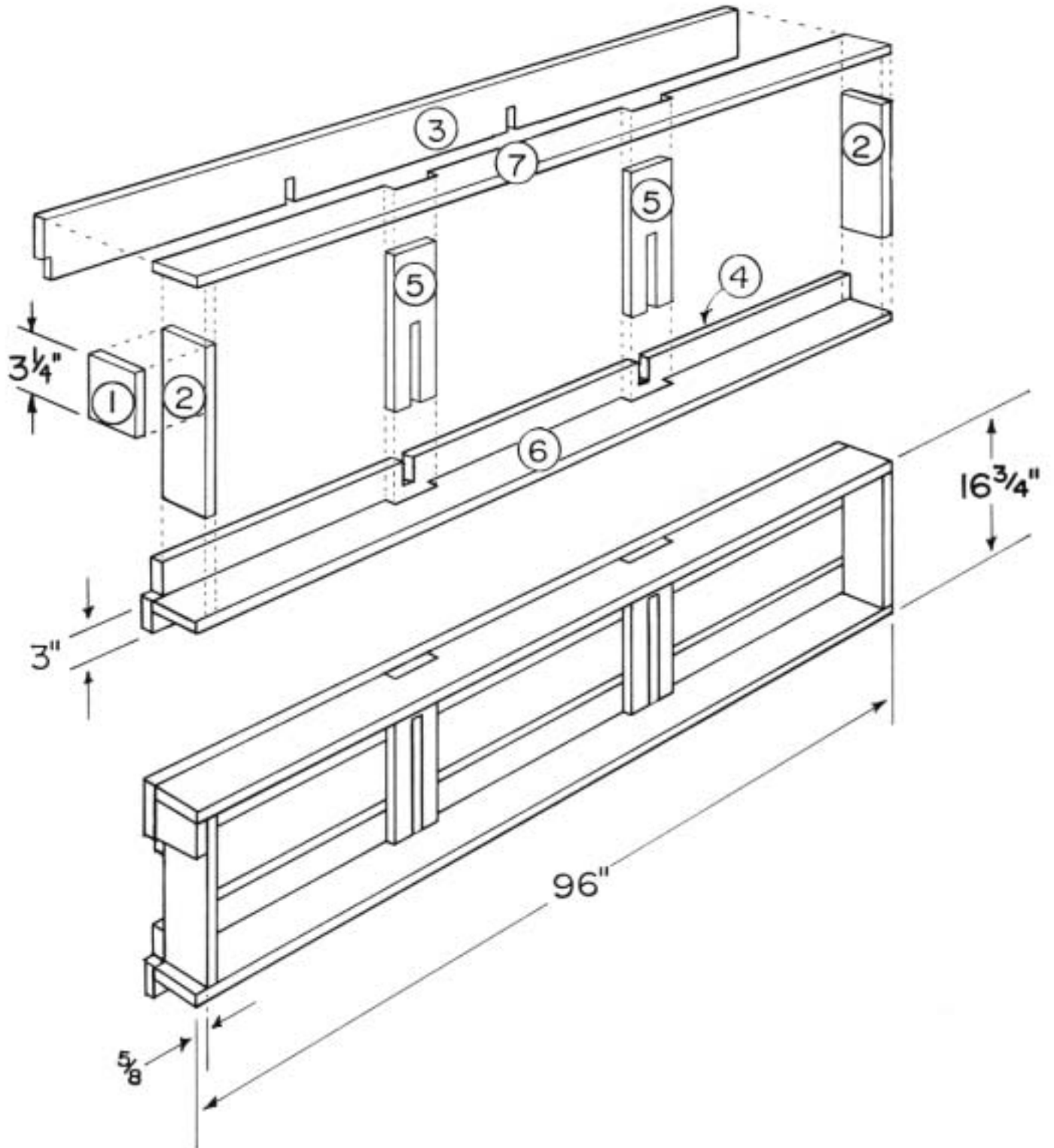
Read all assembly instructions before starting actual work on the offices.

Note: Most 1" x 6" material is actually 3/4" by 5-1/2". Please check your boards to be sure the 1" x 6" is actually 3/4" x 5-1/2".

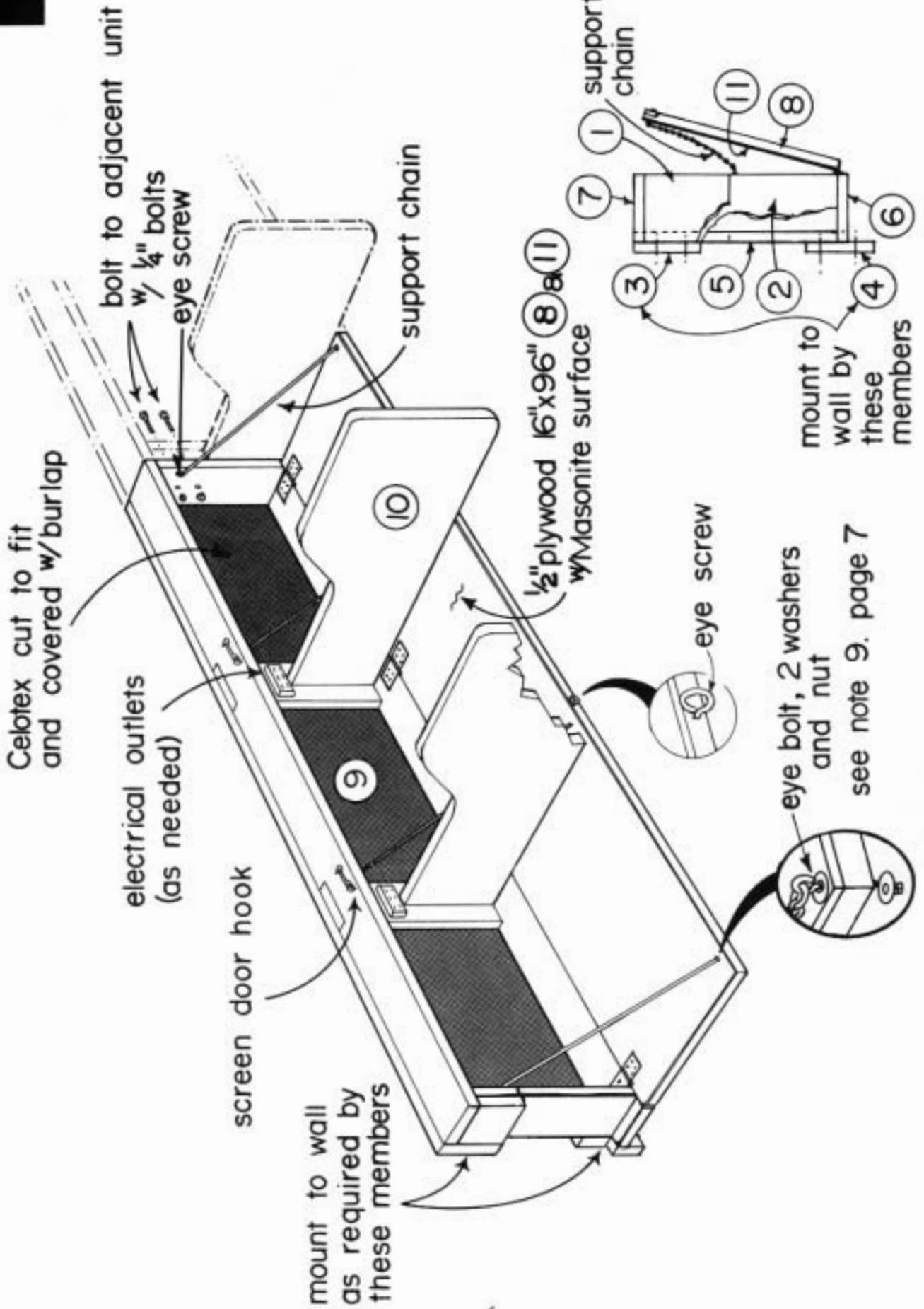


NOTE: Cut all 5/8" slots over-size to accommodate divider Fig. ⑩.





A



SIDE VIEW

ASSEMBLY

Assembly and use of a jig or frame holder will insure consistency and reduce assembly time. Presand and fill all holes and edges prior to assembly.

1. Assemble particle board spacer ① and side ② with finish nails and glue.
2. Assemble top ⑦, bottom ⑥, and sides ② with large finish nails and glue. Corners must be square and edges flush. Space below particle board spacer must be maintained to accept divider.
3. Assemble center divider holders ⑤ to top ⑦ and bottom ⑥ using 1" c/s wood screws and glue. Check dimensions to slot, and check slot for vertical squareness. Maintain slot width to accept divider.
4. Assemble top brace ③ to top ⑦ and sides ② using 2" c/s wood screws and glue. Pre-drill all screw holes.
5. Assemble bottom brace ④ to bottom ⑥ and sides ② using 2" c/s wood screws and glue. Align slot in part ④ with slot in part ⑤ and top surface of part ⑥. Pre-drill all screw holes.
6. Units may be mounted to walls at this time. Use a minimum of eight 2" c/s wood screws. Install four screws in part ③ as shown, and install four screws similarly located in part ④. Units should be attached to wall studs when possible.
7. Install electrical outlet. Check amps and length of wire to determine wire size.
8. Nail and glue the 1/8" Masonite x 16" x 96" to the 1/2" plywood x 16" x 96" making the desk top ⑧.
9. Desk top ⑧ should be mounted with c/s wood screws and aligned so that top of desk ⑧ is flush with top of part ⑥. When drilling holes for eye bolts, be sure to locate so that bolts and chain do not interfere with part ② when closing.
10. Install chain using 1" c/s screws. Angle of chain must be uniform when all units are installed. Desk top must be level and horizontal to floor as chains are installed. Install hooks and eyes and adjust closing.
11. Units should again be filed and sanded prior to finishing. Use primer or base coat prior to finish coat. Interior finish should be white semigloss. Exterior may match walls.
12. Install fabric-covered Celotex cut to fit. Use long upholstery tacks. Consider the possibility of removal.
13. Divider details are shown on page 12, Figure 5.
14. See page 5 for assembly drawing.
15. See page 6 for complete drawing and side view.

NOTES



FOLD-UP STUDENT OFFICES WITH LEGS

(One unit serves three students)

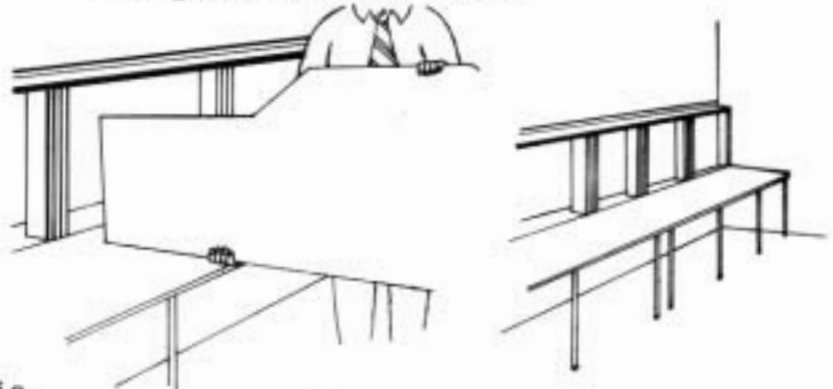
CONVERTING THE LEARNING CENTER

When it is necessary to use the facility on Sunday morning, a structure is needed which can be removed from the location or adjusted in place to become more compact. It takes about twenty minutes to turn this Learning Center into a Sunday School Department.

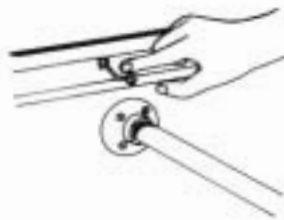


1. Here are two of the 8' units secured to the cement block wall with anchor bolts. The dividers are held securely between the two 1" and 3" supports. (Note difference: The Celotex in the illustration is not removable and helps hold divider. Plans recommend 1x6 holders and changeable bulletin board.)

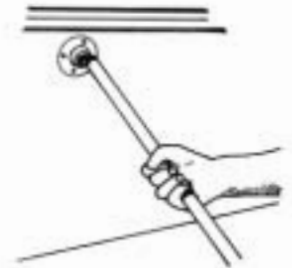
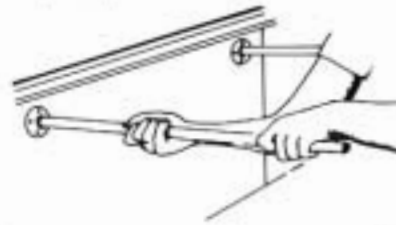
2. Dividers are removed and stacked in storage room. Students' personal items are placed inside the box frame and will be secured in the enclosure.



3. Hinged table lid is lifted and secured by hook and eye or hasp and lock.



4. Legs are unscrewed from pipe brackets and stored.



5. Learning Center is flexible for multi-utilization.



Submitted by
 Pastor Dr. Stan Jenkins
 First Baptist Church
 Fowlerville, Michigan

Designed by
 Ed Martin

WALL MOUNTED--FOLD-UP STUDENT OFFICES WITH LEGS

BILL OF MATERIAL

- 1 - 4' x 8' sheet of 1/2" plywood (1/3 sheet needed per unit)
- 1 - 4' x 8' sheet of 5/8" particle board (makes seven partitions)
- 1 - 4' x 8' sheet of 1/4" plywood (1/3 sheet needed per unit)
- 1 - 4' x 8' sheet of 1/2" Celotex (makes nine bulletin boards)
- 1 - 4' x 8' sheet of 1/8" Masonite (1/3 sheet needed per unit)
- 3 - 8 linear feet of 1" x 6"
- 4 - 1" pipe brackets
- 4 - 1" pipe (length as per age)
- 1 - hasp
- 1 - lock
- 1 - package of large, colored upholstery tacks
- 1 - padlock
- 4 - heavy duty hinges (1" long flat-head bolts and nuts)
- 1/2 pound of finishing nails
- large bottle of Elmer's glue (or other suitable glue)

HAND TOOLS

Hammer
Saw
Framing Square

Chisel
Straight Edge or Chalk Line

POWER TOOLS

Skill Saw
Sabre Saw
Drill

Screw Gun
Disk Sander

A table saw and radial arm saw will be advantageous and save a lot of time if available.

Read all assembly instructions before starting actual work on the offices.

PREPARATION OF MATERIALS

Rip one 1/2" sheet of plywood into three 15-1/4" x 96" sheets. (Fig. 1)

Rip one 1/8" sheet of Masonite into three 15-1/4" x 96" sheets. (Fig. 1)

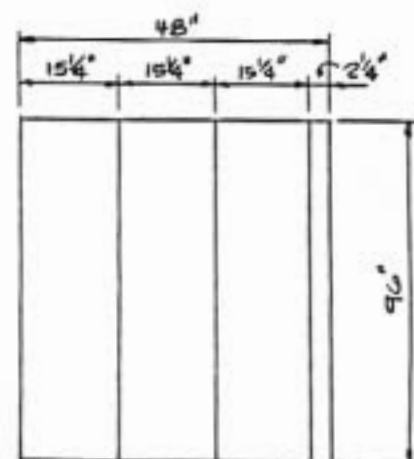


FIGURE 1

Rip one 1/4" sheet of plywood into three 16" x 96" sheets. (Fig. 2)

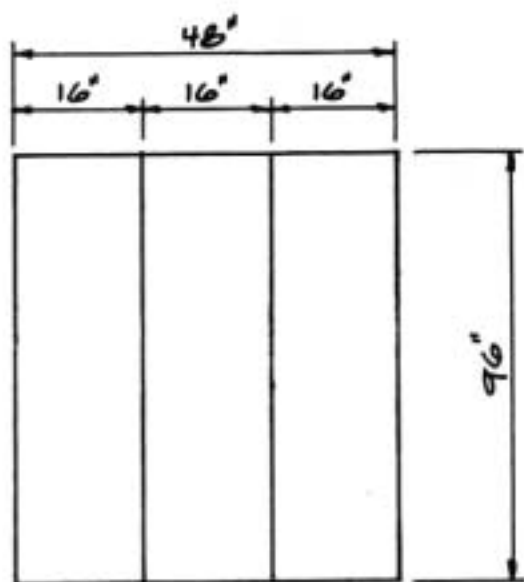


FIGURE 2

Rip one 1/2" sheet of Celotex into 9 boards. (Fig. 3)

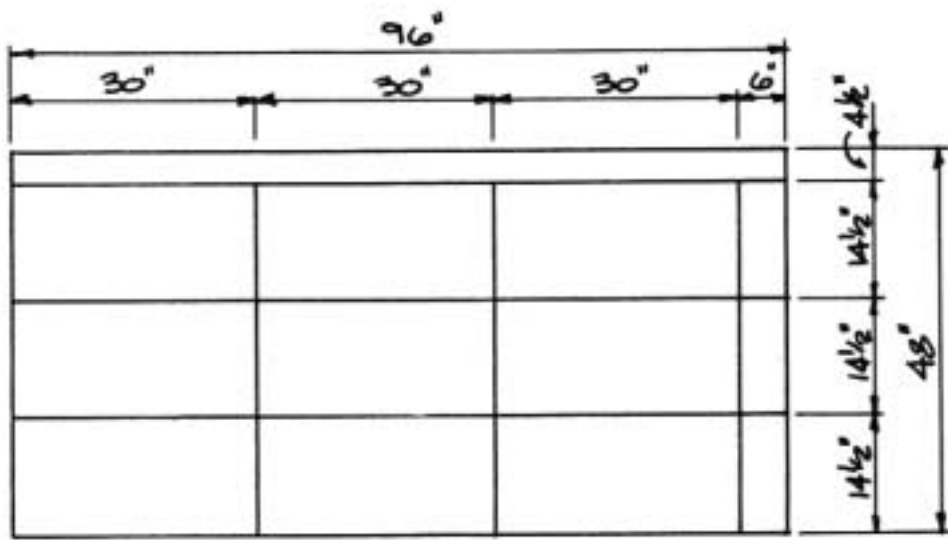


FIGURE 3

Cut one 8 linear feet 1x6 into 6 boards. (Fig. 4)

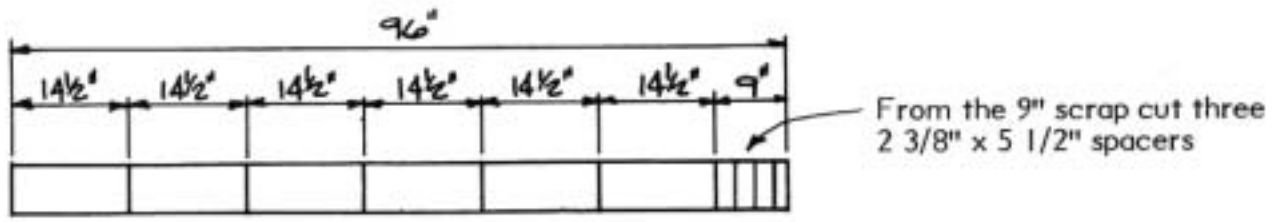


FIGURE 4

Square up two 8 linear feet 1x6 to exactly 96".

Rip one 5/8" sheet of particle board into seven partitions. (Fig. 5)

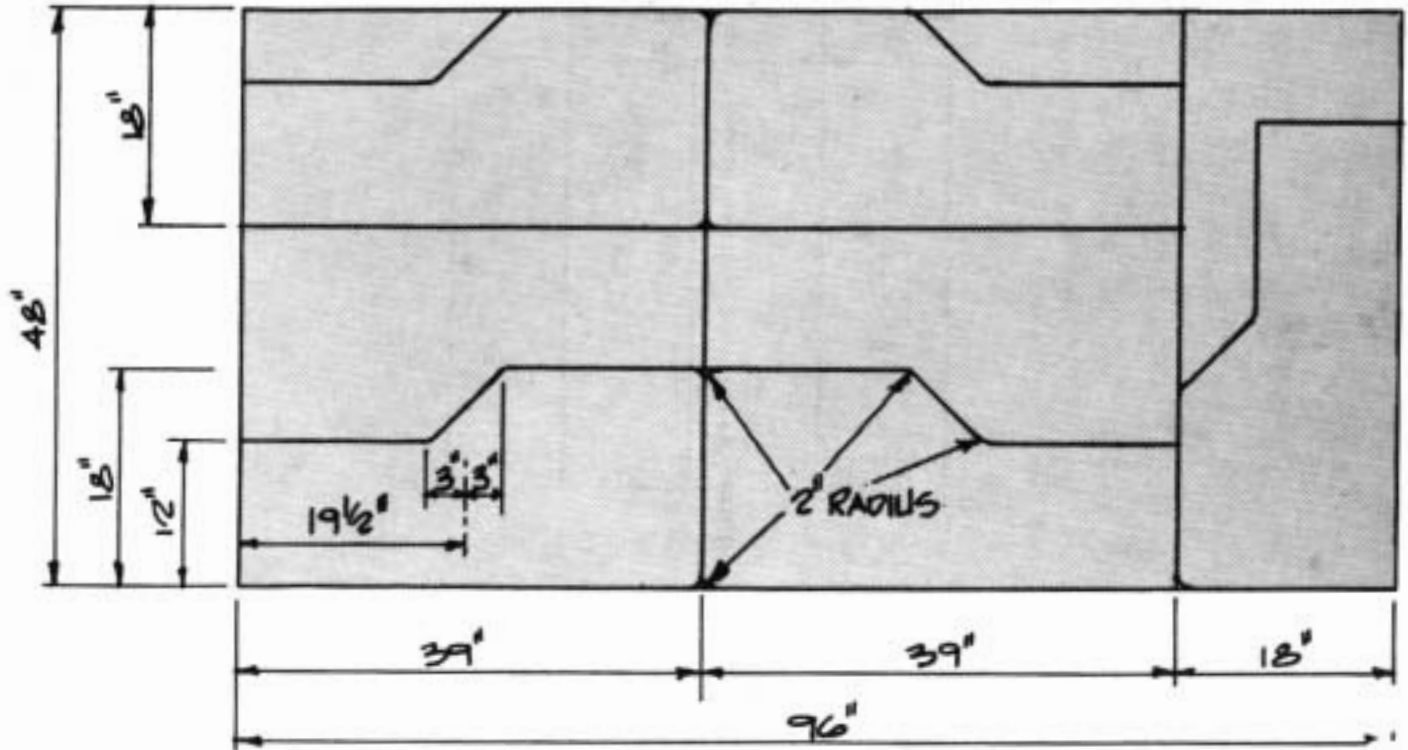


FIGURE 5

Cut 1" pipe to appropriate length and thread one end.

ASSEMBLY OF OFFICES

Refer to Figure 8

1. Laminate the 1/8" Masonite to the 1/2" plywood. This should be done with Elmer's glue (or similar glue) and pressure applied while glue is drying.
2. Construct the bulletin boards by stapling the burlap material to the Celotex. (Fig. 6)

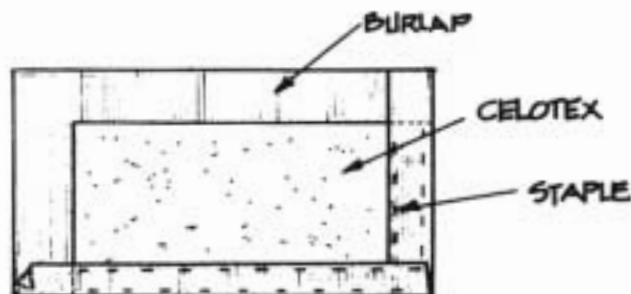


FIGURE 6

3. Construct the frame for the box out of the 1x6 members, making sure to keep everything square. It is best to both glue and nail this assembly.
4. Glue and nail 1/4" plywood back to the frame.
5. Drill holes in the frame for the six hinges.
6. Drill holes in the laminated Masonite lid for six hinges.
7. Paint the box and Masonite lid.
8. Mount the 1" pipe brackets to the plywood side of the laminated lid. (Fig. 7)
9. Put the hinges on the Masonite lid.

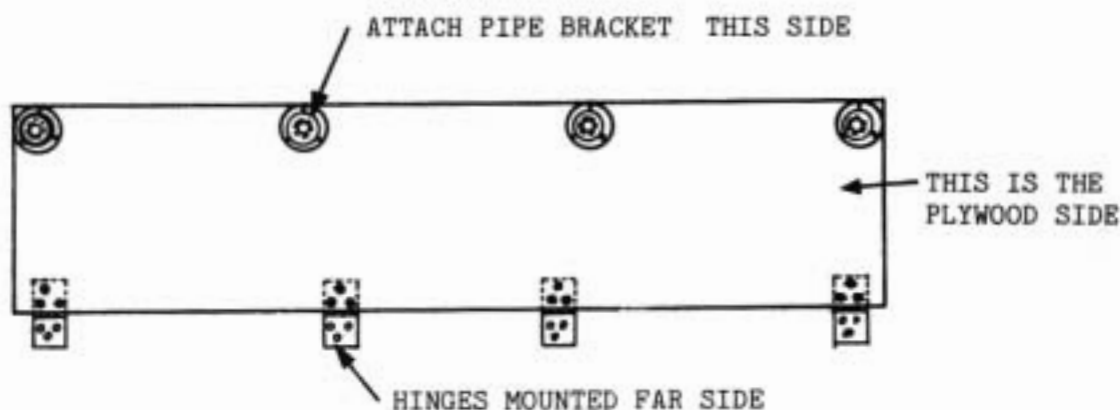
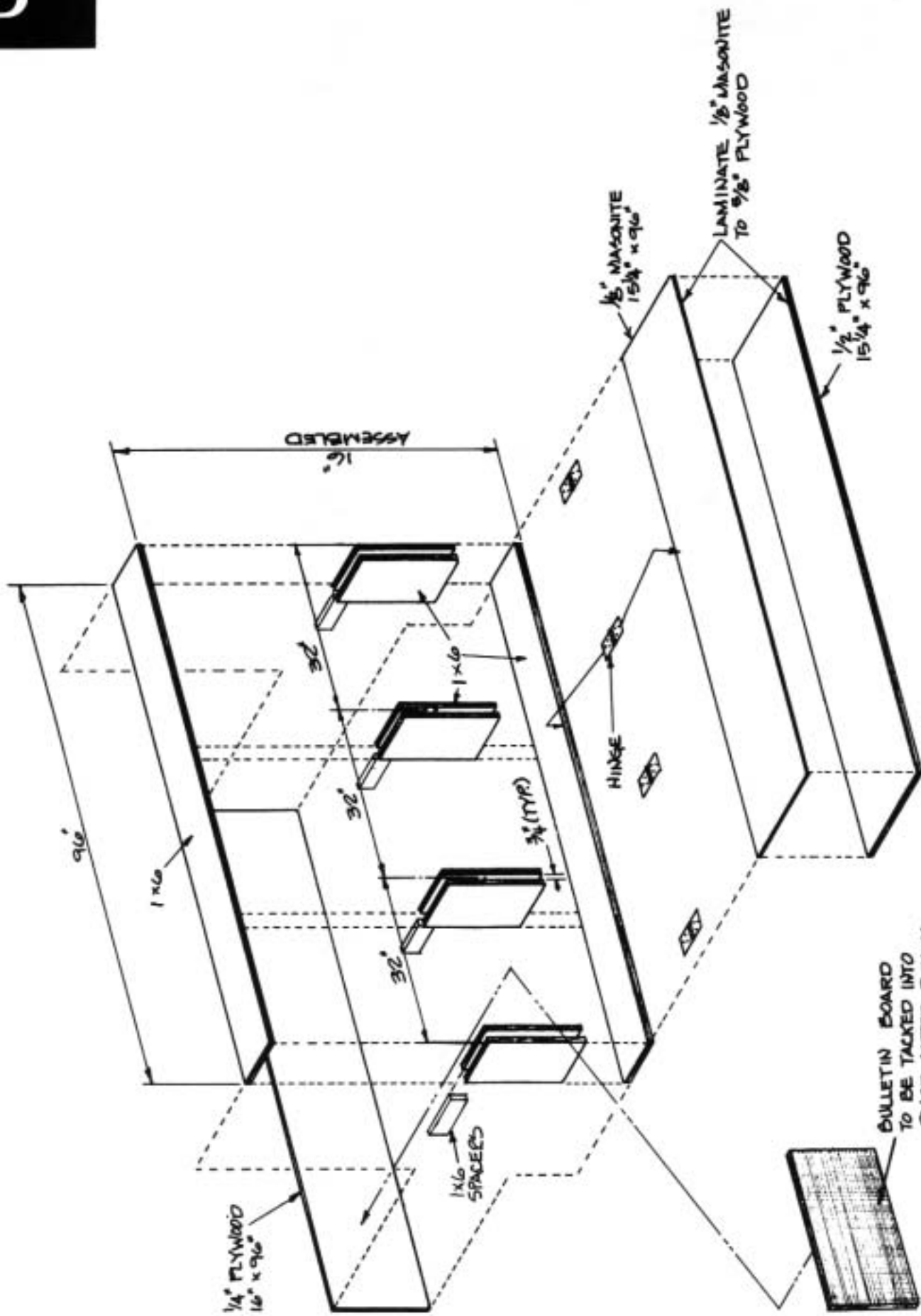


FIGURE 7

10. Mount the box to the wall. (It is not our intent to tell how to mount the unit to the wall because of the varied conditions in the different facilities. But, in most cases, the mounting can be achieved by nailing or bolting through the 1/4" plywood back on the box.) The box should be mounted on the wall at a height that will correspond to the age of the children using them. Make attachments as close to top and bottom of box as possible.
11. Bolt the hinges to the box.
12. Put hasp on box and eye on lid for locking of box.
13. Place a bulletin board into each office and tack in place with large upholstery tacks.



BOX ASSEMBLY

FIGURE 8

BULLETIN BOARD
TO BE TACKED INTO
PLACE AFTER BOX IS
ASSEMBLED AND
PAINTED.

FREE-STANDING STUDENT OFFICES

(One unit serves three students. Height of unit depends on students' needs.)

BILL OF MATERIAL

1 - 4' x 8' sheet of 3/8" plywood (C-D grade - 1/2 sheet needed per unit)
 1 - 4' x 8' sheet of 1/2" Celotex (1/3 sheet needed per unit)
 2 - 4' x 8' sheets of 5/8" particle board (1-1/2 sheets needed per unit)
 1 - 4' x 8' sheet of 1/8" Masonite (1/2 sheet needed per unit)
 14 linear feet of 2x2 or 7' - 2x4 to rip
 8 linear feet of 1x4
 4 - 1" x 1" x 5/8" corner brackets with screws
 12 - #10 x 2" wood screws
 1/2 lb. #6 finishing nails
 Several sheets of sandpaper

3/8" of plywood is enough for 2 units
 1/2" sheet of Celotex is enough for 3 units
 2 - 5/8" sheets of particle board is enough for 1 unit
 1/8" sheet of Masonite is enough for 2 units

HAND TOOLS

Hammer	Chisel
Saw	Straight Edge or Chalk Line
Framing Square	

POWER TOOLS

Skill Saw	Screw Gun
Sabre Saw	Disk Sander
Drill	

A table saw and radial arm saw will be advantageous and save a lot of time if available. Measurement and cutting of the 2x2 and 1x4 will be more accurate and much faster if done on this equipment.

The 4' x 8' pieces of plywood and Masonite should be ripped by lumber company into 2' x 8' pieces.

Read all assembly instructions before starting actual work on the offices.

PREPARATION OF MATERIALS

Rip one 5/8" sheet of particle board into two 2' x 8' sheets. (Fig. 9)
 Rip the 3/8" sheet of plywood into two 2' x 8' sheets. (Fig. 9)
 Rip the 1/8" Masonite x 4' x 8' board into two 2' x 8' sheets. (Fig. 9)
 Rip the 1/2" Celotex x 4' x 8' sheets into three 16" x 8' sheets. (Fig. 10)
 Cut the 1x4 x 8' into four 1x4 x 2' parts for spacers. (Fig. 11)

Cut the 2x2 x 14' into six 28" lengths for legs. For smaller children, cut the length to 26" or 24". Cut the dividers from the 5/8" particle board as diagramed in Figure 17.

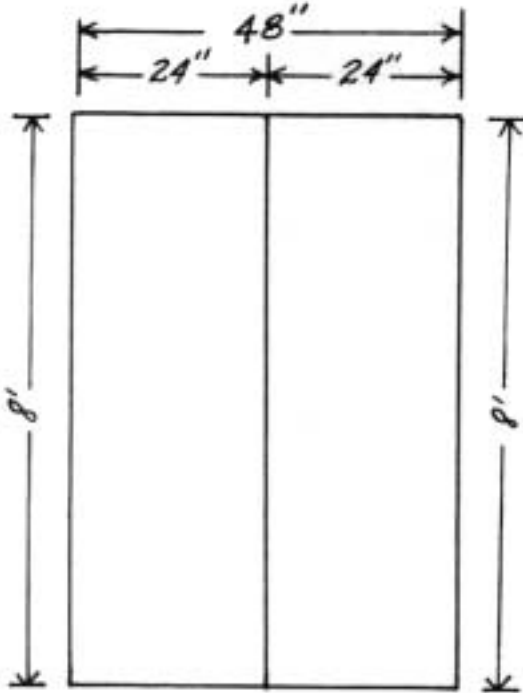


FIGURE 9

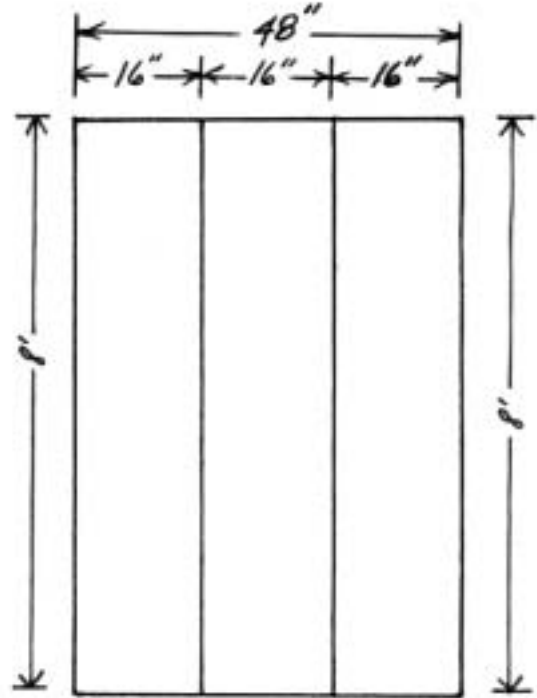


FIGURE 10

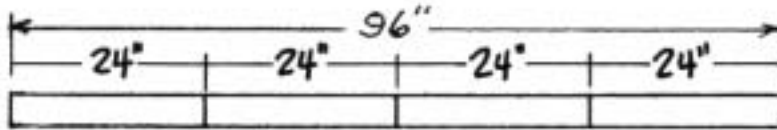


FIGURE 11

ASSEMBLY OF OFFICES

Measure and mark 32" from each end of the 2' x 8' x 5/8" particle board and, using a straight edge, draw a line at the marks across the 2' dimension on each of the two panels. Using #6 finishing nails, nail the two panels together using the 1x4 x 2' boards as spacers.

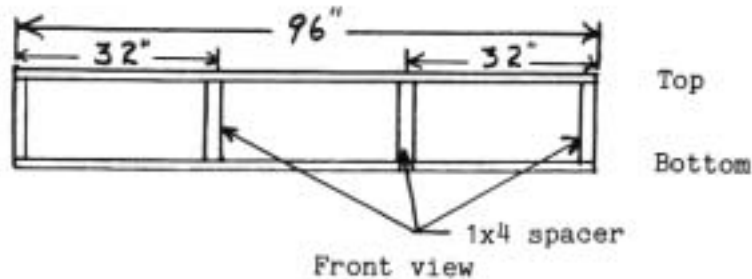
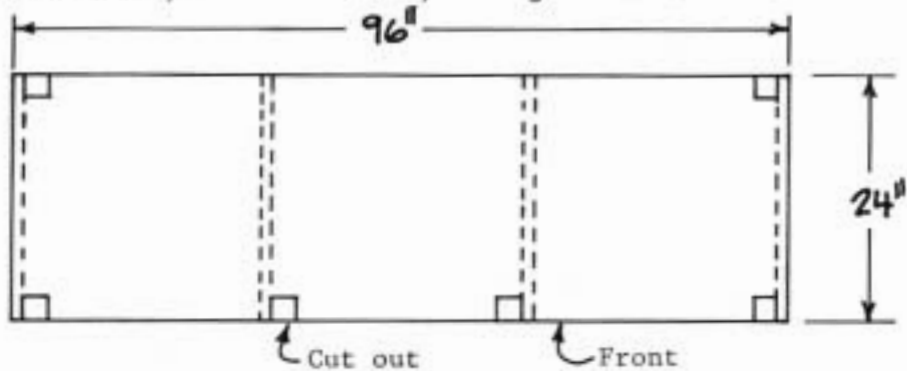


FIGURE 12

Turn the panels upside down after nailing and lay on clean work surface. Using the 2x2 legs, measure cutouts with a 2x2 scrap on the bottom panel where each spacer is nailed. Cut out four notches on the front side (Fig. 13). On the back side, cut out two notches, one on each end. The tighter the leg fits in the notch, the more stability the leg will have.



This view is looking at the bottom side of the assembly.

FIGURE 13

Now insert the six legs in the cut-out notches. Using a 3/64 inch bit, drill two holes through each spacer into the 2x2 leg. Insert #10 x 2 inch wood screw into each pilot hole. Twelve screws are required.

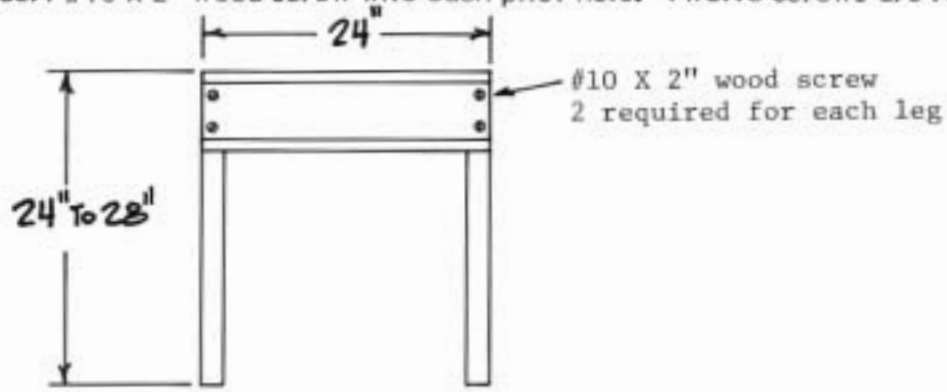
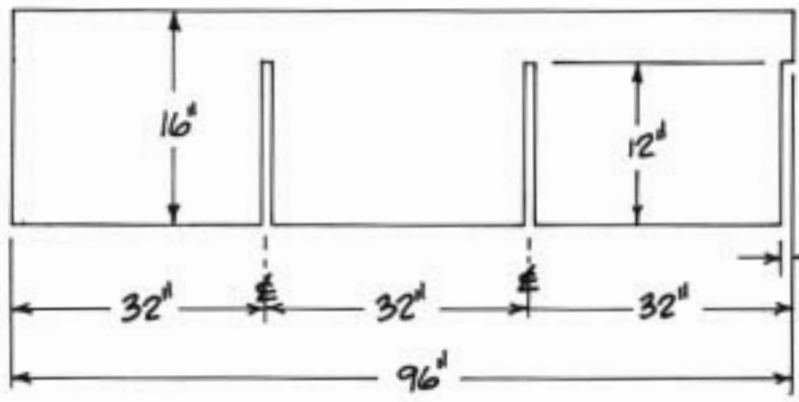


FIGURE 14

Turn the assembly right side up and nail the 1/8 inch Masonite x 24 inch x 96 inch to the top panel. Nails should be spaced so they enter the 1 inch x 4 inch spacers.

Measure 1/2 inch Celotex x 16 inch x 96 inch for cutting (Fig. 15).

The Celotex should be as this end if the unit has no divider on the end.



The Celotex should be notched out as shown here if the unit has a divider on the end.

FIGURE 15

Cut slots for three dividers 5/8 inch wide and 12 inch from base. Nail Celotex to 3/8 inch plywood back with a limited number of small nails so it can be replaced when necessary.

Nail the 3/8" plywood x 24" x 96" panel with Celotex to the back side so that it extends above the Masonite top 16".

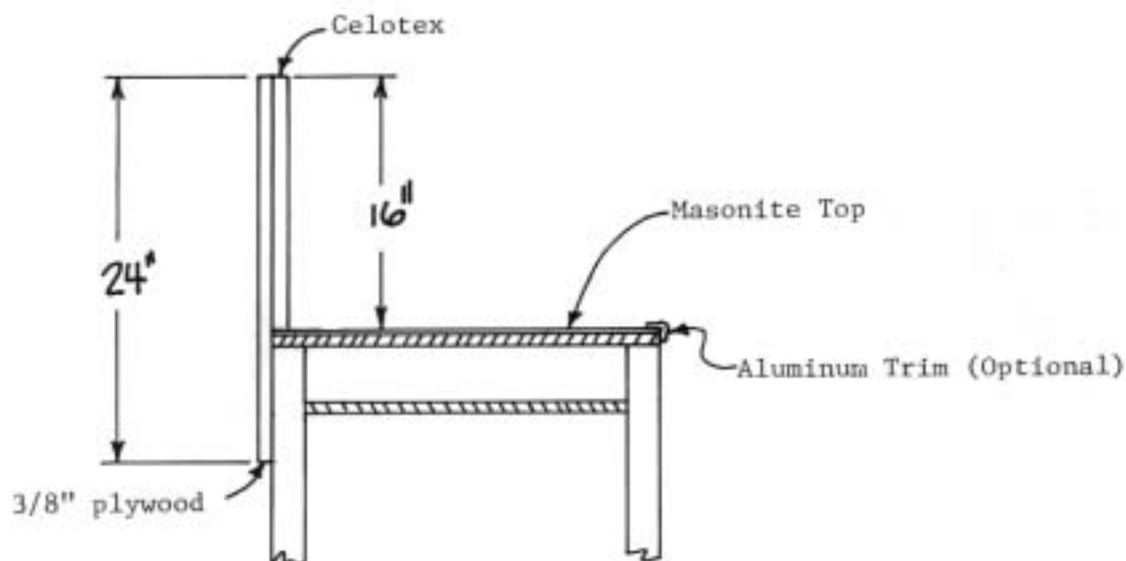


FIGURE 16

The panel will extend down the back and cover the "pigeonhole" and part of the back leg. Nail to the 1x4 spacers and the two legs.

NOTE: 3/4" aluminum counter top trim can be put on the front edge of the office to cover the 1/8" Masonite top and 5/8" panel if so desired. Cost will run about 30¢ per linear foot. If used, it should be placed on the assembly at this point before proceeding.

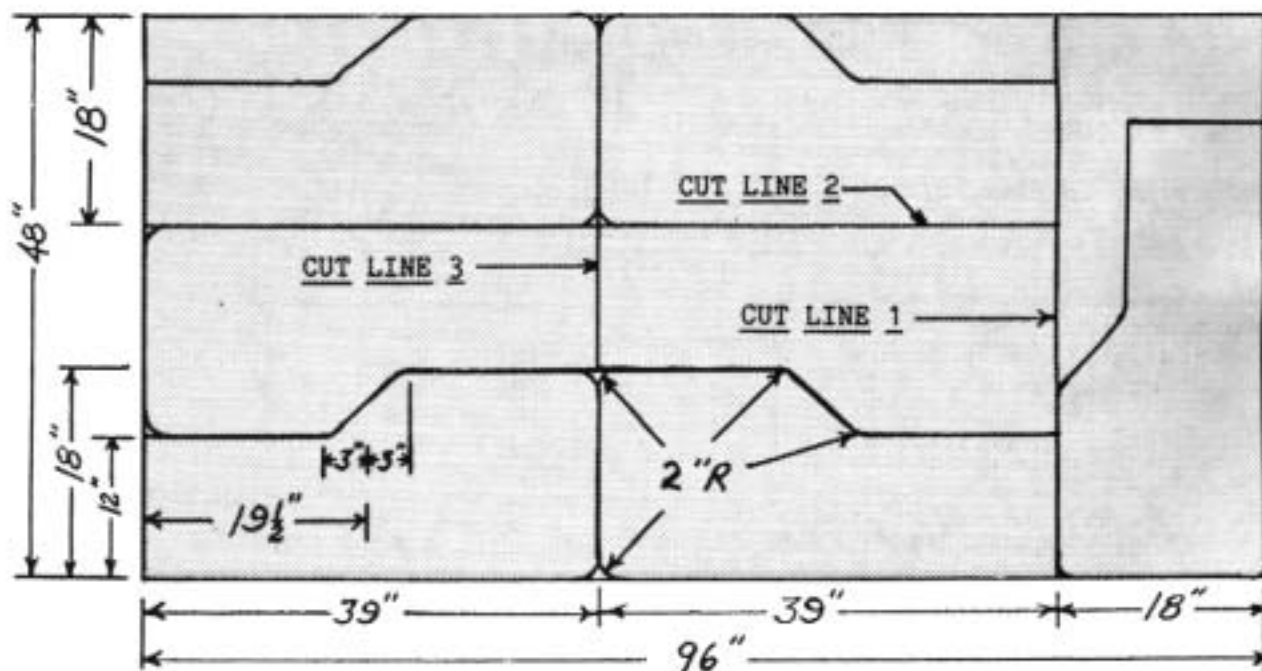


FIGURE 17

Notice the CUT LINES on Figure 17. The dividers can be cut much more quickly by first cutting lines 1, 2, and 3 with a skillsaw or tablesaw rather than using a sabre saw for all the cutting. Line 1 must be cut before line 2 or you will lose one divider per 4' x 8' sheet. A skillsaw can also be used along the other straight lines. The sabre saw need be used only for the "upshoot" of the divider and the rounded corners. Smooth edges with disk sander.

Each divider will need a coat of white primer latex, followed by a coat of implement enamel. The dividers should be painted in three different colors and placed on the offices on a staggered rotation of colors. The dividers should be placed on the offices after they have been painted. Do not decorate offices for adult satisfaction; the school room is a youth sanctuary and should be decorated for youth appeal. Red, white, and blue alternated on the dividers provide sufficient color for the room and maximum decor for the child's immediate environment.

Attach the three painted particle board dividers to the plywood back with nails as shown in Fig. 18. Then attach to the 5/8" top with 1" x 1" x 5/8" corner bracket on 32" center lines and on right end. Edges of 5/8" particle board on top surfaces and shelf surfaces where students' hands and legs make repeated contact should be rounded with disk sander.

Note: Drill holes first

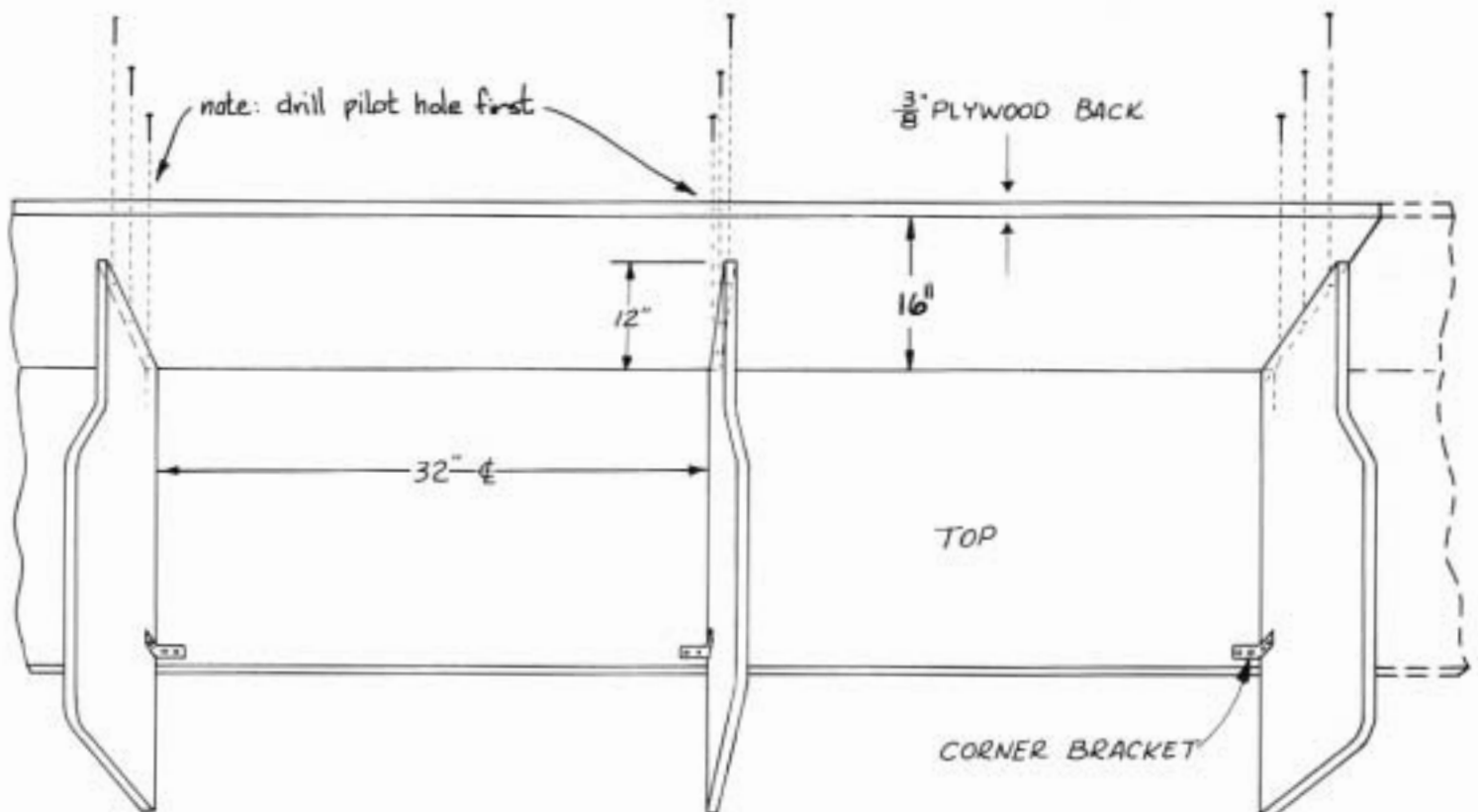
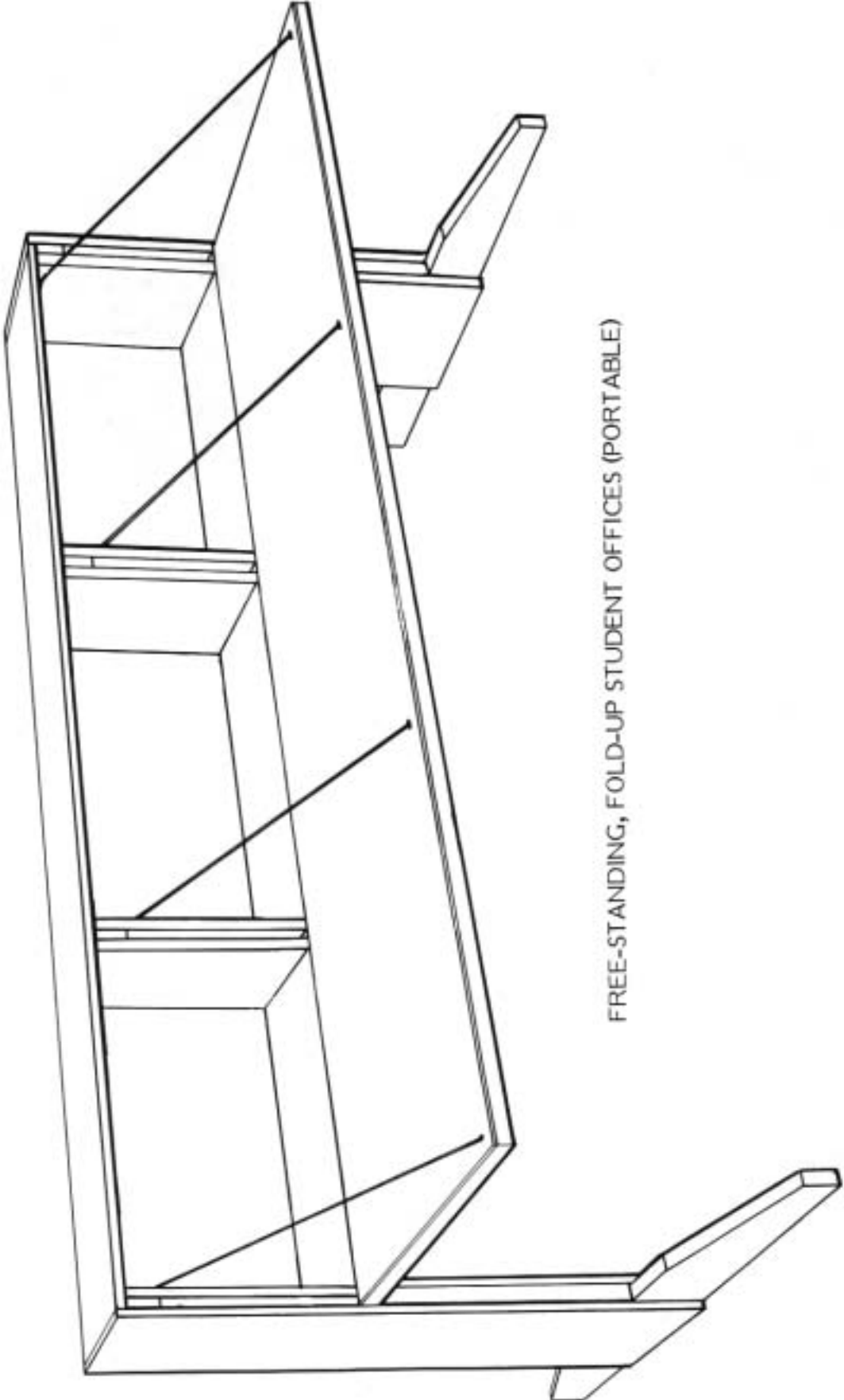


FIGURE 18

D



FREE-STANDING, FOLD-UP STUDENT OFFICES (PORTABLE)

FREE-STANDING FOLD-UP



FREE-STANDING, FOLD-UP STUDENT OFFICES (PORTABLE)

BILL OF MATERIAL

Same as wall-mounted unit with legs
 minus - pipe and pipe fittings
 plus -

QUANTITY	SIZE	
1	1x6 x 12' (for one set of three offices)	} These materials should be at least #2 grade in quality.
1	2x6 x 4' (for one set of three offices)	
1	2x4 x 4' (for one set of three offices)	

Tools and preparations the same as wall mounted unit with legs.

ASSEMBLY INSTRUCTIONS

Assemble set of three offices as described on pages 12-14; then mount on legs as shown in Figure 19 below.

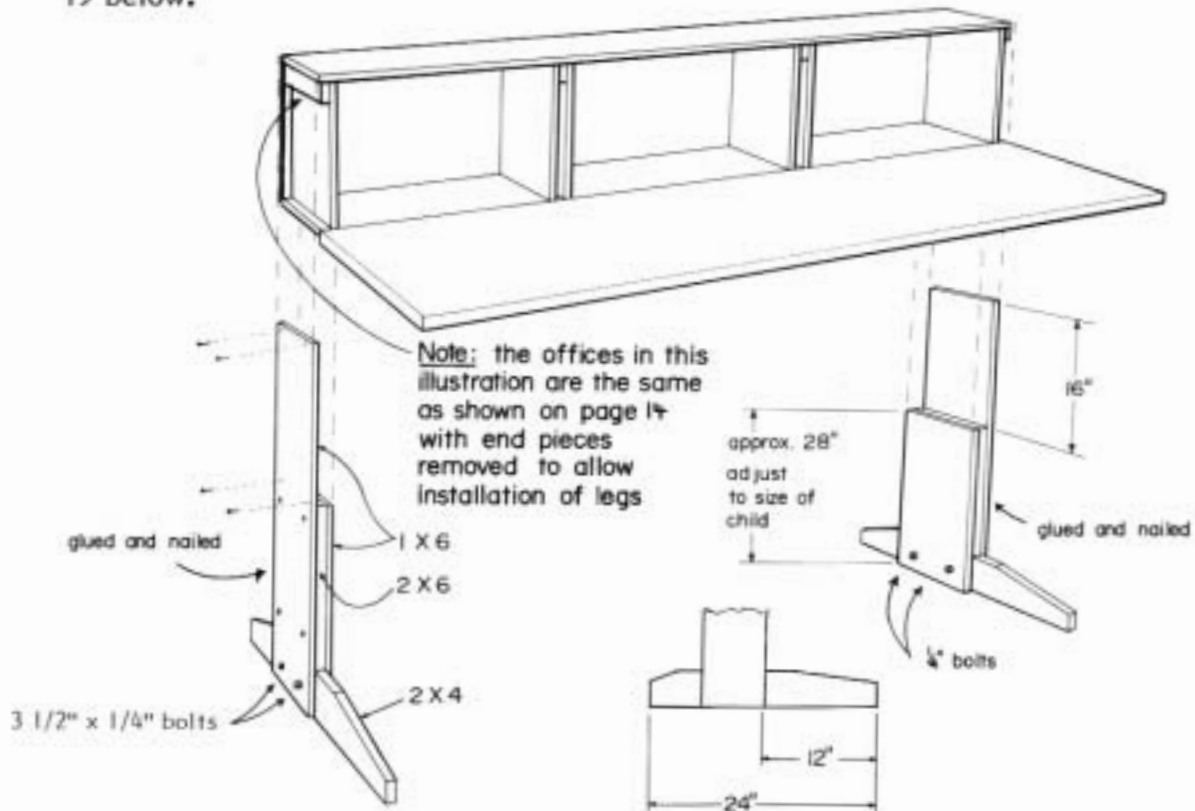


FIGURE 19

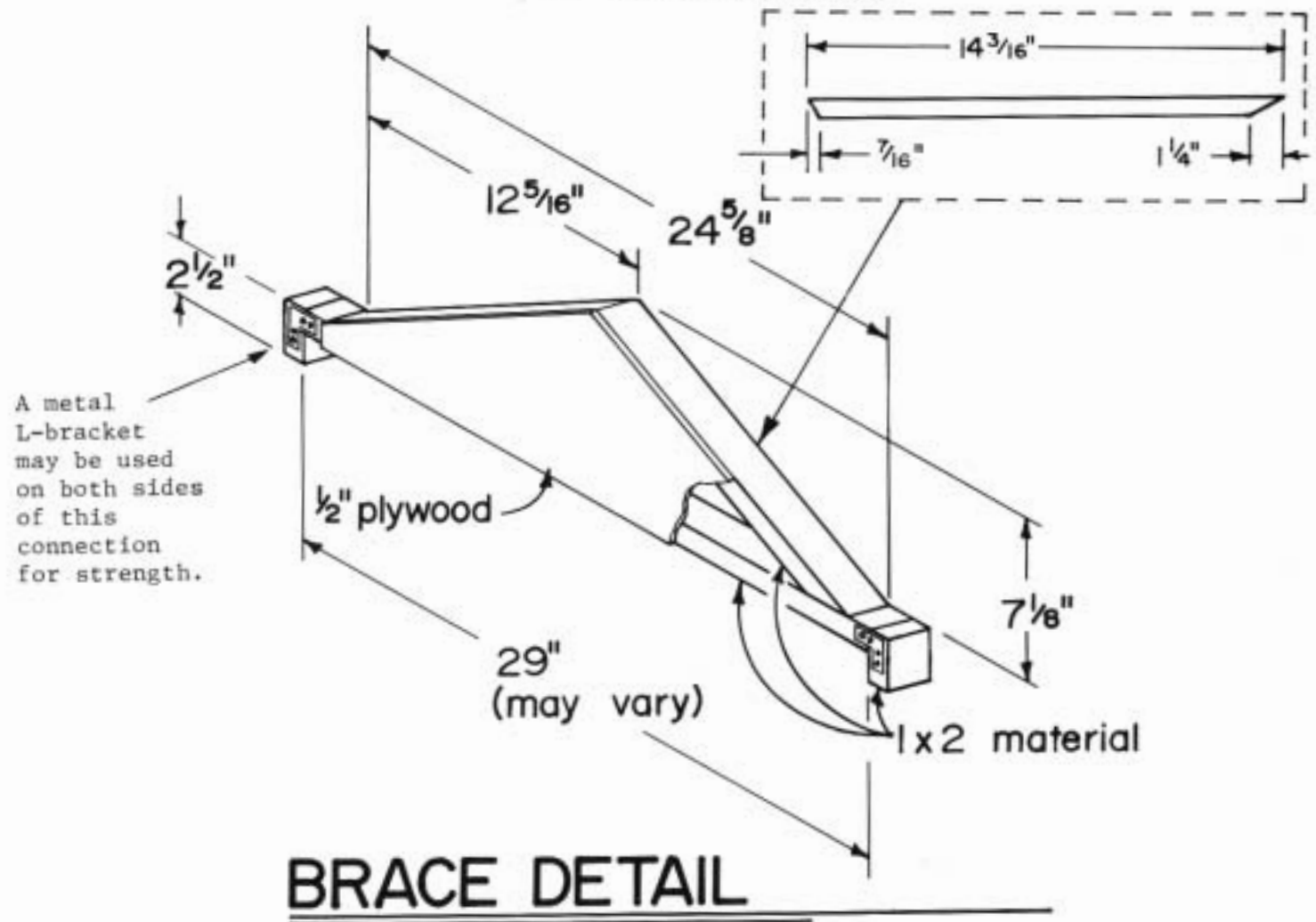
ELEVATED SCORING TABLE

BILL OF MATERIAL

QUANTITY	MATERIAL AND SIZE
2	1/2" plywood 14" x 96"
2	1/2" plywood 1" x 96"
4	Triangle Braces (see Brace Detail)

MATERIAL FOR FOUR BRACES

4	1x2 x 30-1/2" long
8	1x2 x 14-3/16" long (cut at bevel at both ends to form triangle)
8	1x2 x 1-1/2" long
4	1/2" plywood 7-1/8" x 24-5/8"
2	1x2 x 8" long (put on edges of scoring surface to prevent PACE's from sliding.)



BOOKSHELF SCORING TABLE

BILL OF MATERIALS

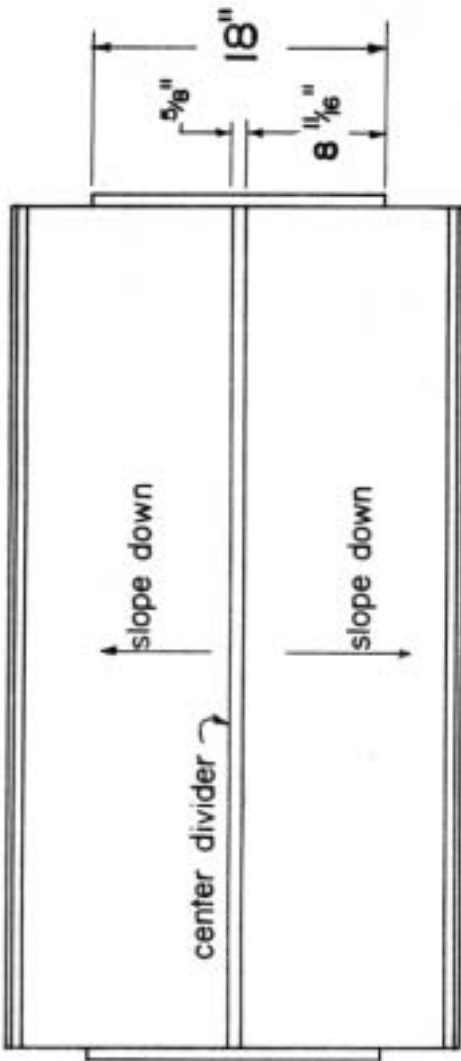
ITEM	QUANTITY	MATERIAL AND SIZE
1	1	5/8" plywood 35" x 48" (center divider)
2	2	5/8" plywood 18" x 35-5/8" (end pieces)
3	1	5/8" plywood 18" x 48" (bottom piece)
4	2	5/8" plywood 3" x 48" (caster support)
5	2	5/8" plywood 12" x 48" (slanted scoring surface)
6	4	5/8" plywood 8" x 47-3/4" (adjustable shelves)
7	4	adjustable shelf standards 36" cut to fit
8	8	adjustable shelf brackets (for 8" shelf)
9	4	carpet casters
10	2	1/2" x 1" x 48" (edge retainers to prevent PACE's from slipping while scoring)
11	24	#10 x 1-3/4" c/s wood screws
12	12	#10 x 1-1/4" c/s wood screws
13	as required	wood glue
14	as required	sandpaper
15	as required	primer paint
16	as required	paint

ASSEMBLY BRIEFS

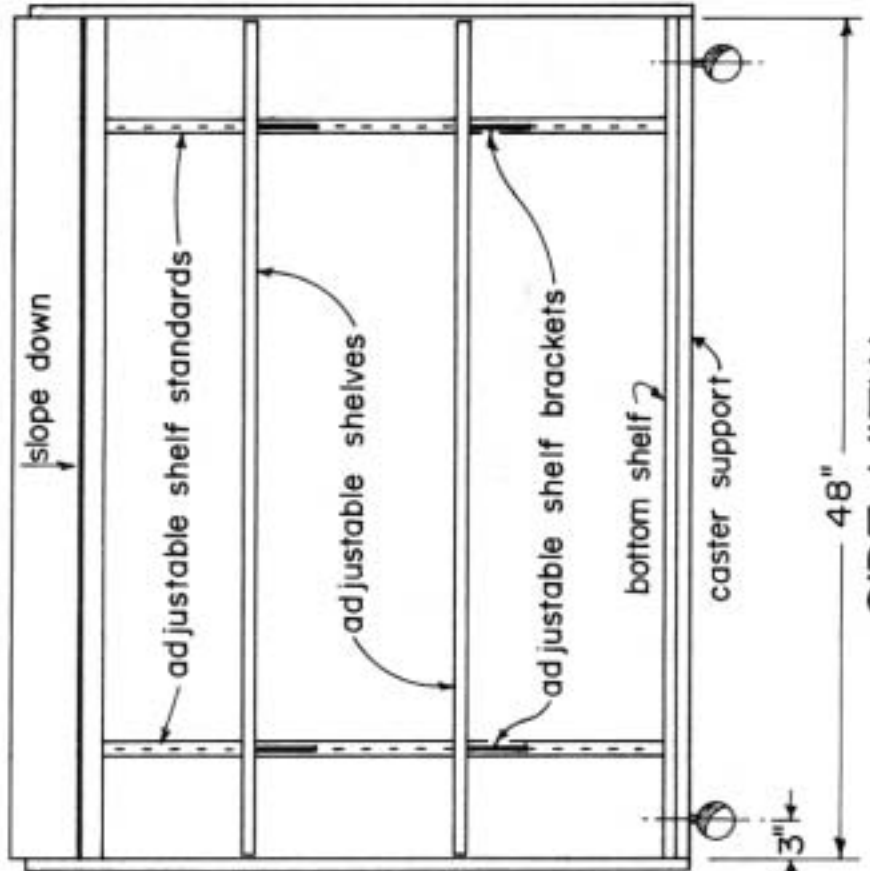
Drill pilot holes and countersink all screws. Assemble with good wood glue. Fill all exposed edges and sand. Sand unit; prime and finish.

SCREW PLACEMENT

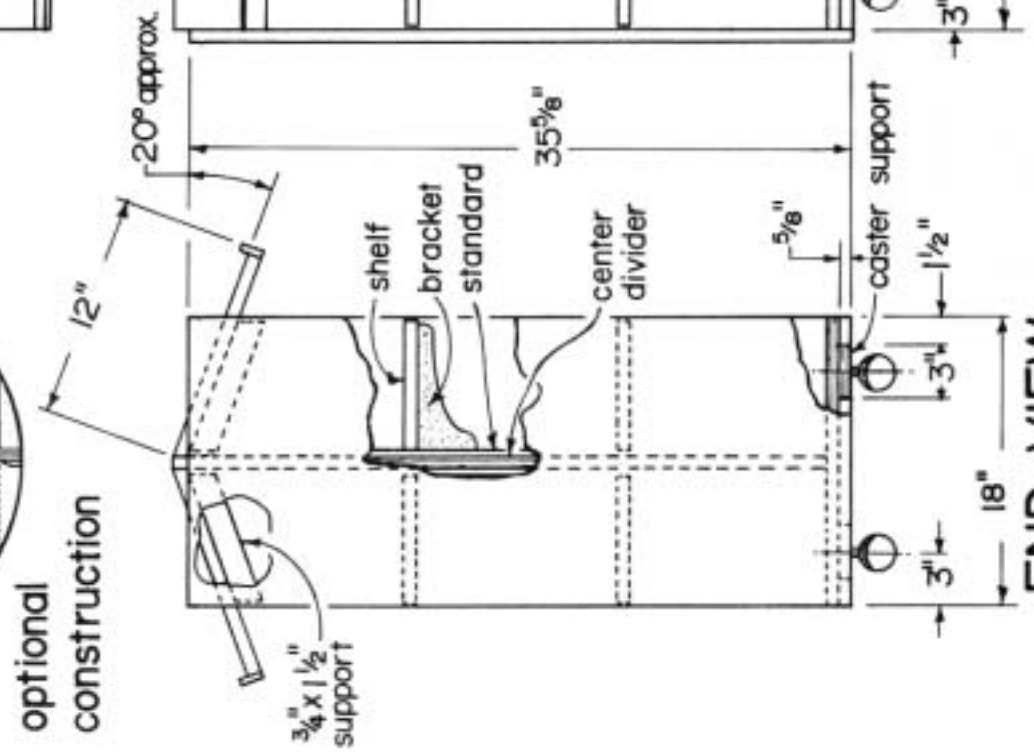
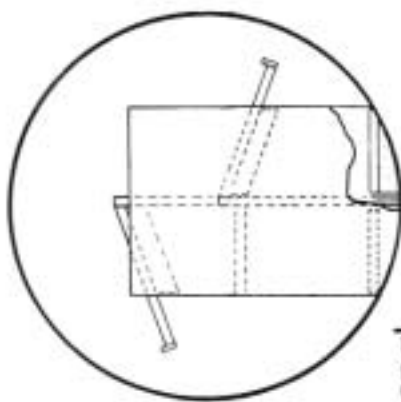
- Six screws mount each end to center divider.
- Six screws mount bottom to center divider.
- Six screws mount bottom to end pieces.
- Eight screws mount each end of slanted scoring surface to end pieces.
- Six screws mount caster support to bottom. Caster support screws spaced evenly and staggered. (#10 x 1-1/4" c/s)



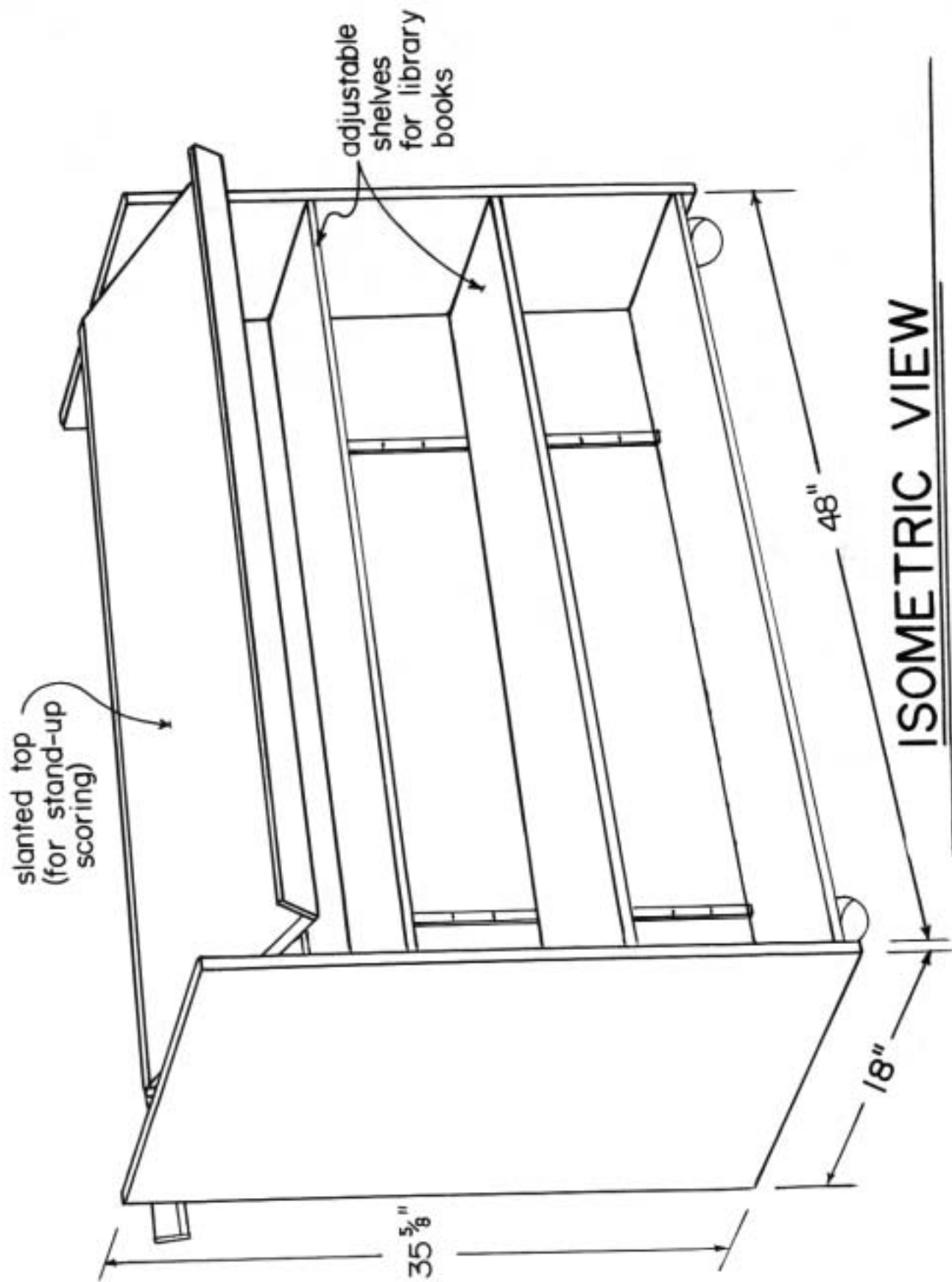
TOP VIEW

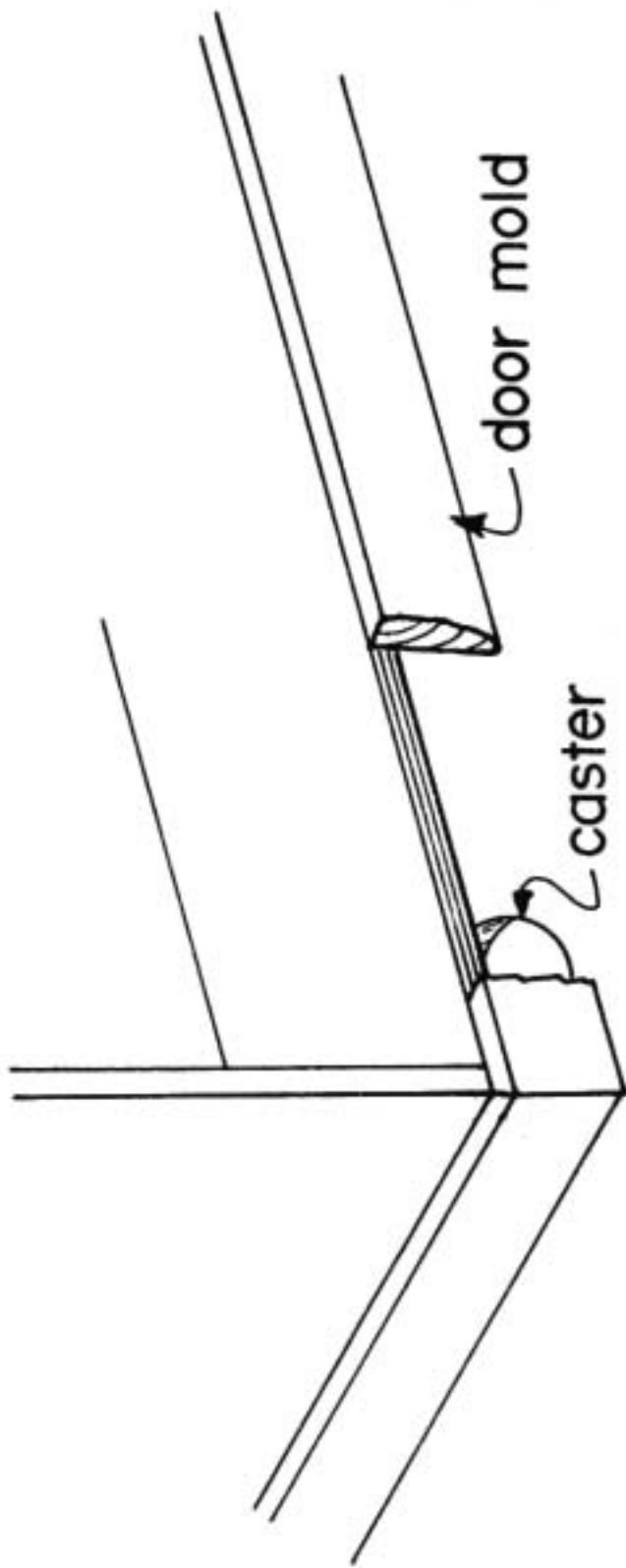


SIDE VIEW



END VIEW





Standard door molding can be added to the bottom of this unit to hide the casters.