

Making a Toolbox

Materials

1"x 4"x8' (2.54cm x 10.15cm x 243cm) wood	Square
7/8" (2.2cm) dowel	Tape measure
11"x 8"x 5/8" (28cm x 20.3cm x 1.6cm) plywood	Goggles
Wood glue	Hammer
1.5" (3.8cm) common nails	Hand saw
Wood clamp	Hand plane
Sandpaper/hand sanding blocks	Power drill

Piece Dimensions

Base 5/8" (1.6cm) plywood - 1@ 8"x 11" (28cm x 20.3cm)

Sides - 2@ 4" (10.15cm) x ? (see below)

Ends - 4@ 4"x 10" (10.15cm x 25.4cm) Cut to angles on one end (directions below)

Dowel - 7/8" x 12.5" (2.2cm x 31.75cm)

Skills

- Measuring
- Safe use of a hand saw
- Gluing two surfaces together
- Using a hand planer
- Hammering and nailing safely
- Using a power drill safely
- Safely using a wood burner

Things to consider:

- Are you working safely? Goggles? Hands clear of blades/hammers/drills?
- Do you know how to use the tool? If unsure, ask for help.
- The hand saw has a waste, known as "kerf", of 1/8" (0.3cm). That means every time you use the saw 1/8" (0.3cm) of wood is lost. Make sure you consider that in your measurements.
- When squaring to draw a line, place your pencil where you want to draw the line and bring the square to the pencil.
- Clean up your space at the end of each class

Process:

1. Take pictures to record the process as you build your toolbox.
2. Gather a 1x4 and a base (8x11) and lightly write your name on both in pencil.
3. Watch the demonstration on measuring and cutting safely. Follow directions to practice with your partner. Measure and cut a 1.5" (3.8cm) piece off the end of your board. Each person should take a turn. What is the kerf? Which side is the discard?
4. Measure the length of your base. We need to cut our side pieces to be the same length as the base plus the ends. How long do they need to be? This could be a little different for each person. Check with the teacher before you start cutting.
5. Measure and cut your pieces from the 1x4. Do two measurements at a time then cut both. Make your first cut to the length listed above. How much extra do you need to add to your second cut? Remember the old adage, "Measure twice, cut once!"

6. Repeat the sequence until you have all of your sides and ends cut. Work with your partner to get both your cut sets done.
7. Once all pieces are cut take the 4 end pieces and match them up in pairs. For each pair, place them together so that the sides that will be glued match up nicely. There may be a slight angle that needs to be considered so that they lay flat together.
8. Watch the demonstration and then glue your ends together. Work with your partner to get both ends glued. Clamp them for 15 minutes.
9. After about 15 minutes you should be able to move the pieces. THEY ARE NOT CURED YET so be very gentle or they will fall apart. Leave the glued ends to dry for 24 hours.
10. After gluing the end pieces, square off one edge with a hand plane or sandpaper depending on need.
11. On the side of the end piece opposite the squared edge, mark off a 3" center block. Then come up 5" from the bottom on each side. Draw a line between the points and cut the corners off.
12. On the ends, mark a point 8.5" from the bottom along the centerline. Using the drill and the $\frac{7}{8}$ " bit, make a hole in both end boards. Make sure rubbish board is under the one you are drilling to avoid damaging the board or the table.
13. Cut a dowel to 12 $\frac{9}{16}$ "
14. Nail the ends and sides-
 - a. One person holds while the other nails.
 - b. Start nails into end pieces so that they just stick out and dent the bottom piece.
 - c. Apply glue evenly along edge of the base.
 - d. While one person holds the base and side together, the other hammers the nails in. Repeat on the other end.
15. Repeat process for sides. Before nailing sides on check if square
16. After nailing use a sanding block or hand plane to even edges. Use a sanding block to smooth all cut surfaces and round the edges.
17. Lightly sand dowel and slide through holes. Glue the tips before finishing. If loose, hammer a small nail through end to hold handle steady.
18. Using your ipad or a computer, print your first name and 2019 onto paper in a large block font. Place a sheet of carbon paper under the print and copy it onto the end of your toolbox
19. Using the soldering iron, burn your name into the end of the box. Work slowly and carefully.

Reflection:

Write a reflection using the guidelines provided. In addition to the general guidelines, you should also discuss how building the toolbox was different from your expectations?

1. Pictures of each step of the process including any drawing or sketches you made during brainstorming and redesign.
2. Your initial thoughts on the project. Were you confident, concerned, excited?
3. If you needed to brainstorm ideas for the project, what different designs or ideas did you initially come up with?
4. How did those designs change or were they modified as you went through the process?
5. Describe what you did during the different phases of making or constructing the project. Include pictures to show the steps.
6. Did the final product come out as you had envisioned it? Did you need to modify your design as you went? Why did it need to be redesigned?
7. How would you change either your design or the process if you were to do it again to make it better?

8. What was the most challenging part of the project? What was the most rewarding part of the project?
9. What was the most surprising thing you discovered while working on the project?