

## Multi-level Tic-Tac-Toe Game

### Objective:

Create a 3-D Tic-Tac-Toe board game  
(can be done in either metal or wood)

### Items needed:

- $\frac{1}{2}$ " thick wood cut into 4" X 4" pieces
- $\frac{1}{4}$ " dowel rod 9 pieces at 3.5" long
- 1" dowel rod or spherical balls, as shown
- 1" X 1" X 18" square stock or ripped down to size



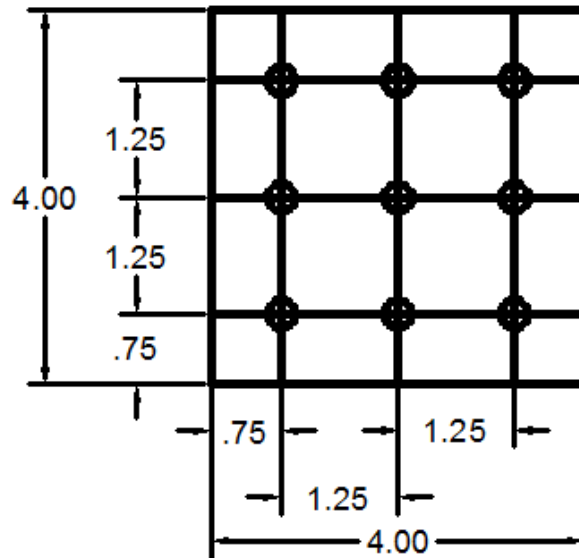
### Machines used to create item:

Table saw, drill press, sanding instrument

### Skills used:

- Create a jig to hold small parts safely while drilling
- Introduce mitre cuts and "V" grooves
- Thinking and spacial relations in a 3-D game environment

To create the game base, you must drill nine holes, equally spaced,  $\frac{1}{4}$ " in diameter. Have students draw and measure boards for the layout of base. The nine holes should look similar to the drawing below. Soften the edges of all four sides of top surface by either sanding, planing, or routing the edge.



For the “X” shaped pieces, it is easier to create them on the table saw as one long X and slice them after they have been created. Place on table saw and create the “V” groove by putting a 45 degree mitre cut  $\frac{1}{4}$ ” deep on each side of the “X” until you have an entire strip shaped like an “X”. At this point, it is easier to sand the sides before slicing. After sanding, you can slice into 1” slices to form individual “X” pieces. You will need a total of 14 of them.

Note the drill hole down the center of each “X”. This also may want to be done prior to slicing. This should be done with a drill bit slightly larger than the  $\frac{1}{4}$ ” dowel.  $\frac{3}{16}$ ” drill is appropriate.

Secondly, you have to complete the circular pieces. You can do this by using 1” spherical wood balls, but you could more easily use the 1” dowel for similar results. Each dowel should be cut into 1” lengths and turned on end to drill a  $\frac{3}{16}$ ” hole parallel with the grain. I suggest having students build a jig to hold their pieces while drilling. You will need 13 of these.

After all pieces are sanded, I recommend staining or painting at least one of the pieces for contrast. Using wood glue, place dowels into base and allow glue to dry. (24 hours)