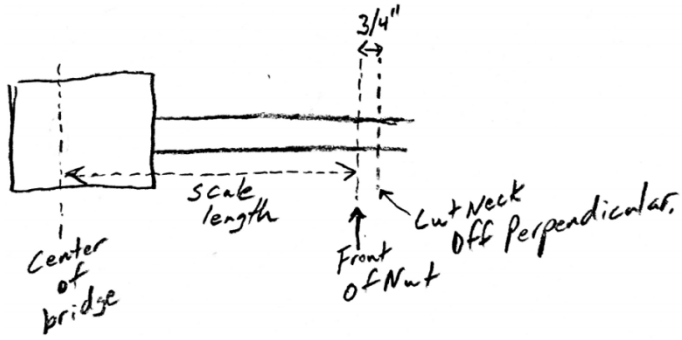
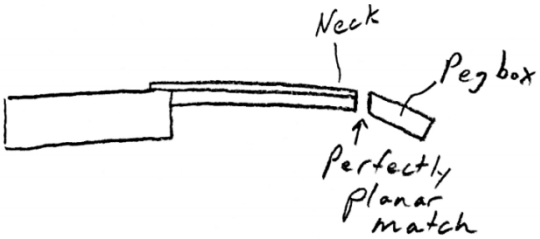
Day 5 Instructions

9. Mark the neck for cutting off the extra length. Be careful -- it's hard to put wood back together once you cut it off.
    a. Fully insert the neck into the instrument body so that the end fits in the neck support at the back of the instrument*.
    b. Measure one scale length from your bridge mark toward the end of the neck and make a pencil mark on your fret board. This will be the front of the nut.
    c. Make another mark ¾" inches behind the nut (opposite the bridge). This is where you will cut off the neck.
    d. Use a miter saw or the scroll saw to cut off the neck with a perfectly perpendicular cut at this location.



10. Optional -- Back to D104 for more sanding?
    a. **Make sure that the end of your neck surface is planar, and that it matches the end of the neck. You may want to use the belt sander to make it perfectly planar. Hold your peg box next to this surface to make sure that both surfaces are planar, and that they match properly**.
    b. Finishing the neck:
        i. If the edges of the neck and fret board are not aligned, you can use a plane to shave them off evenly.
        ii. If you want to sculpt the neck (e.g. make it thinner near the peg box), do that now.
        iii. This is also the best time to sand the neck. You can use the belt sander today.



11. **Glue the peg box to the neck.**
    a. Use tape to hold it firmly in place.
    b. The weakest part of your instrument will be the junction between the peg box and the neck. If you want to add strength to that joint, wait until the glue cures. Then glue an additional thin strip of wood across the joint. You can also wait to see if it breaks, and add the strip later if it does.

<u>Day 5 (Full block)</u>

12. Get a nut. Create a shallow channel for the nut.
    a. Use the nut as a guide to mark the edges of the channel with pencil
    b. Prop up the neck so that its weight does not rest on the peg box. Then carefully cut in on your marks with a coping saw. Stop sawing when the back of the blade is flush with the fret board surface.
    c. Use a chisel to "twist out" the material between your cuts.
    d. Insert the nut. Adjust as necessary.
13. Show your fretboard to Mr. Stapleton, so that he can confirm that it is flat enough to add your frets.
14. Mark the fret positions.
    a. Measure (in centimeters) the distance between the front edge of the nut to the near side (or middle, if you want) of the bridge.
    b. Calculate your fret placements, based on this distance.
    c. Tape a meter stick to your fret board, so that zero cm is at the front of the nut.
    d. In pencil, mark each location on each side of the fret board. Make sure that an imaginary line between opposite fret marks would be perpendicular to the length of the neck.

e. Try to have at least 12 frets, but don't have any frets closer than 1" to the body of the instrument.
f. Using scissors, or a file, make **small** notches where each of your pencil marks meets the corner of the fret board.

15. Attach the fret "wire". This is acutually 100 pound fishing line that is on the fishing reel.
    a. Drill two 1/4" deep, 1/8" or smaller diameter holes
        i. The first hole goes on the back of the neck, beneath the first fret.
        ii. The second hole goes on the back of the neck, beneath the last fret.
    b. Using a phillips driver bit, run the drill backward (CCW) in each hole, to create a countersink for a screw.
    c. Use a manual screwdriver to screw a ½' screw into each hole. Push hard, but stop when the screw is fully seated. If you keep going, you will strip the wood.
    d. Remove the screw that is under the first fret. Leave the other screw in, but back it out at least half way.
    e. Calculate the length of fishing line that you will need for the frets; then add 30%.
    f. Remove the proper length of fishing line from the reel. Make sure that you don't have a knot in your segment!
    g. Insert one end of the line through one of the 4 special sticks of hardwood. Tie a knot or two about an inch from the end, so that the line won't pull back through the wood.
    h. Insert the other end of the line into the hole that you drilled near the nut. Screw a screw about 2/3 of the way into the same hole. Wrap the fishing line around the screw once, and screw the screw in the rest of the way, pushing hard.
    i. With a partner holding the hardwood end of the line, stretch out the line until there is a lot of tension between you. Begin to wrap the fret line around the neck, making sure that it seats in the fret notches that you made.
    j. It is important to apply a LOT of tension. The frets must be completely flat on the fretboard. This is 100# line. You won't break it.
    k. After you finish the last fret, maintain tension and wrap your string twice around the last screw. Maintaining tension, screw in the last screw, pushing hard.
16. Attach the neck.
    a. Use a driver bit in reverse to ream out the body holes through which you will attach the neck.
    b. Insert the neck into the body using glue. Once the neck is fully seated, screw the body to the neck through.
17. Add the saddle.
    a. Position the saddle so that the bridge slot is correctly located on the mark that you made. Tape it down.
    b. Use the saddle holes as a template to drill holes through the body top.
    c. Glue the saddle to the body top, and then firmly attach the saddle with pop rivets.
18. Add the tuners
    a. Get four tuner screws, four plastic tuners, and four pairs of wooden knob parts (one with a D-shaped hole, and one with a circular hole).
    b. Glue the four pairs of wooden knob parts together, matching D-hole piece with a circular hole piece.
    c. Use a file to remove any sharp burrs from the head of the tuning screws.
    d. Cut off the extra piece from the peg box (if you haven't already done so).
    e. Create grooves in the plastic tuners. Using a drill with a driver bit, screw a tuner screw rapidly into and out of a plastic tuner. Don't do this for too long, or friction will melt the plastic.
    f. Insert the tuning screws into their wooden knob parts. Add some hot glue if you want.
    g. Insert the tuning screws into the back of the peg box.
    h. Screw each a distance into its plastic tuner (just to keep them together).
19. Add the strings (ukulele)

a. If you are looking at your instrument with the neck pointing to your left, the string order (from nearest to you to farthest from you) is 40#, 80#, 60#, 40#. Cut four strings that are about 25% longer than your scale length.
b. For each string…
    i. Pass one end of the string through its hole in the saddle. Tie one or more knots in the end of it, so that it won't pull back through the hole.
    ii. Pass the other end through the hole in the plastic tuner. Tie knots in the string so that the tuner barely reaches its slot in the peg box.
    iii. Screw the tuning screw into the tuner until the string begins to tighten.
    iv. Continue with the rest of the strings.
c. Insert the bridge and the nut.
d. Tighten the strings and decide whether or not you need to alter the nut or bridge.

20. Adjust the nut. You want the string to be very close to the first fret, but it should not touch the first fret. The easiest way is to deepen and/or widen the notches.
21. Adjust the bridge. The purpose of bridge adjustment is to get the strings close to the frets, so that their tension won't change much when you press down the string. You can adjust the bridge by sanding it shorter. You may want to add some notches to keep the strings in their places.
22. Tune your instrument. For a ukulele with the neck pointing to your left, the strings should have tones G, C, E, and A (near to far).