Reynolds High School
Wood Shop
Project Library

Hand Tool Project

Background:

The purpose of this exercise is not to make something beautiful that you will cherish forever, but to practice using a variety of hand tools safely and correctly. Once you appreciate how each hand tool works, you'll better understand how to use its powered cousin. Of course, a real woodworker will appreciate the value of a good hand tool and could finish this block by hand before you even plug in the miter saw.

Description:

You are making a block of wood. I'm not really sure what you'll do with this when you're done. At the end of the project, I'll ask you to write a description of your own. Perhaps you can invent a good use for this!

Production Plan

Step 1: Identify Tools

Power Tools

- You won't use any power tools in this project. That's why it's called the "Hand tool project"!

Hand Tools

Tape Measure 	Pencil 	Back Saw / Miter Box 
Combination Square 	Try Square 	Block Plane 

Coping Saw	Pattern	Chisel
		
File	**Bench Vise**	**Hand Screw**
		

Step 2: Locate Materials

- Pine, 1x3 (nominal)
    - ** When you buy boards at a lumber yard, they are sold in "nominal dimensions". "Nominal" means "in name". When you buy a 1x3, you aren't really buying a board that is 1" by 3". That's just what they call it.* The actual measurement of a 1x3 is _____" by _____".

Step 3: Cut Stock

- Always cut your stock longer than what you need. This allows you to square both ends of the board and work around any defects.
- Cut a piece of 1x3 *about* 8" long. This cut does not have to be perfect!

Step 4: Square Stock

- Use the back saw and miter box to cut one end of your board square.
- Check your cut with a try square or combination square.

Step 5: Prepare Joints

- Lucky you! There is no joinery in this project! Move on to the next step.

Step 6: Drill Holes

- There are no holes in this project. Keep going!

Step 7: Shape

Here's where the magic happens. Use the shop drawing to help you with these steps. Be sure to measure carefully as you go!

CUTTING TO LENGTH (6 ¾")

1. Put your name and period on the face of the board right now. There are going to be 120 of these things floating around the shop soon and you don't want to have to do this twice… or three times… or four…

2. Use a tape measure to mark exactly 6 ¾" in length from the squared end to the end to cut.
3. Use a combination square to make a perpendicular line at the 6 ¾" mark.
4. Use the miter box and back saw to cut the board at the 6 ¾" mark. Set the miter box on the edge of a bench and push the block towards the back of the box. Leave half of the line width when you cut! (In other words, you should be cutting so close to the line that you saw half of it and leave half of it behind.)

JOINTING TO WIDTH (2 3/8")

5. In the drawing, you see that your board will be 2 3/8" wide. The board you have is bigger than that. These next steps will show you how to achieve the 2 3/8" width.
6. Use the tape measure to mark 2 3/8" high on the face. Make two marks, one on the left and one on the right, so that you can get a straight line.
7. Use the straight edge of the combination square to connect a straight line between the two points.
8. Clamp the board in a bench vise.
9. Use the block plane to shave the board down to the 2 3/8" mark. Be sure to keep the plane square! Check often with a combination square or try square. *Taking material off the edge of a board is called jointing. (There is a power tool in the shop called a jointer that does the same thing, only faster. It also eats fingers!)*

COPING THE RADIUSED END (1" and ¾")

10. Use the pattern to trace the two radii on one end of the board. Be sure the ends of the two boards line up perfectly. Also, don't cut your board shorter than 6 ¾"! *(Optional: For a higher grade, use the shop drawings to construct your own radii. They are 1" and ¾". Leave your construction marks on the board to receive credit for this!)*
11. Clamp the board in a bench vise and use a coping saw to cut the two radii. Be sure that your cut is at 90 degrees to the face of the board! Cut with smooth, even strokes.
12. Use a file to clean up the cuts when you are done.

CUTTING THE BEVEL AND RADIUS EDGE (1/4" and 3/16")

In the space below, sketch a beveled edge and a radiused edge.

Beveled Edge	Radiused Edge

13. The **beveled edge** is flat. It measures ¼" from the face and the edge. (See the shop drawing.) This is on the side of the board that has the 1" radius.
14. On both the left and right of the board, measure ¼" from the corner on the face and the edge. That's a total of four marks. Connect each pair of marks using a straightedge.
15. Clamp the board in a bench vise and use the block plane to cut a 45 degree beveled edge. Use the lines that you drew as a guide. Use smooth, even strokes with thin cuts.

16. The **radiused edge** is round. It measures 3/16" from the face and edge. (See the shop drawing.) This is on the side of the board that has the ¾" radius.
17. On both the left and right of the board, measure 3/16" from the corner on the face and the edge. That's a total of four marks. Connect each pair of marks using a straightedge.
18. Clamp the board in a bench vise and use the block plane to cut a radius on this edge. Start with a cut at 45 degrees, then work one side and then the other to make a smooth, rounded edge. Do not use sandpaper to finish this! (Okay, in the real world, you'd use sandpaper to finish this, but I want to see what you can do with a hand plane first!)

CHISELING THE GROOVE (3/4" wide by 3/16" deep)

19. Using the shop drawing to guide you, measure 2 ½" from the square end. Measure another ¾" for the width of the groove.
20. Mark two perpendicular lines using a square.
21. Use a back saw and miter box to cut exactly 3/16" deep. You will need to invent a way to measure this! *(If you watch the videos, you'll see a method that I used!)*
22. Firmly clamp your work to the workbench with a hand screw. Use a chisel to remove the material from the notch you created. Do not hit the chisel with a hammer. Use your palm or a wooden mallet.
23. Refer to the drawing to mark the last groove using any method that you have learned so far. *(Again, you'll see my method in the video.)*
24. For this cut, you are going with the grain, so you do not need to pre-cut the edges of the notch. *Do not use the back saw for this cut!*
25. Use the chisel to remove the material from the groove until it is exactly 3/16" deep.

FINISHING UP

26. Now wasn't that fun? Make sure your name and period are on your board (see step 1).
27. Finally, you need to write an entry for our class catalog of interesting things. On a sheet of paper, write a description of this object that you might find in a catalog. Include the material that you used, who would be interested in it, and its possible uses.
28. I bet most of you miss that last step!

Step 8: Smooth

- Since this is a practice project, you don't need to sand anything. I want to see all of your construction lines.

Step 9: Assemble

- There's nothing to assemble. (Unless you need to pull yourself together after this arduous challenge!)

Step 10: Finish

- We're going to leave this as bare wood, without a finishing coat.

Step 11: Install Hardware

- There is not hardware to install. You're done!

Assessment

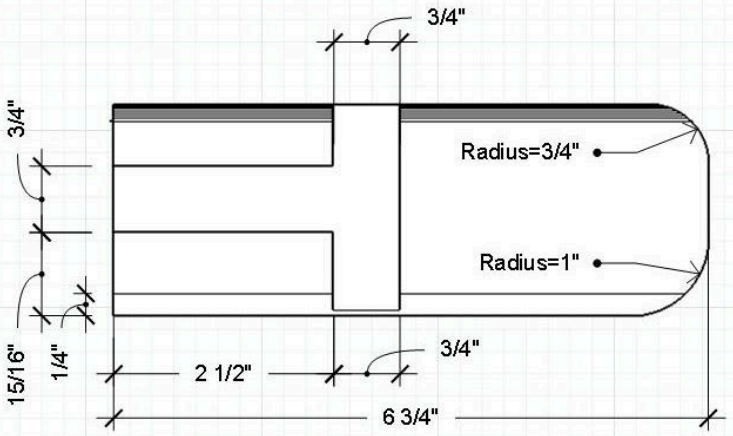
Turn-in Checklist

- ❑ Board is 6 ¾” long, and 2 3/8” wide.
- ❑ There is a ¾” radius on the top-right corner, and a 1” radius on the bottom-right corner.
- ❑ There is a ¼” bevel on the bottom edge of the top face (see drawing).
- ❑ There is a 3/16” radius along the top of the top face (see drawing).
- ❑ There is a ½” groove across the grain on the top.
- ❑ There is a ½” groove along the grain on the left side of the top.
- ❑ You wrote a very interesting catalog entry using your best language skills. (See step 7, line 28.)

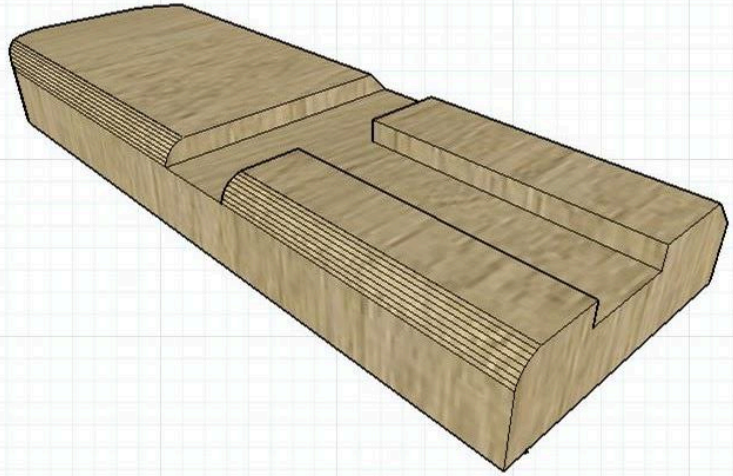
Scoring

6	Every step is completed. Everything is accurate to within 1/16”	95-100%
5	Every step is completed. Everything is accurate to within 1/8”	85-95%
4	Every step is completed. At least half of the measurements are within 1/8”	75-85%
3	Every step is attempted. At least two measurements are within 1/8”	65-75%
2	At least half of the steps are attempted. One measurement is within 1/8”	50-65%
1	A board is turned in with your name on it.	0-50%

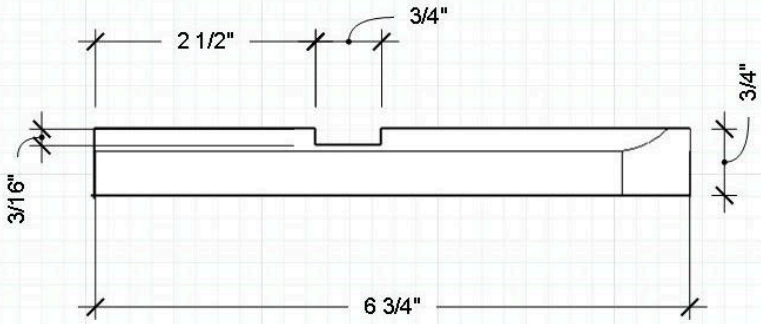
Top



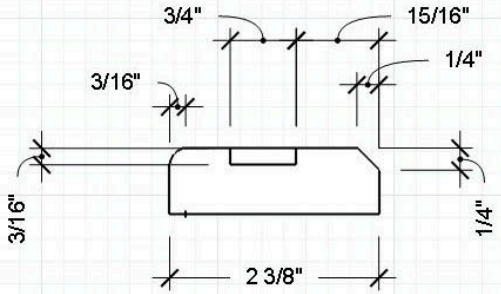
Isometric



Front



Left



RHS WOODS

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PROJECT
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DRAWN BY
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DESCRIPTION
Details

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