

14. Mouse

Toddlers can get a lot of practice walking and running with this push toy mouse (Figure 14-1). And the mouse has been known to squeak as the wheel axle rubs against the hole in the mouse's body.



Figure 14-1. Mouse

Materials and Tools

Below are the materials and tools required, followed by a parts explosion (Figure 14-2) and side view (Figure 14-3).

Wood Cut List

Part	Material	Size (thickness, width, length)	Qty
Body	Hardwood	3/4" to 1" x 7" x 9"	1
Wheels	Hardwood or plywood	3/4" x 4" x 4"	2
Ears	Plywood	1/4" to 3/8" x 3 1/4" x 6"	1
Grip	Hardwood	3/4" x 3/4" x 2 1/2"	1
Axle	Dowel	3/8" diameter x 4 1/2" (cut-to-fit)	1
Wheel spacers	Dowel	3/4" diameter x 1"	2
Push stick	Dowel	1/2" diameter x 17 7/8" ²⁸	1
Nose connector	Glue dowel	1/4" diameter x 1"	1

Other Parts

Part	Material	Size	Qty
Eyes	Options	See ways to create eyes (Chapter 21)	2
Nose	Hardwood ball	3/4" with 1/4" diameter hole	1
Feet	Leather, plastic or rubber ²⁹	1/16" x 2" x 4"	2
Feet fasteners	Brads	1"	4

Tools Required

- Woodworking tools and supplies (see Chapter 2, pp. 14-5)
- Special tools for this toy
 - Twist drill bits: 3/8", 25/64", and 13/32"
 - 1" Forstner bit
 - Pliers

²⁸ Cut length to fit size of child.

²⁹ A piece of inner tube works well. The material must be flexible enough to curve with the wheel as it turns.

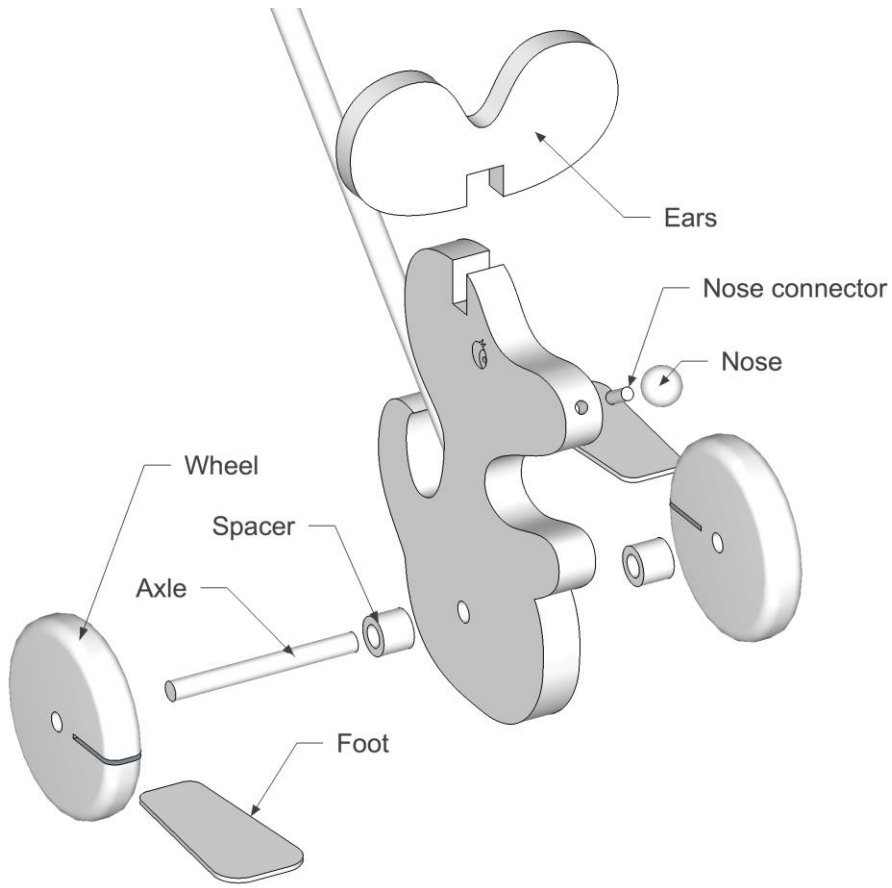


Figure 14-2. Mouse Parts Explosion

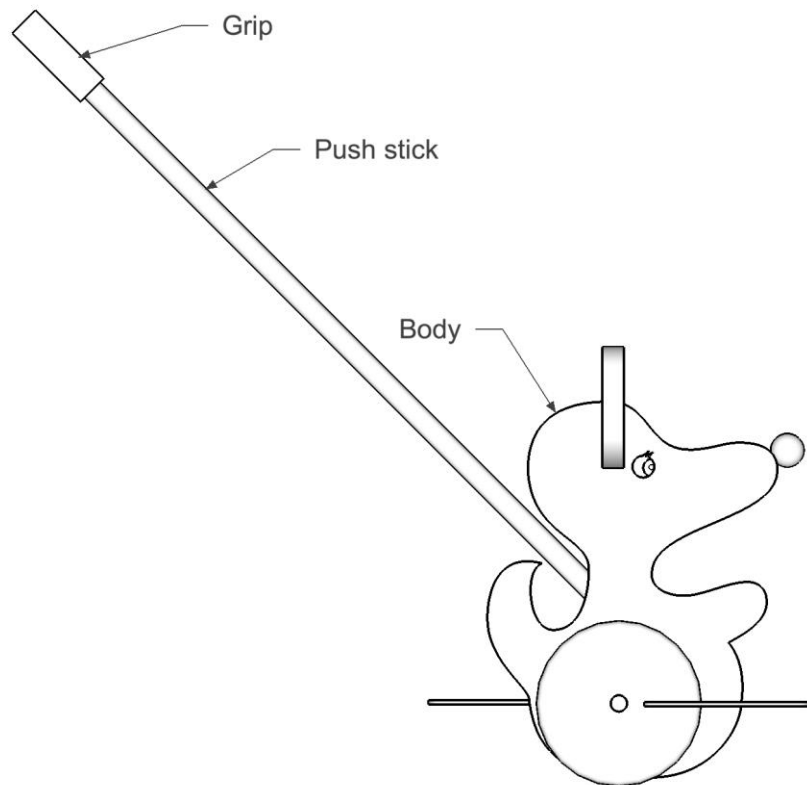


Figure 14-3. Mouse Side View

Plans and Steps

Body

1 – Design. Figure 14-4 gives the dimensions for the mouse body. The template for the body is at the end of this chapter (Figures 14-8). Copy the outline of the template onto the rectangular blank for the body and mark the holes that need to be drilled in the face of the blank.

2 – Hole for wheels. Drill the through hole for the $\frac{3}{8}$ " axle using a $\frac{13}{32}$ " drill bit. Since the axle must rotate in the hole, a drill bit larger than $\frac{3}{8}$ " must be used. Drill a test hole and check that the $\frac{3}{8}$ " dowel being used for this project rotates freely.

3 – Eyes. Use the template to mark the location of the eyes. There are several choices for the mouse eyes. See step number 6, in the next section. The size of the holes for the eyes will depend on the option chosen. No holes will be needed if the eyes are painted or plastic eyes are glued on.

4 – Shape. Cut out the body to within $\frac{1}{32}$ " to $\frac{1}{16}$ " of the outline. Do not cut the slot for the ears now. That will be done in step 3 of the section (on the next page) on "Holes and Slot in Edge of Body." Sand the body to the outline.

5 – Edges. Round over edges to a $\frac{1}{8}$ " to $\frac{1}{4}$ " radius, either using a rasp and sandpaper or a router.

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.

6 – Sand. Progressively sand all surfaces and edges up to a 150-grit sandpaper.

Wheels, Ears, Feet, Eyes, Push Stick and Grip

1 – Wheels. The $3\frac{3}{4}$ " diameter wheels need to be made from plywood or hardwood. The center hole should be $\frac{3}{8}$ " in diameter. Adjust the size of this hole to the dowel purchased for this project, allowing for a proper glue joint.

2 – Wheel spacers. Cut the 1" spacers from a $\frac{3}{4}$ " diameter dowel. Locate the center of the $\frac{3}{4}$ " diameter and drill a $\frac{13}{32}$ " hole through each spacer. These small spacers need to be held firmly when drilling the hole, and the $\frac{3}{8}$ " dowel needs to rotate freely in this hole. Sand the corners of the spacers to break any rough edges.

Making Wheels

See Chapters 18 and 19 for ways to make large wheels. There is also a jig described in Chapter 20 for sanding the edges of wheels, and another jig in Chapter 18 for rounding over wheels using a router.

Jig to Hold Spacers for Drilling

See Chapter 19 (p. 170) for an easy to make jig for holding a spacer while drilling the center hole.

3 – Feet. Use the template (Figure 14-7) to cut out two feet from the material chosen (leather, plastic, or rubber).

4 – Slot for Feet. Draw slots in the wheels for the feet, as shown in Figure 14-2 (or 14-3). Cut a slot in each wheel about 1" long perpendicular to the edge. The feet will be inserted in this slot during the assembly process. The width of the slot needs to match the material used for the feet.

The feet should not fit loosely in these slots. Try to make the width such that a small amount of force is required to pull the feet into the slot.

5 – Ears. Using the template (Figure 14-6), draw an outline of the ears onto the 3 1/4" x 6" blank. Make the width of the cut-out on the bottom of the ears fit the width of the mouse body. Cut out the ears, sand to the outline,

round over the edges (except the edges of the cut-out) to a 1/8" radius, and sand all surfaces and edges to 150 grit sandpaper.

6 – Eyes (optional). Axle pegs with either 1/2" or 3/8" heads or wood buttons with 1/2" or 3/8" heads can be used for the eyes. If axle pegs are used, their tenons will need to be shortened. Other choices are to purchase plastic eyes or paint them directly on the body.

Creating Eyes

Different ways to create eyes are described in Chapter 21, pp. 184-5.

7 – Push stick. Make the push stick and grip as described Chapter 2. Adjust the length for the child that will be using the toy.

Holes and Slot in Edge of Body (see Figure 14-4)

1 – Push stick. Drill a 1/2" hole 1" deep in the body for the 1/2" diameter dowel.

2 – Nose. Drill a 1/4" hole 1/2" deep for the glue dowel that holds the ball nose.

3 – Ears. In the body cut the slot for the ears 5/8" deep. The width of this slot should suit the

thickness of the blank out of which the ears were made.

Glue Joints

See Chapter 2 (p. 19) for warning about glue joints for dowels.

Finish

1 – Sealer. Mask off all parts that will be glued. Seal all wooden parts with de-waxed shellac, except the axle that is used to attach the wheels and the dowel used to attach the nose. Allow to dry, then lightly sand with a super fine sanding pad.

2 – Paint (optional). Any painting of parts should be done before the mouse is assembled.

Paint the eyes directly on the face of the body, if that option for eyes is chosen.

3 – Finish coat. Continue to mask all parts that will be glued. Apply water-based gloss or semi-gloss polyurethane or another child safe clear finish to all the sealed parts. Two coats are recommended.

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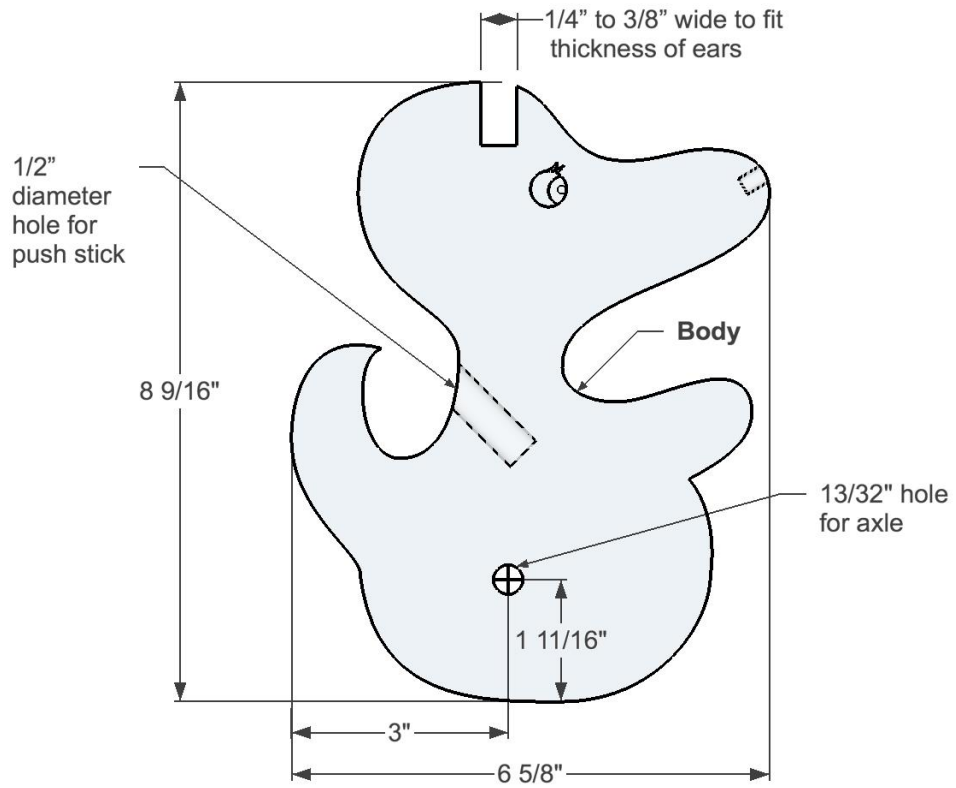


Figure 14-4. Mouse dimensions (not actual size)

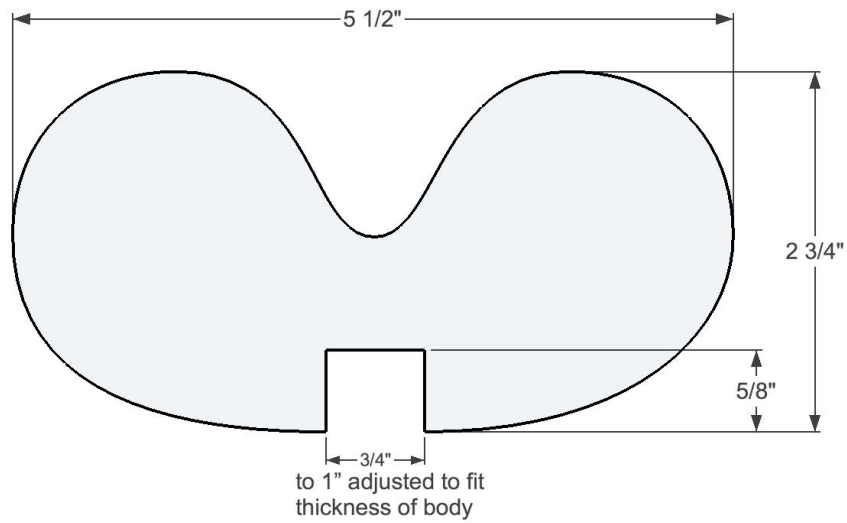


Figure 14-5. Mouse Ears Dimensions (not actual size)

Assemble

1 – Feet. Pull the feet into the slots in the wheels. Since the slots are narrow, the best way to insert the feet is to clamp the wheel in a vice and use two pliers to pull the feet into the slot.

Nail two brads into the edge of each wheel to secure the feet. The brads should go from the edge of the wheel into the feet. Countersink the brads and fill the holes with wood filler.

2 – Glue axle. Sand the end of the axle. Put glue into the center hole of one of the wheels using a toothpick or nail. Wipe off any glue from the faces of the wheel, then insert the axle so its end is flush with the outside of the wheel. Wipe off the glue that is pushed to the outside. Allow the glue to set for 15 minutes.

3 – Dry assemble wheels. Put one of the $\frac{3}{4}$ " wheel spacers onto the axle. Slide the axle with the wheel attached into the axle hole in the body of the mouse. On the other side of the body put the second $\frac{3}{4}$ " spacer and the second wheel. Allowing a gap of about $\frac{1}{32}$ " between the spacers³⁰ and the body, place a mark where the axle is flush with the outside of the second wheel – the one not yet glued to the axle.

4 – Trim axle and glue second wheel. Disassemble the wheels and axle (step 3) and

trim the axle at the mark. Reassemble the axle, spacers, and wheels. Glue the second wheel to the axle and remove the $\frac{1}{32}$ " spacers.

Using Wood Buttons to Cover Axle Hole

An alternative to the method described above for attaching the wheels is shown in Figure 14-1. Here a $\frac{1}{2}$ " wood mushroom button is glued into the axle hole. The wheel is wide enough to allow space for the tenon of the button to be glue into the axle hole, and still have enough space to glue the axle to the wheel.

4 – Nose. Glue one end of the $\frac{1}{4}$ " connector dowel into the ball and the other end into the body.

5 – Ears. Glue the ears to the slot in the top of the head.

6 – Eyes. If using axle pegs, wooden buttons, or purchased plastic eyes with tenons, holes should have already been drilled for the tenons. Glue the eyes into the holes on either side of the body.

³⁰ The plastic clip used to seal a loaf of bread or a piece of cardboard from a cereal box make ideal spacers for this gap.

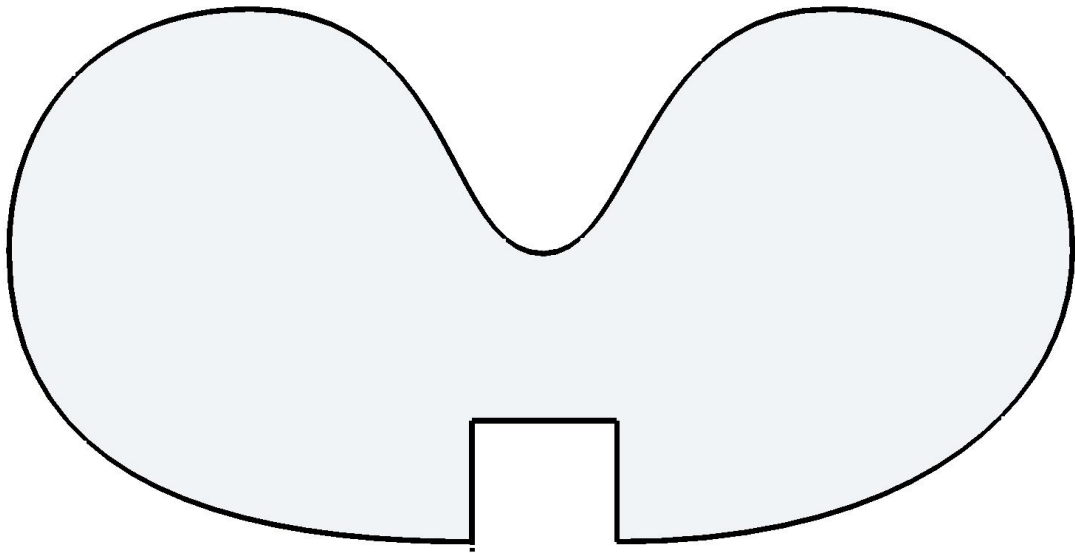


Figure 14-6. Template for Ears

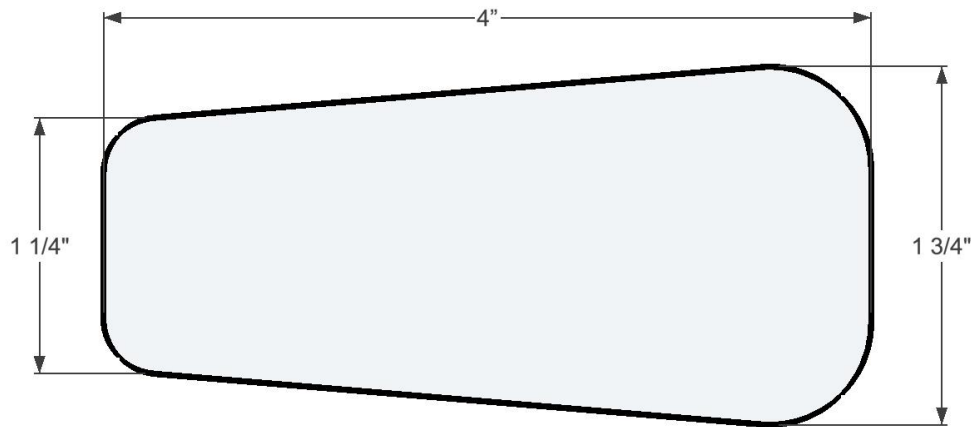


Figure 14-7. Template for feet

Figure 14-8. Template for body (next page)

