

## 10. Counting 1 - 2 - 3 - 4

Toys like Counting 1 - 2 - 3 - 4 have been around for many years in one form or another. This type of toy is used to help toddlers and young children learn a few numbers and some basic shapes. It helps develop fine motor control at the same time.



Figure 10-1. Counting 1-2-3-4

## Materials, Tools, and Plan

### Wood Cut List

Part	Material	Thickness, width, length	Qty
Base	Hardwood	3/4" x 6" x 6"	1
Pieces	Baltic birch plywood	1/4" x 3 1/2" x 3 1/2"	10
Pegs	Dowel	5/16" diameter x 1 5/8"	10

### Tools Required

- Woodworking tools and supplies (see Chapter 2, pp. 14-15)
- Special tools for this toy:
  - Square with 60-degree angle
  - Compass
  - Drill bits: 1/2" drill bit (brad point bit preferred); 5/16" twist bit



**Figure 10-2.** 1-2-3-4 Board and Pieces



## Steps

### Base and Pegs

**1 – Base.** Cut  $\frac{3}{4}$ " stock into a 6" by 6" square.

**2 – Mark peg holes.** Use a pencil to locate the centers of the 10 holes for the pegs, following the dimensions given in Figure 10-3, or by using the template for the base given in Figure 10-4. Accuracy is important here to ensure that the pieces will slide easily onto the dowels. Use a punch to increase the size of the marks.

**3 – Round corners.** Using a sanding block, stationary belt or disk sander, round the corners to an approximate  $\frac{1}{4}$ " radius.

**4 – Round over edges.** Using a sanding block or a router, round over the edges (top and bottom) to a  $\frac{1}{8}$ " to  $\frac{3}{16}$ " radius.

#### *Router Safety*

**DO NOT USE** a router to round over edges of toy parts **UNLESS** the router is stationary, that is, attached to a router table. See Ch. 18, p. 158.

**5 – Drill holes for pegs.** Use a piece of scrap wood to drill test holes with a  $\frac{5}{16}$ " drill bit. Test that the  $\frac{5}{16}$ " dowel purchased for this project forms a good glue joint in the test holes. If not, select a different drill bit or sand the dowels.

Drill the 10 holes exactly  $\frac{1}{2}$ " deep. If available, put a stop on the drill bit or drill press to ensure all the holes are the same depth.

#### *Glue Joints*

See Chapter 2 (pp. 18-9) on drilling and testing good glue joints for dowels.

**6 – Sand.** Use 150 grit sandpaper on all surfaces of the base.

**7 – Cut pegs.** Before cutting, sand the entire  $\frac{5}{16}$ " dowel using a sanding pad. Cut 10 pieces from the dowel, each exactly  $1\frac{5}{8}$ ". Check that the pegs form a proper glue joint in the holes drilled in the base. Chamfer the edges of one end of each peg.

#### *Chamfering*

See Chapter 20 (pp. 180-1) for a simple jig used to safely sand, round over, or chamfer the end of a dowel using a stationary belt or disk sander.

**8 – Attach pegs.** Use a nail or toothpick to smear glue into the 10 holes in the base, and then insert a peg into each hole. Wipe off any glue that squeezes out of the holes.

### Circle, Rectangles, Triangles, and Squares

**1 – Circle.** Use a compass to draw a  $2 \frac{7}{8}$ " diameter circle on one of the  $3 \frac{1}{2}$ " square pieces of Baltic birch. Cut out the circle within  $\frac{1}{16}$ " of the outline, then sand to the outline. Mark the center of the circle with a punch.

#### Circle Cutting and Sanding Jigs

See Chapters 18 (155-8) and 20 (178-9) for jigs to cut out and sand circles.

**2 – Rectangles, triangles and squares.** Following the dimensions given in Figure 10-3, or using the templates (Figure 10-4), cut out 2 rectangles, 3 triangles and 4 squares from the remaining Baltic birch  $3 \frac{1}{2}$ " x  $3 \frac{1}{2}$ " blanks.

Using a chop saw is the easiest way to cut out these pieces. Of course, other methods can be used, and if rough cuts are made the pieces can be sanded to achieve the correct sizes. Mark the exact locations with a punch where holes are to be drilled.

**3 – Drill holes.** Holes need to be drilled in each of the toy pieces using a  $\frac{1}{2}$ " drill bit. The accuracy of the location of these holes is very important for the pieces to fit properly on the pegs. It is possible to drill two or three of the pieces at a time if they are held together tightly with clamps while drilling. Be certain to use a backup board for clean exit holes when drilling.

#### Drilling and Drill Bits

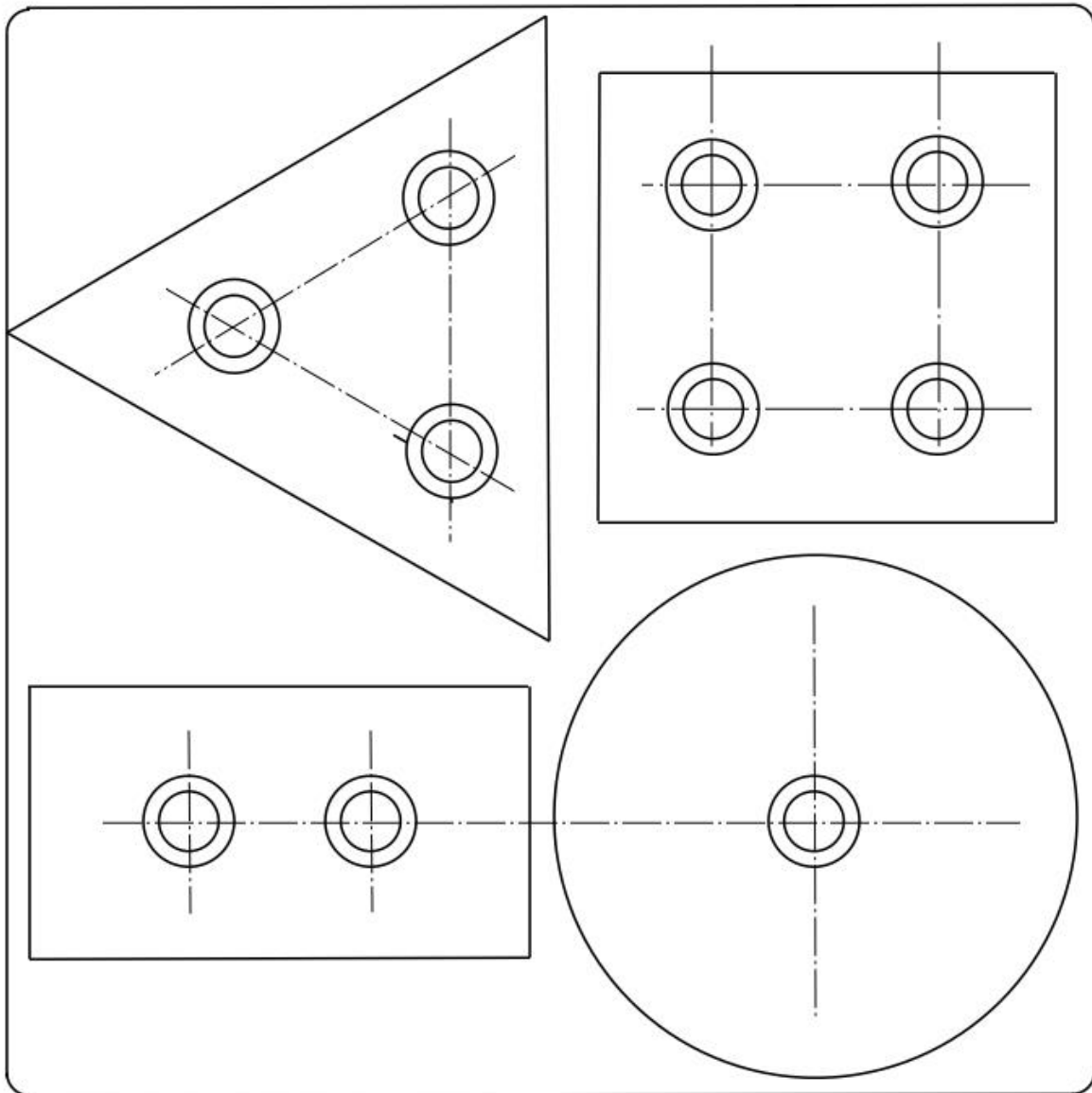
See Chapter 19, pp. 165-7.

**4 – Sand.** Using a sanding block, sand the top and bottom of each piece and all edges, including around the  $\frac{1}{2}$ " holes. Round the corners of the rectangles, triangles, and squares.

### Finish

**1 – Seal.** Apply a coat of de-waxed shellac to the entire base, including the pegs, and to all the pieces. When dry, sand lightly with a foam sanding pad to remove any raised grain. Let dry for about one hour.

**2 – Polyurethane.** Apply one or two coats of water-based polyurethane to the base, pegs, and pieces. Lightly sand between coats with a fine sanding pad.



**Figure 10-4.** Counting 1 - 2 - 3 - 4 Templates