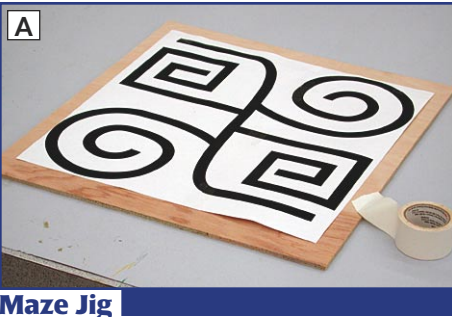


PLAY CUBE

By Rob Joseph



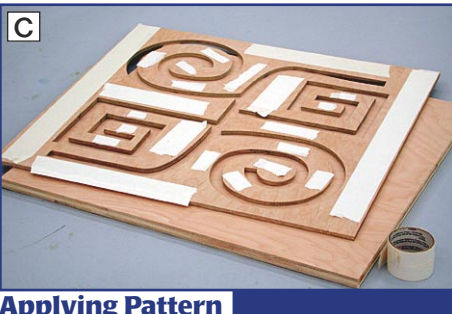
Maze Jig

Step 1 - Cut the maze jig (I) to the dimensions given in the material list. Locate the maze pattern in the pattern packet, and adhere it centered on the maze jig with double-sided tape (Q), as shown in photo A.



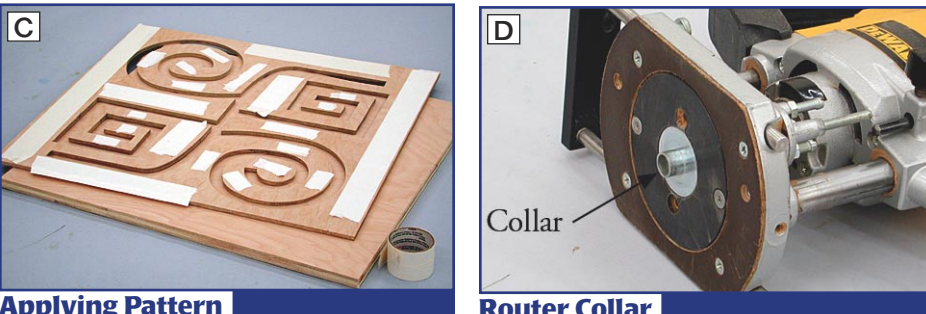
Scroll Sawing

Step 2 - Drill a pilot hole in the maze blank, and use the scroll saw to cut out the blackened portion of the maze, as shown in photo B.



Applying Pattern

Step 3 - Cut the back panel (B) to the dimensions given in the material list. Use the double-sided tape, and tape the maze jig centered on the back panel, as shown



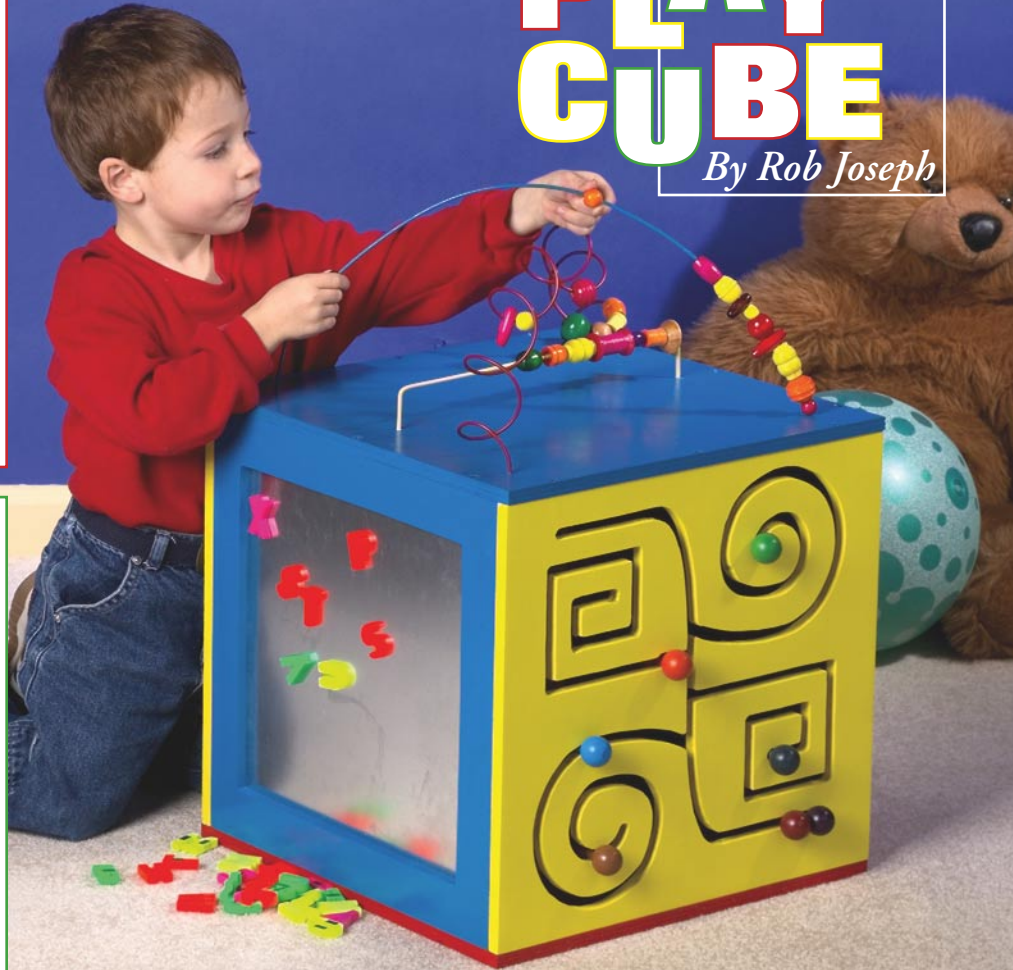
Router Collar

in photo C.
Step 4 - Using a hand-held plunge router with a 1/2" collar (S), as shown in photo D, and a 3/8" straight cutting bit (T), you will



Cutting Maze

route out the maze profile by making several passes, removing material with each pass.
Step 5 - The collar will follow the jig, as shown in photo E.

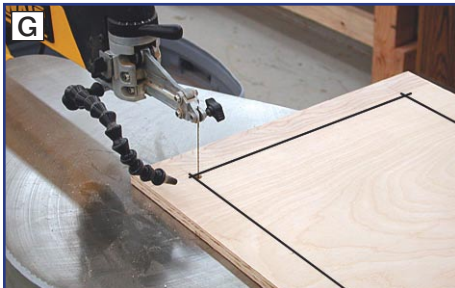


This project is recommended for 12 months and older. Parental supervision is advised when using the magnetic letters.



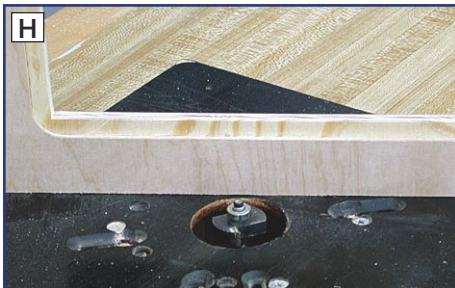
Right Panel Layout

Step 6 - Cut the right panel (D) to the dimensions given in the material list. Refer to the right/left panel drawing for the opening location. The dotted lines are showing the rabbet on the inside. Transfer the opening dimensions centered onto the blank, as shown in photo F.



Scroll Sawing Right Panel Opening

Step 7 - Drill a starting hole in the right panel to allow you to insert the scroll saw blade. Scroll saw around the location lines, as shown in photo G.



Right Panel Rabbet

Step 8 - Use the router in the router table to rout out a $\frac{3}{8}$ "-wide by $\frac{1}{8}$ "-deep rabbet on the back side of the right panel, as shown in photo H. Use a sharp chisel to square the corners.

Material List

T x W x L

A	front panel <i>birch plywood (tic-tac-toe)</i>	$\frac{1}{2}$ " x $14\frac{3}{4}$ " x 16"
B	back panel* <i>birch plywood (dowel maze)</i>	$\frac{1}{2}$ " x $14\frac{3}{4}$ " x 16"
C	left panel <i>birch plywood (magnetic board)</i>	$\frac{1}{2}$ " x $14\frac{3}{4}$ " x $14\frac{3}{4}$ "
D	right panel <i>birch plywood (plastic mirror)</i>	$\frac{1}{2}$ " x $14\frac{3}{4}$ " x $14\frac{3}{4}$ "
E	top <i>birch plywood</i>	$\frac{1}{2}$ " x $15\frac{3}{4}$ " x 16"
F	bottom <i>birch plywood</i>	$\frac{1}{2}$ " x $15\frac{3}{4}$ " x 16"
G	brackets for tic-tac-toe (2) <i>pine</i>	$\frac{3}{4}$ " x $\frac{3}{4}$ " x 12"
H	tic-tac-toe plates (9) <i>pine</i>	$\frac{3}{4}$ " x $3\frac{3}{4}$ " x $3\frac{3}{4}$ "
I	maze jig <i>birch plywood</i>	$\frac{1}{4}$ " x $14\frac{3}{4}$ " x 16"
J	tic-tac-toe bracket spacers (6) <i>pine</i>	$\frac{3}{4}$ " x $\frac{3}{4}$ " x $\frac{3}{8}$ "
K	sheet metal backing <i>plywood</i>	$\frac{1}{8}$ " x $13\frac{3}{4}$ " x $13\frac{3}{4}$ "

Supply List

L	wire (3)	$\frac{1}{8}$ " diam. x 36"
M	plastic mirror	$\frac{1}{8}$ " x 12" x 12"
N	washers (6)	$\frac{3}{8}$ " inside diam.
O	tic-tac-toe dowels (3)	$\frac{3}{8}$ " diam. 13"
P	sheet metal	$\frac{1}{16}$ " x 12" x 12"
Q	double-sided tape	
R	wood glue	
S	router collar	$\frac{1}{2}$ " diam.
T	straight cutting bit	$\frac{3}{8}$ " diam.
U	glass retainers** (8)	
V	wood screws for sheet metal, glass retainers (20)	#6 x $\frac{5}{8}$ "
W	wood screws for tic-tac-toe brackets (6)	#6 x 1"
X	wood screws for top and bottom (24)	#6 x 1"
Y	wire-bending dowel	$1\frac{1}{2}$ " diam. x 24"
Z	Liquid Nail for wire	small tube
AA	high-performance enamel spray paint	your choice of colors
BB	mixed wooden beads**	
CC	ball knobs for maze** (14)	1"
DD	dowels for 1" ball knobs (7)	$\frac{3}{8}$ " diam. x $1\frac{1}{2}$ "
EE	X and O stickers (18 half X's, half O's)	$3\frac{1}{4}$ "
FF	spray varathane	

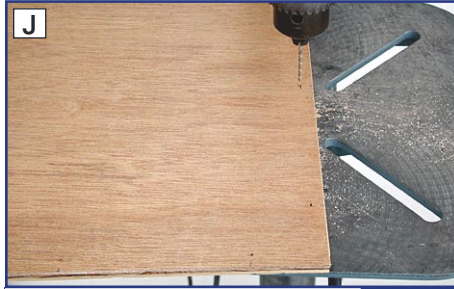
*Patterns needed for this project are located in the pattern packet starting on page 35.

** Items are listed in our Buyers Guide on page 78.



I
Left Panel Rabbet

Step 9 - Cut the left panel (C) to the dimensions given in the material list. Refer to step 6 for the opening location. Transfer the opening dimensions, as shown in photo F. Drill a starting hole, and scroll saw out the opening, as shown in photo G. Use the



J
Sheet Metal Backing Panel

router in the router table to make a $\frac{3}{8}$ "-wide by $\frac{1}{16}$ "-deep rabbet on the back side of the left panel, as shown in photo I.

Step 10 - To help stiffen the sheet metal (P), a backing is used. Cut the sheet metal backing (K) to the dimensions given in the



K
Center and Fasten Backing

material list. The backing is fastened to the rabbet with the $\frac{3}{8}$ " wood screws (V). Pre-drill two evenly spaced holes along each edge of the backing $\frac{3}{8}$ " in from the edges, as shown in photo J.



L
Glass Retainers

Step 11 - Center the backing on the panel, and screw into place, as shown in photo K.

Step 12 - Cut or have the plastic mirror (M) cut to the dimensions given in the material list. Use glass retainers (U) with



M
Front Panel Layout

wood screws (V) to hold the plastic mirror in place. Use two retainers for each edge, as shown in photo L. The glass retainers have a slight lip on the screw portion area. Sand this lip flush to allow the retainers to sit flush against the mirror. This only pertains



N
Scroll Saw Front Panel

to you if you're using the same retainers.

Step 13 - Cut the front panel (A) to the dimensions given in the material list. Refer to the front panel drawing for opening locations. Transfer locations to the front panel, as shown in photo M.



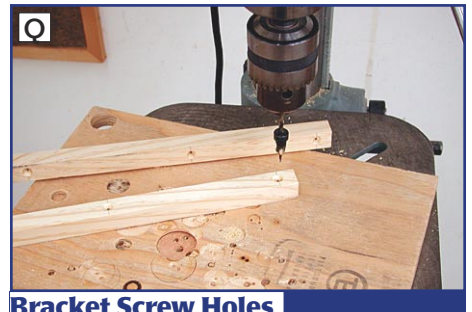
O
Brackets

Step 14 - Drill a starting hole. Insert the scroll saw blade, and remove the center material, as shown in photo N.



P
Bracket Screw Locations

Step 15 - Cut the tic-tac-toe brackets (G) to the dimensions given in the material list. Use the table saw to make the ripped cuts, as shown in photo O.



Q
Bracket Screw Holes

Step 16 - Refer to the front panel drawing for the bracket screw locations, and transfer their locations to each bracket, as shown in photo P.



Cut Dowels to Length

Step 17 - Use the drill press to pre-drill, and slightly countersink each screw location, as shown in photo Q.

Step 18 - Refer to the front panel drawing for the dowel locations in the brackets. Transfer marks, and drill the $\frac{3}{8}$ "-wide by



Tic-Tac-Toe Plates

$\frac{3}{8}$ "-deep stopped holes.

Step 19 - Cut the tic-tac-toe dowels (O) to the dimensions given in the supply list. Use the band saw to make the cuts, as shown in photo R.



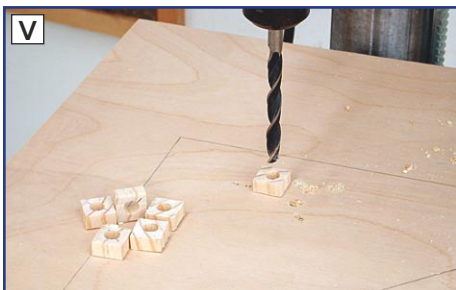
Plate Center Hole

Step 20 - Cut the tic-tac-toe plates (H) to the dimensions given in the material list. Use the table saw with a push stick to make the cuts safely, as shown in photo S.



Drilling through Holes

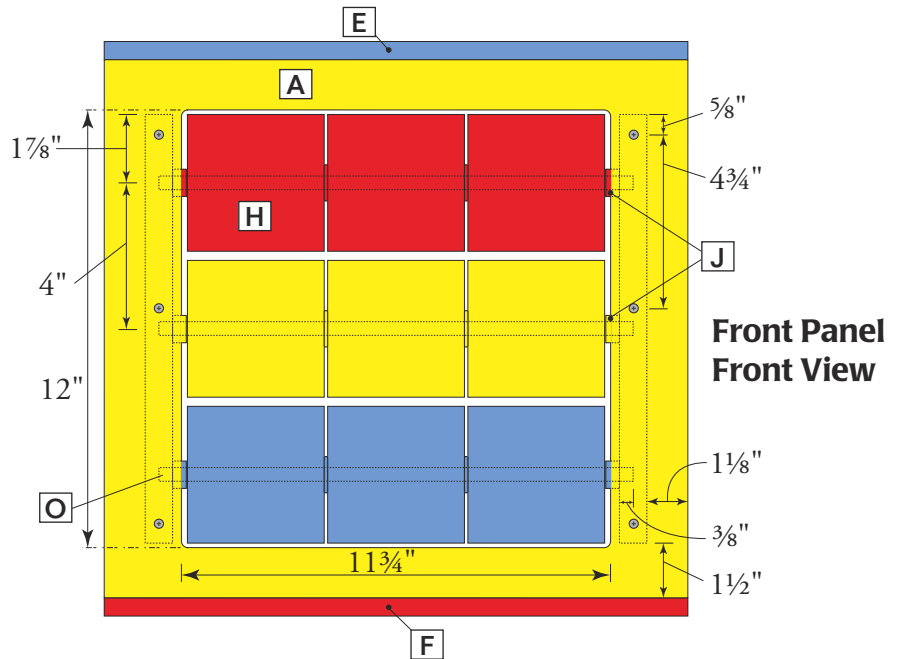
Step 21 - $\frac{25}{64}$ " through holes are drilled through the tic-tac-toe plates at the center. Locate their centers by drawing diagonal lines on their ends, as shown in photo T.



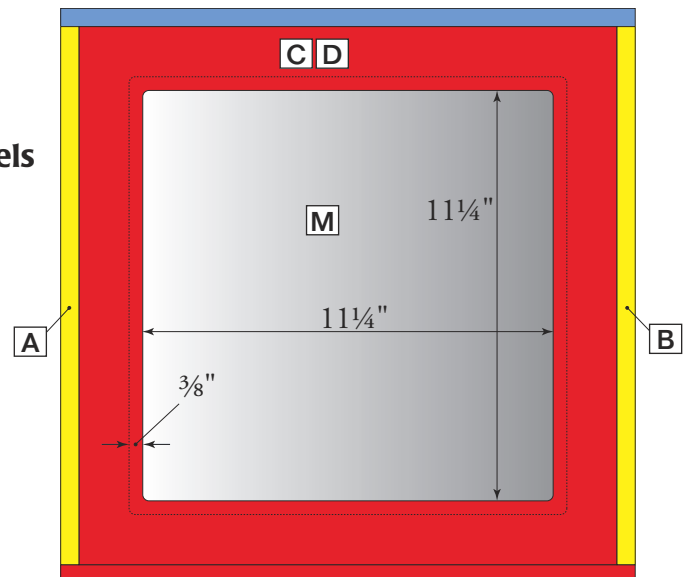
Bracket Spacer through Holes

Step 22 - Use the drill press to drill each plate, as shown in photo U.

Step 23 - Cut the tic-tac-toe bracket spacers (J) to the dimensions given in the



Right/Left Panels Front View





Fastening Tic-Tac-Toe Assembly

material list. Drill a $\frac{3}{8}$ " through hole in the center of each block, as shown in photo V.

Step 24 - Dry-fit the tic-tac-toe assembly against the front panel with the washers (N) between each plate and the bracket spacers on the ends of each dowel. Center



Top and Bottom Screw Locations

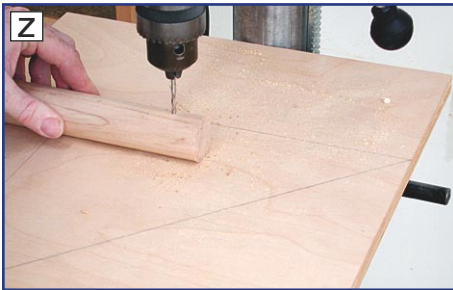
the assembly carefully, making sure the plates clear the sides and ends, and adjust if necessary. Use the 1" wood screws (W), and fasten the assembly to the front inside panel, as shown in photo W.

Step 25 - Cut the bottom (F) and the top (E) to the dimensions given in the material



Countersinking Screw Holes

list. The bottom and top are attached to the front, back, and right/left panels with the 1" wood screws (X). Evenly space 3 screw locations along each end on both the top and bottom blanks. Measure in from the edges $\frac{1}{4}$ ", and mark, as shown in photo X.



Wire Bending Dowel

Step 26 - Use the drill press with a countersinking bit, and pre-drill each screw location in the top and bottom blanks, as shown in photo Y.

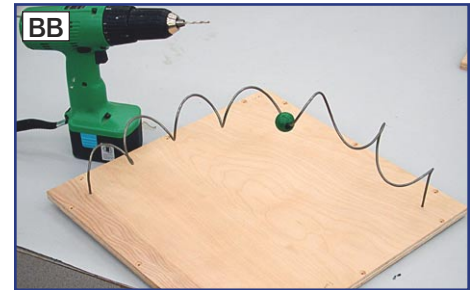
Step 27 - Use the drill press, and drill a $\frac{1}{8}$ " through hole in the end of the wire-



Spiralling Wire

bending dowel (Y) about 1" down from the end, as shown in photo Z.

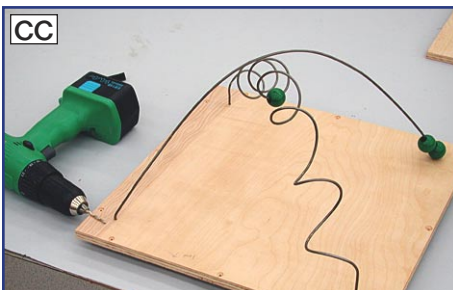
Step 28 - Spiral one of the wires (L) around the dowel by sticking one end of the wire in the $\frac{1}{8}$ " hole and wrapping the wire around, as shown in photo AA. Leave about 3" of



Pre-Drilling Wire Holes

straight wire at the end. Cut the wire near the hole in the dowel to remove the wire.

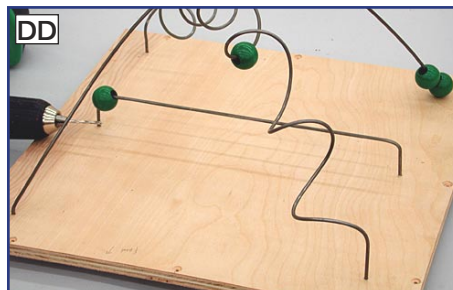
Step 29 - The spiralled wire is glued into the top in step 36. Two $\frac{1}{8}$ " holes are drilled in the diagonal corners of the top panel making the spiral bow, as shown in photo



Second Wire Location

BB. Play with the length of the wire and trim it down if necessary.

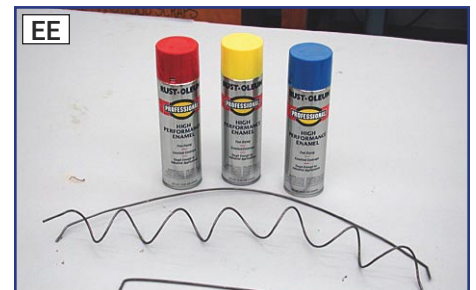
Step 30 - Use a straight wire (L), slightly bend it over the top of the spiralled wire and drill an $\frac{1}{8}$ " hole in the opposite diagonals, as shown in photo CC. Again, you'll have to play with the length that meets your



Third Wire Location

needs for how the wire should look.

Step 31 - Using the last piece of wire (L), cut it down to about 18" to 20". This gets mounted under the first two pieces of wire. Make the straight portion about 12" long, then bend a 90° angle in each end.



Spray Paint Wires

Center it on the top panel, and locate the two $\frac{1}{8}$ " holes. Drill each hole, as shown in photo DD.

Step 32 - Each wire is cleaned and painted using a high-performance enamel spray (AA), as shown in photo EE. Using enamel



Painting Panels

helps prevent chipping.

Step 33 - Remove the sheet metal and mirror from their panels. Each piece of the cube is painted using the high-performance enamel, as shown in photo FF.



Knobs Pre-Drilled

Step 34 - The 1" ball knobs (CC) are re-drilled to a diameter of $\frac{3}{8}$ ". Clamp the knobs securely, and make the $\frac{3}{8}$ "-wide by $\frac{1}{2}$ "-deep holes with the drill press, as shown in photo GG. Cut the dowels (DD) for the ball knobs to the dimensions given in the supply list.



Painting Knobs

Step 35 - Paint the 1" ball knobs and dowels the color of your choice, as shown in photo HH.

Step 36 - Re-assemble the sheet metal to its panel, the mirror to its panel, and the tic-tac-toe to its panel. The wire is Liquid Nailed (Z) into the holes drilled into the



Fasten Wire with Beads

top. Place as many beads (BB) as you like on each wire and glue in place, as shown in photo II.

Step 37 - Glue (R) the four panels together, making sure your orientation is correct.



Gluing Panels

Use clamps with rags on the ends to protect the paint when gluing, as shown in photo JJ.

Step 38 - Assemble the knobs onto the maze panel with glue (R) in each knob, one knob



Gluing Knobs in Place

for the front and one for the back. Be sure the knobs can move freely around the maze before the glue sets, as shown in photo KK.

Step 39 - Using the 1" wood screws (X), screw the bottom to the panels, as shown



Attach Bottom

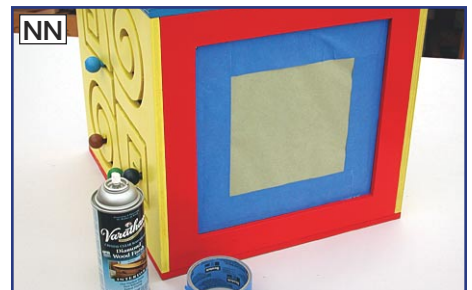
in photo LL.

Step 40 - Using the 1" wood screws (X), screw the top to the panels, as shown in photo MM.



Attach Top

Step 41 - Tape off the mirror and sheet metal. Spray a few coats of varathane (FF) to help protect the project, as shown in photo NN, or use a finish of your



Applying Finish

choice. Some like to use a more child-safe finish if your kids are still teething. Attach the "Xs" and "Os" (EE) to the tic-tac-toe plates. **WWW**