



Making the Bass Marimba

by Terry McGee and Jesse Rowan

We followed Jon Madin's book 'Make Your Own Marimbas'. Supplies of timber and hardware were donated by Cameron's Hardware, and the plumbing supplies needed were donated by Nature Coast Plumbing. Terry collected the hardware in his 'truck' (see above).

After testing various hardwoods available locally for resonance (we made a few sample bars), we chose Victorian Ash (also known as Tasmanian Oak) for the bars. The project took many days over several months to complete.

We hope the instruments we've worked on bring many years of musical fun and creative learning to the students and teachers of Broulee Public School.

Jesse and Terry



The Process

1. Cutting the bars

We marked out the measurements for each bar, starting with the longest - the lowest note. They were roughly cut using a small drop saw (compound mitre saw) with a roller support at the other end.



2. Trimming the width of the bars

The longer bars were slightly wider than the shorter bars. The width as well as the length affects the tone and pitch of the bars. This direction of cutting along the grain is called ripping.



3. Trimming the ends of the bars

The table saw is able to cut accurate right angles very smoothly. This direction of cutting is called cross-cutting (across the grain).



4. Marking arch limits

We measured and marked a space across the centre of each bar where we would cut and sand an arch in the back to bring the note down to its rightful pitch.



5. Cutting the arch

It's tricky to cut a curve using a bandsaw as the blade wants to dictate the direction. It takes a wide swathe out to save on sanding time. This can be done by hand using a chisel and mallet.



6. Sanding the arches

An oscillating spindle sander saved time and effort here. You have to be careful not to take off too much as towards the end, a little makes a noticeable difference to the pitch.



7. Hand planing to chamfer the edges

It helps to have a vice to hold the timber when planing. The hand plane is used to smooth the edges, then to take off the sharp arrises (corners).



8. Sanding the ends

The ends of the bars were sanded with a belt sander. You need to be careful not to burn the end grain by pushing too hard.



9. Chamfering the ends

By holding the bar at a 45 degree angle, the edges can be chamfered (slightly rounded). The bars will look and feel better with chamfered edges.



10. Salt test

We used sawdust instead of salt to find the nodal points. The nodal points are where the timber vibrates least, and this is where they are fixed to the frame with nails or screws to allow the best sound.



11. Vibrating with a mallet

As we struck the bar with the mallet the sawdust formed diagonal lines to show the pattern of vibration of the bar. The best musical sound is achieved by making instruments in ways that will not constrict vibrations.



12. The sawdust marks the nodal points

As the bar was hit continually the lines of sawdust became clearer. These were marked carefully with a pencil.



13. Tuning the bars

This was the trickiest part of all. We held the bar by a nodal point and hit it with a mallet in front of a microphone for the computer. The tuner app showed us how close we were to the pitch.



14. The electronic tuner

This free application by Japanese flute player, Tatsuaki Koroda, allowed us to tune the bars with great accuracy.



15. Drilling the holes in the bars

The holes need to be drilled at a marked nodal point so vibrations will not be constricted by the screws or nails that hold them on to the frame. Jesse used the drill press.



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16. Sanding the tops

The tops of the bars were levelled and sanded by passing them through the wide drum sander. This should have been done before cutting the arches out, but we got away with it!



17. Sanding by hand

Jesse using fine sandpaper to hand-sand the bars ready for lacquering and sealing.



18. The mallets

These were made from dowel rods. We used 19 mm for the top end pair, and 22 mm for the bottom end pair. Plumbing 'root eliminators' tied on to the bottom end pair bring out the proper tones of the bass notes.



19. Making mallets

The dowels were cut off at the required length, and the handle ends were rounded and sanded smooth. The top mallets were hammered into the truck shock absorber grommets.



20. Drilling holes

Holes were drilled into the handle ends for the strings which help avoid 'lost mallet syndrome'.



21. Making the frame

This is a straightforward carpentry job, following Jon's instructions. We adjusted distances between the support nails and eyelets as suggested by our salt test results, which may vary with each kind of timber used. Wheels were added to one end to help with moving the big instrument.



22. Cutting the resonators

Terry used a hacksaw to cut close to the marked lengths of pipes for each note of the bass marimba. It couldn't fit through the bandsaw. It's tricky to cut a round slippery shape.



23. Trimming the pipes the pipes

The bandsaw was used to trim the final lengths accurately as this affects the pitch of the pipes.



24. Sanding the pipes

Luckily we have good machines set up in our workshop for making flutes. The belt sander was great for cleaning up the rough ends of pipes.



25. Dust extraction helps with safety

You can see the dust extraction pipes leading from the belt sander (above right) up to the ceiling. These take noxious fumes and dust from timber and plastic through pipes that lead through the ceiling into a large bag like a huge filter in another small room. This has to be emptied every six months.



26. Making the treble module of resonators

The pipes all had to be checked in pitch and slices cut off to bring them up to correct pitch. The bandsaw followed by the belt sander were used to trim the final lengths accurately, as this affects the pitch of the pipes.



27. Making the bass resonators

As the notes get lower the resonators need to be longer to attain the correct pitch. The instrument would have been too tall if these pipes were left straight, so (like French horns which wind their length) we used plumbing fittings to make the long bass pipes turn up.



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28. Staining and lacquering the bars

The bars were lightly stained with Dark Oak and when that dried we lacquered them with Feast Watson China Oil. This is floor sealer, so we hope it will stand up to the wear and tear the bars will get in the playground.

29. Marking the notes

We used quick-drying Artline paint pens to write on the notes - this had to be done last as the lacquer smudged the colours. We'll be able to touch these up as they wear. We also added cord to stop the bars from bouncing off when hit.

30. The finished bass marimba

Here is the finished two-player Bass Marimba. The rails at each end are for storing the mallets when not in use. We will put castors on the other legs to help with steering the marimba when it gets moved.



More Wacky Instruments



Jon Madin's workshop was a great inspiration and a boost for music playing in the school. We have planned a working bee for June 2012 where we will make some of the instruments from Jon's book. Many thanks to [Eurobodalla Fencing](#) for donating some of these blue blue containers for making drums like the ones shown at left, and some plumbing pipes.