



DIY Outdoor EMT Wind Chimes



by Fadibja

Just like my [last Instructable](#), this project came per request from my mother. She wanted wind chimes to hang in the yard among the landscaping to add both visual and audible appeal. This project actually only requires a few materials that are easy to find at a local craft store, home improvement store, or online. Let's get started!



Step 1: Tools & Materials

Materials:

- 3/4" EMT (steel electrical conduit)
- Twine / rope / fishing line
- Wooden disks / boards
- Heat shrink tube
- Eyelet screws
- Wood stain
- Sanding sealer
- Acrylic paint
- Clear coat

Tools:

- Pen / pencil / marker
 - Scissors / Xacto knife
 - Tape measure / ruler / calipers
 - Pipe cutter / hacksaw / Dremel
 - Sandpaper (150 & 180 grits)
 - Center punch (I used a hammer & a nail)
 - Drill & 1/8" bit
 - Clamps
 - Paper Towels
 - Paint brushes
 - Disposable gloves
 - Rags
 - Respirator
-

Step 2: Disclaimer

As you can see in the section above, this Instructable utilizes several tools and materials that can be harmful if used incorrectly. Please use caution and ask somebody for help if you do not feel comfortable doing something.

Step 3: Planning & Research

I began my research by asking my mother exactly what she wanted the wind chimes to look and sound like. She wanted the color blue to be incorporated into the design, and she wanted the sound to be deeper and

making DIY wind chimes. I came across a website from a man named Lee Hite whom I can only imagine is the world's leading expert on wind chimes and wind chime design. His site contained an incredibly in-depth article on how to make your own wind chimes. I am going to reference it on multiple occasions throughout this Instructable, so I will provide links accordingly. The main

more soothing rather than high pitched and "tinny". I then found a ton of reference images of different designs and constructions. Next, I searched through YouTube, Google, and Instructables for tips and tricks on

site can be found here:

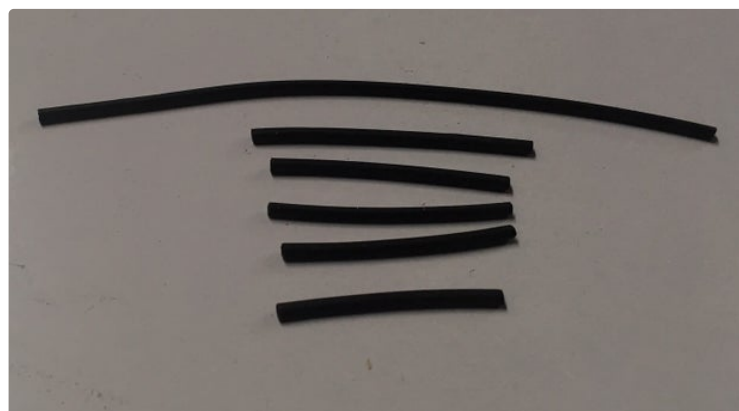
<http://leehite.org/>

(click the tab at the top of the screen labelled "Chime Design" for the article on making your own chimes)

Step 4: Gathering the Materials

You can make the actual chimes out of several different materials including copper, steel, aluminum, brass, and more. I searched through my local Lowe's and found EMT (Electrical Metallic Tubing) a.k.a. electrical conduit that was relatively cheap (\$3.81 for 5 feet). Since it is made of steel, I figured it would stand up well against the weather. I chose a 3/4" ID (inner diameter) since it came in manageable 5-foot sections and it would produce a deeper sound. The larger the diameter of the pipe, the deeper the sound.

At a local craft store (Michaels), I bought a spool of twine, a wooden disk with a nice detailed edge, a smaller wooden disk, and a wooden star. They will be used for the top support, the striker, and the wind sail. The other materials I needed were eyelet screws, heat shrink tubing, wood stain, sanding sealer, paint, and clear coat which I already had.







Step 5: Making the Chimes

Using the chart on Mr. Hite's website entitled "Pre-calculated Tube Length and Hang Point Dimensions [English & Metric] PDF", I clicked the link for 3/4" EMT to bring up a table in a new tab.

From left to right, this table gives Octave Note, Frequency [Hz], Length [inches/mm], and Hang Point [inches/mm].

I chose to use 5 chimes for my design, so after measuring the height of the hook the chimes would hang from, I selected the notes C#, D#, F#, G#, and A# in the lengths I wanted from the chart.

I chose these notes under the advisement of this article: <https://www.popularmechanics.com/home/how-to-plan...>

I then used a pipe cutter to cut the EMT to the required lengths. You could also use a hacksaw, bandsaw, Dremel, or angle grinder with a cutoff wheel.

I then used a hammer and a nail (use a center punch if

you have one) to mark the places where I needed to drill holes in the chimes. I then used a drill with a 1/8" bit to drill the hanging holes in the chimes at the locations specified in the chart. Choose whatever size bit allows your twine/rope and your heat shrink tubing (more on that later) to feed through. **MAKE SURE YOU DRILL THE HOLES IN THE CORRECT LOCATIONS ACCORDING TO THE CHART.** The locations are specifically chosen to produce the loudest, most resonant sound.

With the chimes completed, I sanded them down to get rid of the dirt and grime left on them from the home improvement store. I used a section of flexible 150 grit 3M sandpaper to sand through the dull top layer and reveal the shiny steel. I then came back with a 180 grit 3M soft sanding pad to smooth out the surface, get rid of any marks from the 150 grit sandpaper and make the chimes even shinier. I'm sure you could even polish them if you wanted to, but I figured they were going to get weathered and dirty outside again anyways.

Pre-calculated Tube Length and Hang Point Dimensions [English & Metric] PDF
Requires a free PDF reader like Adobe® or Foxit™

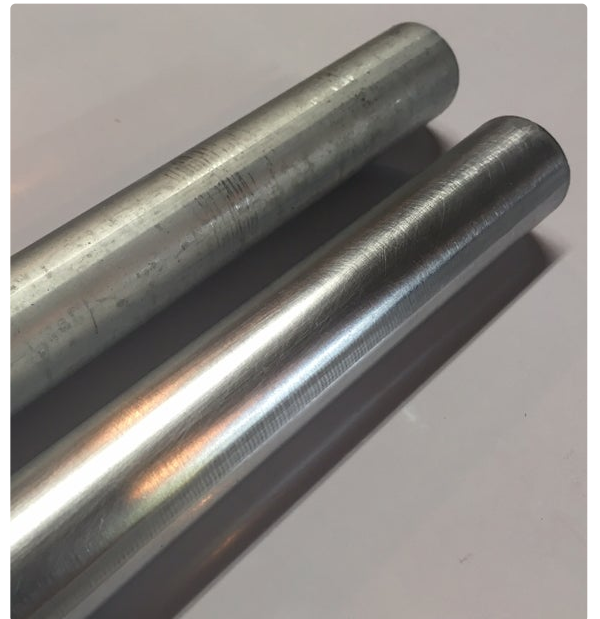
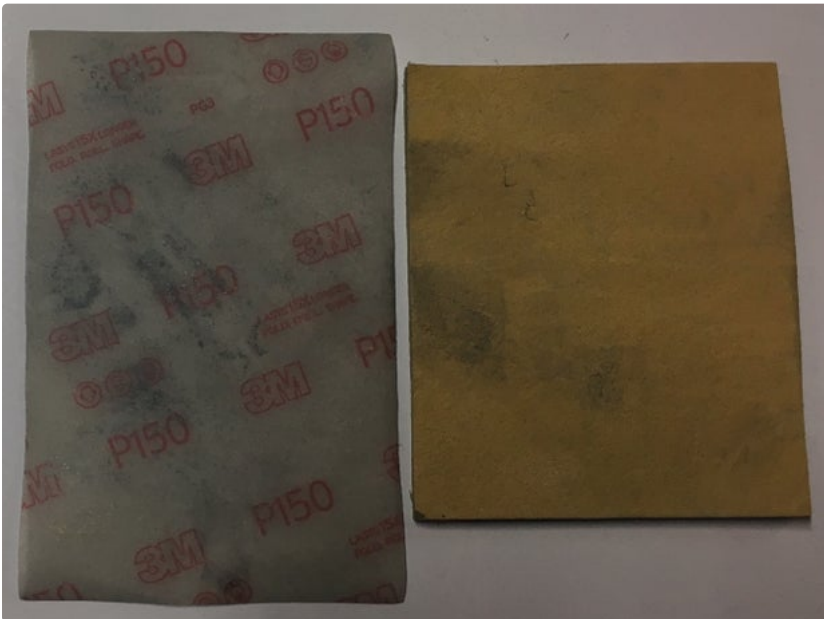
Click on a specific metal and size to download dimensions or the top row to download a family of dimensions

OD or Nominal Size (inches)	Alum .035 20 Gauge	Alum .049 18 Gauge	Alum .058 17 Gauge	Alum .065 16 Gauge	Alum .083 14 Gauge	Alum .125 1/8"	Copper Type L Blue	Copper Type M Red	Brass .065 Wall	Steel EMT thin-wall	Cast Iron Sked 40
.50	Alum	Alum	Alum	Alum			Copper	Copper	Brass	EMT	
.75	Alum	Alum	Alum	Alum	Alum		Copper	Copper	Brass	EMT	
1.0	Alum	Alum	Alum	Alum	Alum		Copper	Copper	Brass	EMT	Cast
1.25	Alum	Alum	Alum	Alum	Alum		Copper	Copper	Brass	EMT	
1.50	Alum	Alum	Alum	Alum	Alum	Alum	Copper	Copper	Brass	EMT	Cast
1.75			Alum		Alum				Brass		
2.0		Alum		Alum	Alum	Alum	Copper	Copper	Brass	EMT	Cast
2.25		Alum		Alum	Alum				Brass		
2.50				Alum	Alum	Alum	Copper	Copper		EMT	Cast
3.00				Alum		Alum	Copper	Copper		EMT	

C#/D ^D	1,108.70	14 3/16	3 3/16
D	1,174.61	13 3/4	3 1/16
D#/E ^D	1,244.50	13 3/8	3
E	1,318.50	13	2 15/16
F	1,397.00	12 5/8	2 13/16
F#/G ^D	1,480.00	12 1/4	2 3/4
G	1,568.00	11 15/16	2 11/16
G#/A ^D	1,661.20	11 9/16	2 9/16
A	1,760.00	11 1/4	2 1/2
A#/B ^D	1,864.60	10 15/16	2 7/16

Note	Length	Hang Pt.
C#	14" $\frac{3}{16}$	3" $\frac{3}{16}$
D#	13" $\frac{3}{8}$	3"
F#	12" $\frac{1}{4}$	2" $\frac{3}{4}$
G#	11" $\frac{9}{16}$	2" $\frac{9}{16}$
A#	10" $\frac{15}{16}$	2" $\frac{7}{16}$





Step 6: Making the Top Support, Striker & Wind Sail

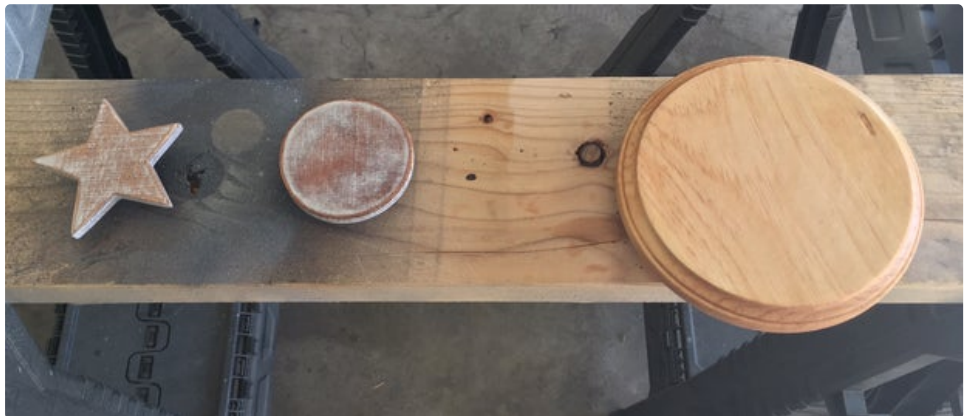
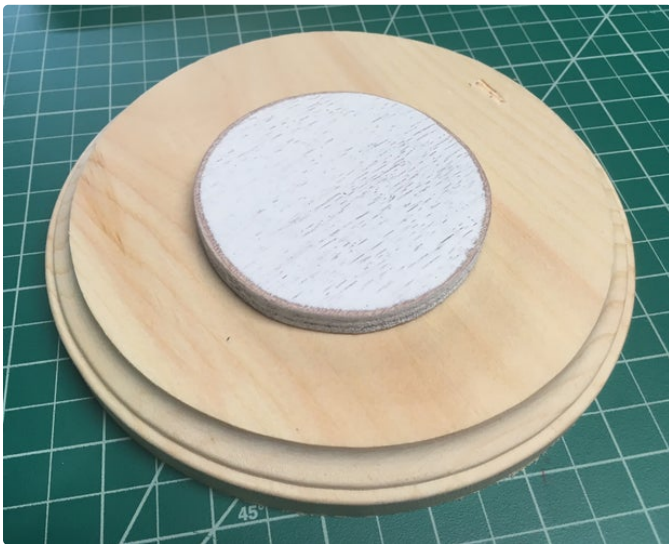
I cheated and took the easy route here by buying pre-cut wooden pieces for the top support, striker, and wind sail at the craft store. This was mostly because I don't yet own a jigsaw, and I didn't feel like trying to cut the pieces with a hacksaw. If you are more ambitious than I was, you can certainly cut your own pieces using a jigsaw, band saw, etc.

Since the pieces were pre-cut, all I had to do was stain, seal, and paint them. To protect the wooden pieces from the weather, I decided to both stain the wood and add sanding sealer. I put on 3 coats of a Minwax stain, let it dry, then put on 3 coats of Minwax sanding sealer. I hammered a couple of very small nails into a scrap board so that I could rest the pieces on them without sticking to the board during the staining process.

I used a stain color I already had, but you can get creative and experiment with darker or lighter stains depending on your preference and the type of wood you're using. The Almond color I used only darkened the wood a little bit, but it definitely looked better than the unstained wood.

It says on the can that the sanding sealer isn't necessary if you've already stained the wood, but I used it anyways for extra protection.

*EDIT: These pieces did not hold up very well to the rain even with the several layers of protection I added. I would suggest either keeping them dry or using pressure-treated wood.



Step 7: Painting

The sanding sealer raises the grain of the wood, so I used sandpaper to smooth it out before adding paint. I used CraftSmart acrylic paint in blue and white to paint the wooden pieces.

Just like my last Instructable, I wanted to weather and distress the wood, so I sanded the paint back in random areas, especially around the edges, to give it a worn look.

I then used a wash (part paint, part water) of black to add a dirty look to it.

Once this was dry, I sprayed on 3 coats of Krylon flat clear.



Step 8: Assembly

This was by far the hardest and most frustrating part of this project. Don't be discouraged if it takes you several tries to get everything lined up correctly. Be patient and take a break if you need to. While sifting through the massive amount of information on Mr. Hite's website, I missed the Microsoft Excel spreadsheet he linked to figure out the placement of the chimes relative to the top support disk. I neglected to do this, which meant that I actually had to cut down my striker since my chimes were too close together.

http://leehite.org/chime_software/DIY_Wind_Chime_S...

The two design aspects to consider at this point are the alignment of the chimes (top, middle, or bottom) as well as their order. The website offers help for both of these. I ended up aligning the chimes at the top and putting the chimes in the order 1-3-5-2-4 with 1 being the shortest chime.

When stringing the chimes, I utilized a great technique I found on the website to prevent the twine from rubbing against the holes in the chimes and snapping. I cut a length of heat shrink tubing just longer than the diameter of the chime, fed it through the hanging holes, and then fed the twine through the tubing. This way the twine is never in direct contact with the steel edges.

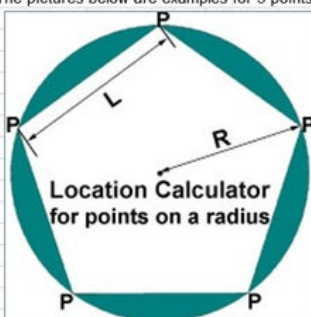
I used small eyelet screws to loop the twine through and connect all of the pieces together. I used the Excel spreadsheet form earlier to find the placement of the 5 eyelets on the top support disk. I then used a pair of calipers to find the center of the top support disk and the striker to attach more eyelets. I also screwed one into the wind sail.

The first time I tried to string it together, I tried using one long piece of twine to connect all of the chimes. This was very difficult to control and keep every chime aligned at the top. I ended up taking everything apart and stringing each of the chimes individually. I began by cutting 5 pieces of twine and tying them to each of the 5 eyelet screws. I then strung up the first chime and used it to align the rest. This was a lot easier since I only needed to worry about aligning one chime at a time. Now I'm not sure what kind of knot is best for this application, but I just used a basic overhand knot and it seemed to work fine.

Following the diagram from earlier, I strung the striker so that it hung just below the center of the longest chime. I then hung the wind sail from the striker.

Pre-Calculated Values					Location for Points on a Radius		
Number of Points (P)	Radius (R) inches	Length between points (L)			Enter # Points (P)	Enter Radius (R)	Distance Between Points (L)
		decimal inches	fraction inches	mm			
3	2.5	4.33	4 5/16	109.5	5	2.315	2 3/4
3	3	5.20	5 3/16	131.8			
3	3.5	6.06	6 1/16	154.0			
3	4	6.93	6 15/16	176.2			
3	4.5	7.79	7 13/16	198.4			
3	5	8.66	8 11/16	220.7			
3	5.5	9.53	9 1/2	241.3			
3	6	10.39	10 3/8	263.5			
4	2.5	3.54	3 9/16	90.5			mm = 69.9
4	3	4.24	4 1/4	108.0			
4	3.5	4.95	4 15/16	125.4			
4	4	5.66	5 11/16	144.5			
4	4.5	6.36	6 3/8	161.9			
4	5	7.07	7 1/16	179.4			
4	5.5	7.78	7 3/4	196.9			
4	6	8.49	8 1/2	215.9			
5	2.5	2.94	2 15/16	74.6			
5	3	3.53	3 1/2	88.9			
5	3.5	4.11	4 1/8	104.8			
5	4	4.70	4 11/16	119.1			
5	4.5	5.29	5 5/16	134.9			
5	5	5.88	5 7/8	149.2			
5	5.5	6.47	6 7/16	163.5			
5	6	7.05	7 1/16	179.4			
6	2	2.00	2	50.8			
6	2.5	2.50	2 1/2	63.5			

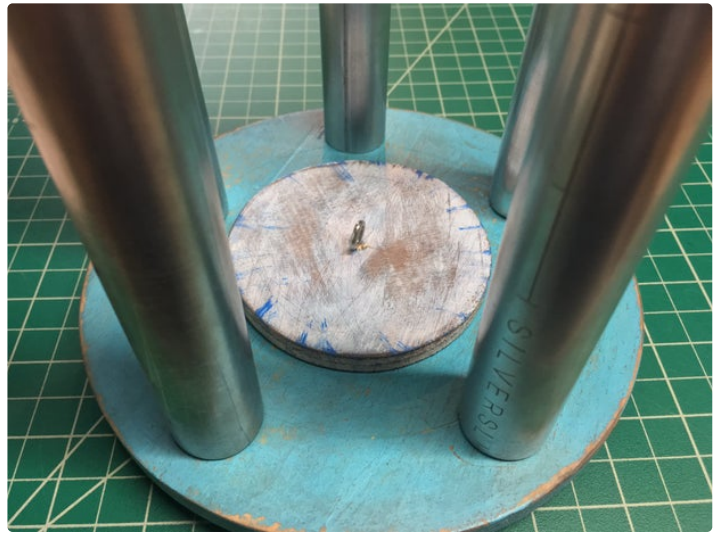
Draw a circle with radius (R). Using the value for (L), adjust a compass to the value (L) and walk the compass half way around the circle, marking each point the compass touches the circle. Then from the beginning point walk the compass in the opposite direction marking each point the compass touches the circle. The pictures below are examples for 5 points





1 - 3 - 5 - 2 - 4





Strike zone for top, bottom or center alignment



Top Aligned chimes

Find the center line for the longest chime and position the striker at least an inch or more below that center line. Anywhere in the green section above.



Bottom Aligned chimes

Find the center line for the shortest chime and position the striker at least an inch or more below that center line. Anywhere in the green section above.



Center Aligned chimes

Find the center line for all chimes and position the striker at least an inch or more below the center line. Anywhere in the green section above.





Step 9: Conclusion

I'm really excited with how my wind chimes turned out. This wasn't a very detailed or time-consuming project, but it was something I had never tried before. I learned way more than I ever thought I would have about wind chimes, and I ended up with an awesome, functional piece to add to our landscaping. We've already had a couple of pretty windy days since I hung them, and they sound great! Big thanks to Lee Hite and his awesome

website. Definitely read through all of his stuff

Check out my other Instructables Here:
<https://www.instructables.com/member/Fadibja/instr...>

I have also entered this project into the Make it Move contest so be sure to vote!

<https://youtu.be/NUbboddL9zY>







I've been looking for a good tutorial on how to make a wind chime to honor the recent passing of our sweet pup. This is one of the best I've found. Thank you for sharing. It was well written and seems very easy to follow. I also appreciated the short video to see what it sounded like. Most tutorials don't have that and to me, that important. Thank you again.



Excellent instructions. For builders of wind chimes. At times I've lived for several months in an RV especially in the wintertime in the south. Wind Chimes used to be popular to hang on the RV awning. The problems was they almost universally annoy the neighbors, and not just a little bit. Apparently the particular frequencies are hard to shut out. So unless you live where others can't hear the chimes, you might not want to hang one up.

I'm talking about knocking on doors, confronting the offenders and complaining to the park managers kind of annoyed. I agree with the neighbors, it's just additional noise they didn't ask for. Sort of like trespassing.



I have a set of well made and tuned chimes similar to these that I've always kept inside just because they are a beautiful decoration. Now that I live in a house instead of an apartment, I agree most outdoor wind chimes are an irritating invasion of the luxury of quiet on your own property.



your build instructions are great, and incredibly detailed. i just want to know how they sound, im guessing the sound is great compared to thin tubes and cheap windchimes, but if i could hear it in a video id be more motivated to build one myself.



Great step-by-step explanations. Thanks for sharing !



I've thought about making a wind chime but had no idea how to cut tubing to achieve a melodious sound. Thanks for solving that for me!



I made one, many years ago of 1/2 inch EMT and it still has not rusted. Use a program on PC that calculated the frequency and ground each tube to the right pitch. As for the supporting hole I held the tube between forefinger and thumb and found the place where the tube made the best sound and drilled the hole there. I think it was around 22.5 percent of the length from the end.



Great project! I've never made chimes, but this is something I'm considering now. Thank you for sharing this! :)