WHISTLE

Lathe Project

The Purpose...

In this activity you will use the Milling Machine, Drill Press, a Machine Lathe, and a Buffing Wheel, to fabricate a whistle.

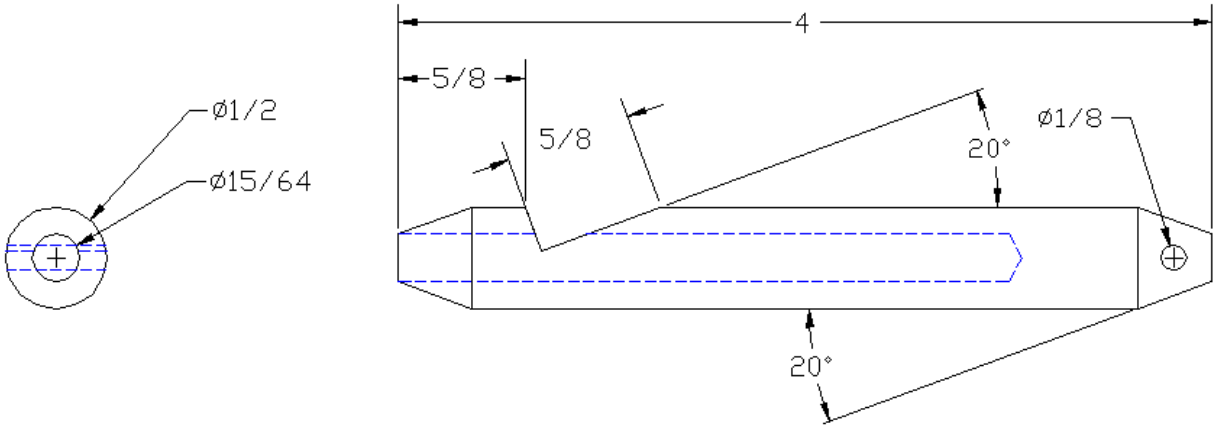
You will learn how to cut out stock, mill, drill, face, centre drill, and taper.

The Preparation...

READ THESE INSTRUCTIONS THOROUGHLY BEFORE YOU BEGIN!

For this activity you will need the following:

• 1/2 x 4" Aluminum rod • 1/4 x 5/8" Wood dowel • Ruler • Scriber • Centrepunch • Hammer	• Single-cut file • Sandpaper in various grits • Demonstrated safe use of Milling Machine • Demonstrated safe use of Drill Press • Demonstrated safe use of Machine Lathe • Demonstrated safe use of Buffing Wheel



SAFETY

You should wear eye protection ANY TIME you are working in the shop.

Get some now.

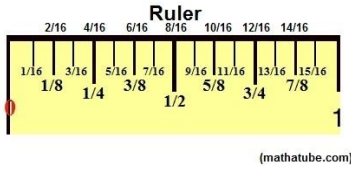
STOCK BREAK OUT & LAYOUT

Use a HACKSAW to cut a piece of 1/2" diameter aluminum rod to 4" (100mm) long

Use Soft Jaws to protect the metal from the vice

Mark a line 5/8" (16mm) from one end

This locates the start of our cut

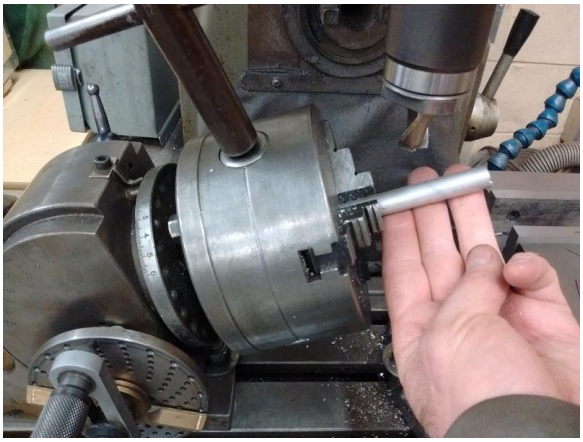


MILLING

The Milling Machine can do many things, but mainly it is used to make things very flat. We will use this machine to cut a flat notch in the end of the Whistle.

The machine looks big and scary, but it is actually one of the easiest machines to use. It is BIG and STABLE, and gives a nice cut because it won't VIBRATE.

Set Milling Machine dividing head to 20°



Insert Aluminum Rod into chuck, sticking out about three finger widths

My kid helped machine some engine parts on a Mill when he was 8. You got this.

Set milling cutter so that the RIGHT edge is touching the 5/8" mark

Raise the table 1/4 turn, and mill a small cut into the metal, feeding the material INTO the rotation of the cutter

Raise the table 1/4 turn at a time after each pass, cutting until the LEFT edge of the cutter just touches the work

The cutter is 5/8" wide - you want a 5/8" wide slot

NO DEEPER!

DRILLING

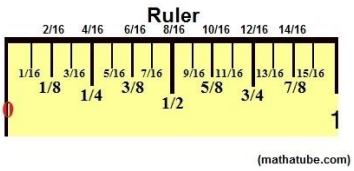
The Drill Press does a sweet job at putting holes in things.

Centerpunch the location of the keyring hole 3/16" (5mm) from the non-milled end

Use the sort-of rounded part at the back of the vice – it holds round metal super sweet

This hole should be PARALLEL with the slot

Look at the drawing on the front page



You want a fairly DEEP and MEANINGFUL center punch mark. If it's too tiny, the drill bit will wander off, bend, and probably break.

Clamp the Whistle into the Drill Press Vice

….With the center punch mark at the ABSOLUTE TOP

….With the center punch mark in the MIDDLE of the vice jaws

….With the vice CLAMPED DOWN

Drill with a 1/8" bit, all the way through, and lighten up your pressure near the end! *(Drill bits breaking through, like to break off)*

DO NOT DRILL THE VICE!

FACING (LATHE)

"Facing" is making one side perfect. In the case of the lathe, we will make one end perfectly flat.

The Lathe can do many things, but it is best used to machine round things. We will use this machine to cut the ends of the Whistle FLAT and TAPER them, as well as DRILL a hole for the reed.

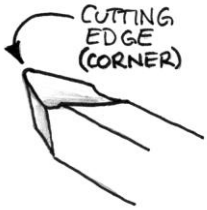
Video: How to Face on the Lathe

Insert the work into the lathe chuck, sticking out no more than a thumb width

Place the cutter so that the cutter itself (not the holder) is 90° to the end of the work, AND able to cut the exact center

SIDE VIEW

TOP VIEW



Move the **CROSSFEED** to machine the end perfectly flat

SET SPEED LEVERS LIKE THIS

CROSS FEED HANDLE

Face **BOTH** ends

OLD AND BUSTED

NEW HOTNESS

TAPERING (LATHE)

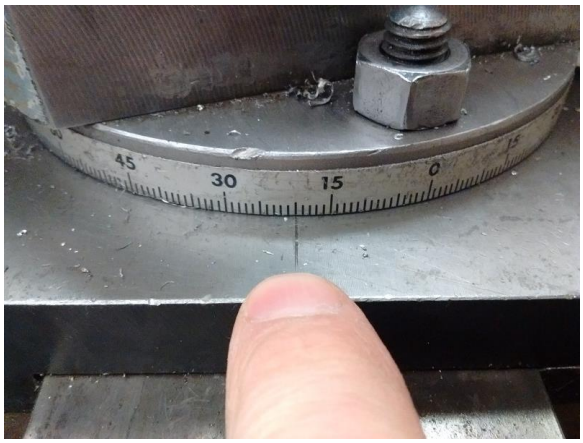
"Tapering" is making something get smaller at an angle.

Video: How to Taper on the Lathe

Set the **COMPOUND REST** to 20°

The compound can be rotated once you loosen the two large nuts that lock it down (shown in picture).

Be sure to lock it down solid!



Adjust the cutter so that it (not the cutter holder) is 90° to the direction of travel

You will cut using the COMPOUND FEED (shown) ONLY

DO NOT USE THE OTHER HAND WHEELS FOR CUTTING!

DIRECTION OF TRAVEL (ARROW)

Taper <u>each end</u> until there is 1/4" (6mm) of the flat end remaining

DRILLING (LATHE)

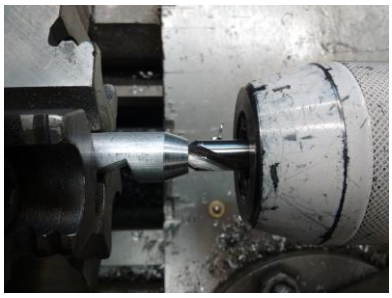
Place a chuck and a centre drill in the tailstock

Video: How to Center Drill

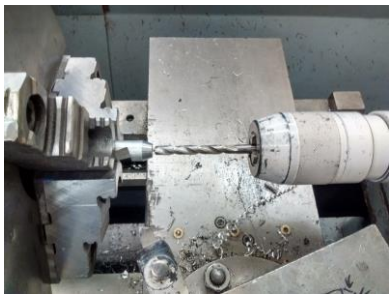
Set LATHE SPEED as fast as it will go
(DRILL SPEED is based on the DRILL SIZE)

Centre drill the end you milled until you have drilled halfway up the tapered part of the bit

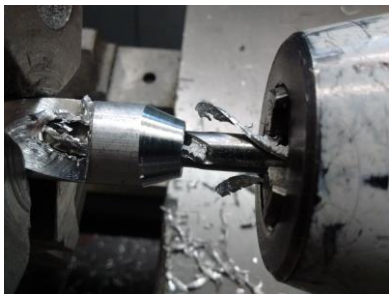
Center Drills are double-ended. When you break one end off, you still have another end to use. In English, this is called "Foreshadowing."



Video: How to Drill



Now drill a **15/64"** hole, as deep as you can drill deep without burying the flutes (the spirals), backing out several times to clear the chips out.



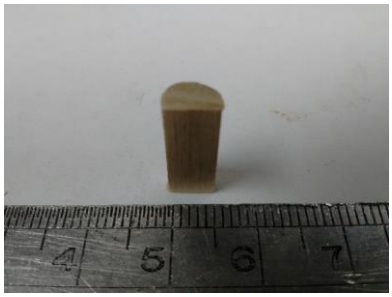
The flutes allow the chips to exit. If they cannot exit, they will bunch up inside, jam, break the drill bit off inside your project, and you start over. Ha ha for you for not following the instructions.

REED

Cut a piece of 1/4" wood dowel to the same length as the notch to the end of the whistle.

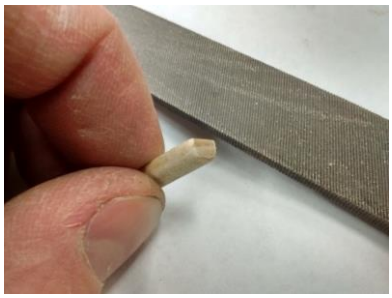
It *should* be 5/8", but stranger things have happened.

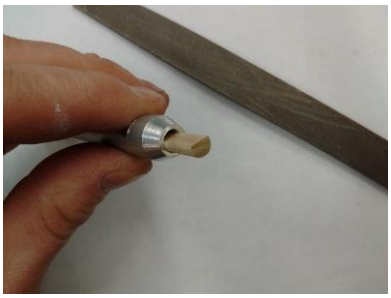
FIRMLY hold dowel in fingers and file one side flat to exactly 5mm width. Not 4.5mm, not 6mm, 5mm exactly.



Just like your finger is rounded so it can fit up your nose, ROUND the edges of one end slightly

Align the FLAT of the reed with the FLAT of the Whistle, and press the reed into the open end of the Whistle





Give it a test toot, and adjust the reed location if necessary. You want it to be loud, with minimum effort.

FINISH

Clean up any burrs with a single-cut (smooth) file

Video: Buffing Wheel

With 400 grit sandpaper and water, "*sand it 'till yo can't stand it no mo"*

Polish on the Buffing Wheel to a lustrous sheen

If the surface isn't total bling eye candy, you need to SAND IT more. Polishing scratches just gives you polished scratches.

HAND IN YOUR AWESOME, PERFECT, POLISHED, WORKING WHISTLE FOR HUGE MARKS!!!

