

Lesson #15: Hand Tool Project (7-10 Day Project)

Objectives

Students will be able to...

- Apply information learned in this unit to a project.

Common Core Standards

Cabinetmaking and Wood Products Pathway

A1.4, A1.7, A2.1, A2.2, A3.1, A2.3, A6.1, A6.2 A3.4, A6.7, A4.1, A5.1, A5.2, & A5.4

Residential and Commercial Pathway

D2.1, D2.2, D3.1, D3.3, & D4.1

Reading 11-12.4

Writing 11-12.1

RIST 11-12.2

Problem Solving/Critical Thinking 5.4

Health and Safety 6.2, 6.3, 6.6, & 6.12

Responsibility and Leadership 7.4 & 9.3

Demonstration and Application 11.1

Technical Knowledge and Skills 10.1, 10.2, & 10.3

Materials

Hand Tool Project Order of Construction
16-Inch Block for Each Student

Lesson Sequence

- One last bit of “business” we must take care of before entering the shop is finding volunteers that will help lead the rest of the class in clean-up at the end of the period. “Housekeeping” is a very important part of any shop’s operation, and ours is no exception. Assign clean-up duties for the shop. Allow for volunteers first. Jobs include: Foreman, safety glasses, tools, tool room, machines*, benches, floor, sweeping etc.
- Pass out the *Hand Tool Project Schematics and Hand Tool Project Order of Construction*. Review the Project’s order of construction.

- Take students into the shop and demonstrate the assigned operations from the print/hand-out each day. Be sure to reiterate expectations for shop behavior, tool use and safety. The Project Schematics must come each day to the shop.
- Distribute **16-inch blocks** to students. As you hand the blocks out, write the student's name and period number on the back with a large permanent marker. As soon as students receive their blocks have them get to work.

**Students can dust-off the machinery. This gets them into the habit of cleaning the machinery at the end of every period even though none of the machines are used for this project.*

Assessment

Be sure to roam around shop and check in with students along the way. Check for student understanding by questioning and observing what they are doing every day in the shop.

Use project criteria to grade assignment.

Accommodations/Modifications

Check Student Understanding
One on One Support
Pair Students Up If Needed
Extra Time to Complete Project

Hand Tool Project-Order of Construction

Directions: *Read and understand* each step completely BEFORE attempting it. Write the corresponding number from the project drawing in the spaces provided. At the close of each class, ask the instructor to check your work and initial and score the operations you have completed that day.

- _____ 1. Using the Measuring and hand Saw skills that you have already learned in this class, choose a 2 x 4 piece of Douglas Fir, measure, mark and cut it (just to the right of the line) to give you a piece that is 16 inches long.
- _____ 2. Orient your 2 x 4 board by deciding which face will be the back, top and which edge will be the bottom, and which end will be the right and which end will be the left. The board must be oriented correctly every time you measure and make a mark. Use the provided marker (approximately $\frac{3}{4}$ " tall letters near the center of the board) to mark a "T" on the top, "B" on the bottom, "L" on the left side and an "R" on the right side.
- _____ 3. Write your name and class number legibly on the back of your block in large letters with the marker your teacher will provide.
- _____ 4. On the front face of your 2x4, use a **tape measure** to measure $15\frac{1}{4}$ inches over from the left front edge and make a carot (Δ) mark. Place the tip of your carpenter's pencil on the tip of the carot mark and carefully slide the **speed square** over until it comes to rest against the pencil and draw a vertical line across the face of the block. Place the block into the vise and clamp it tight enough so that it won't bounce around while you cut. Using a **crosscut saw**, make a cut just to the right of the line, being careful to leave the line visible.
- _____ 5. Use a speed-square to mark a line at a 45° angle across the face of your block. Place the pivot-point of the speed square at the bottom left corner of your block. Pivot to 45° and make your mark.
- _____ 6. Set a sliding **T-bevel** for a 67.5° angle. Mark your 2x4 using the same point as the 45° line you just drew. With a cross-cut saw, cut along the 67.5° mark. Cut just to the left of the line, being careful to leave the line approximately $\frac{1}{32}$ ".
- _____ 7. Lay out a parallel line $3\frac{3}{8}$ inches up from the bottom edge across the entire length of your block using a **marking gauge**. With a hand plane, remove the top edge of the block down to the line. Make sure to plane to the line; do not plane the line off.
- _____ 8. On the front face of your stock, measure over $3\frac{1}{2}$ inches from the right end, and $1\frac{3}{8}$ inches up from the bottom edge. Where the two lines intersect, bore a $\frac{7}{8}$ -inch hole using a **brace** and **drill bit**.
- _____ 9. Measure over 7 inches from the right end, and up $1\frac{1}{4}$ inches from the bottom. Drill a $\frac{5}{16}$ -inch hole with a **hand drill** at this point.

- _____ 10. On the front face of your 2x4, measure over 7 inches from the right end, and up $2 \frac{3}{8}$ inches from the bottom. At this point, drill a **countersink** and drill a pilot hole for a #6x1 $\frac{1}{4}$ inch drywall screw. Install the drywall screw with a **Philips screwdriver**. Make sure the head of the drywall screw is flush.
- _____ 11. Measure over 10 $\frac{5}{8}$ inches from the right end, and up 1 $\frac{1}{2}$ inches. Using a **compass**, draw an arc with a 1- $\frac{7}{8}$ -inch radius centered on this point.
- _____ 12. Place your block so its top edge is down on the workbench, this will allow you to work on the bottom edge.
- _____ 13. On the bottom edge, measure over 2" from the right end, and down $\frac{5}{8}$ of an inch. Drive an 8 penny (d) finish nail at this point with a **finish hammer**.
- _____ 14. Measure over 4 inches from the right end and down $\frac{7}{8}$. Drive a 6d finish nail at this point.
- _____ 15. From the right end, measure over 5 $\frac{1}{2}$ inches and up $\frac{3}{4}$ of an inch. Drive an 8-penny sinker at this point, leaving the nail head sticking out. Do not sink the nail and use a **framing hammer**.
- _____ 16. Measure over from the right end $7\frac{1}{4}$ inch and up $\frac{5}{8}$ of an inch. At this point, drive a 4d finish nail. Using a **nailset**, sink the nail head $\frac{1}{16}$ inch to $\frac{3}{32}$ inch below the surface of the wood.
- _____ 17. Measure over 9 $\frac{1}{2}$ inches from the right end of the block and mark a square line across the bottom edge of the block. Align the provided hinge leaf to the left side of the mark and trace the outline of the leaf. Take a 1" **chisel** and chisel out a mortise that will allow the leaf to sit flush with the surface of the wood.
- _____ 18. Place the block face up. Using a **straightedge** (a roofer's square works well) mark a line from corner to corner between the two longest points.
- _____ 19. Make sure your name and period number are still legible on the back face.
- _____ 20. Staple this paper to your block and turn it in to have it graded.