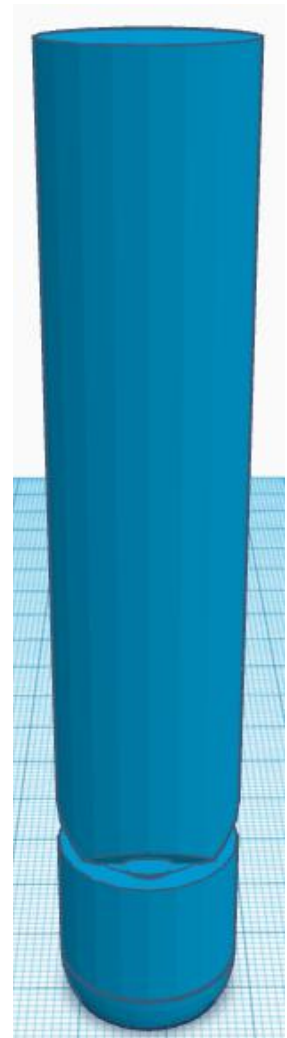
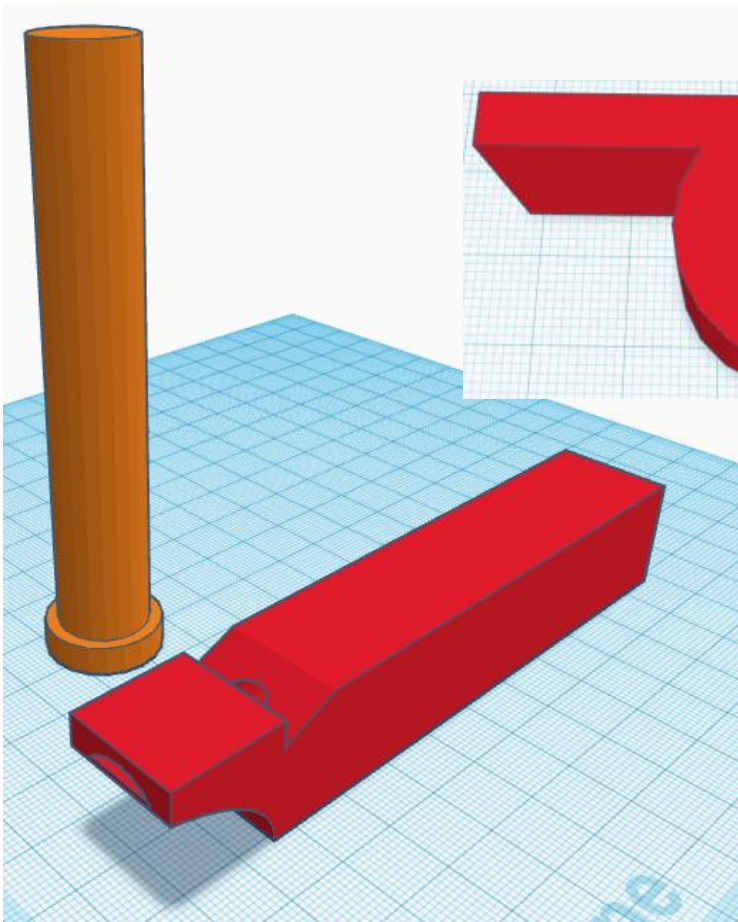




3 different whistles Project



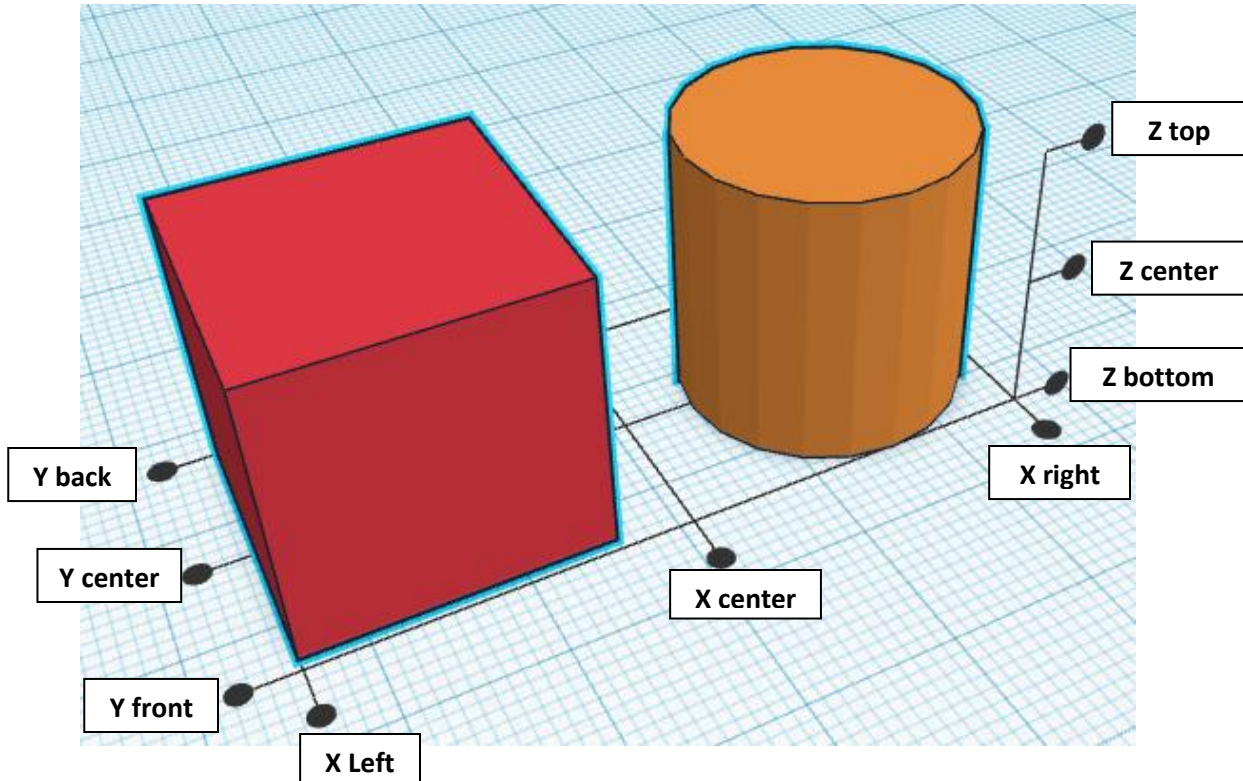
Reference to Aligning, Flip direction, Move direction, and Rotate direction.

Always be in the "home view"

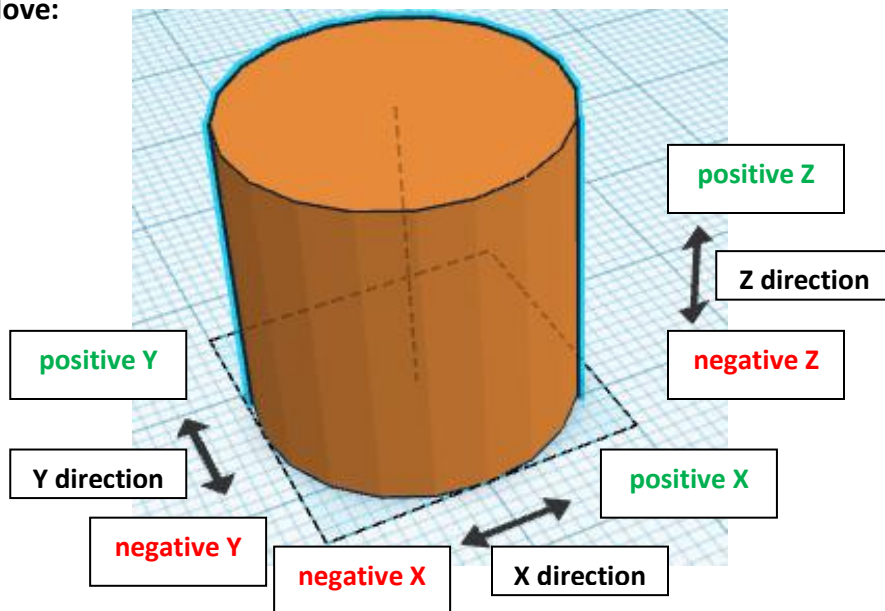


when doing any of these!!!

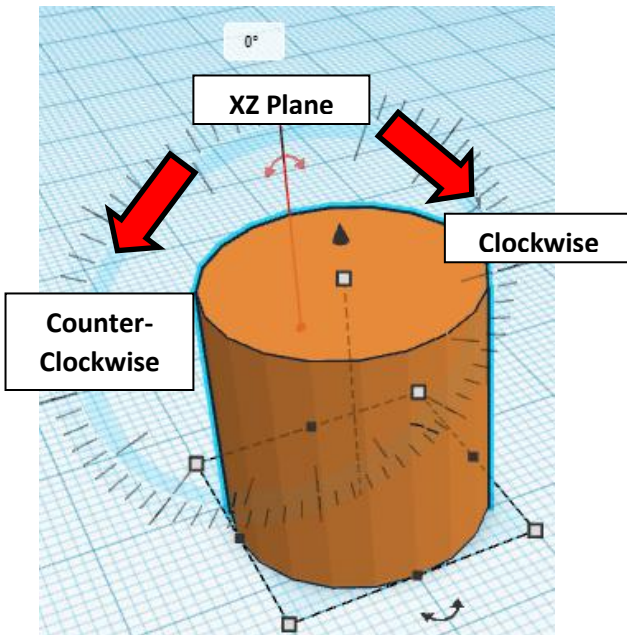
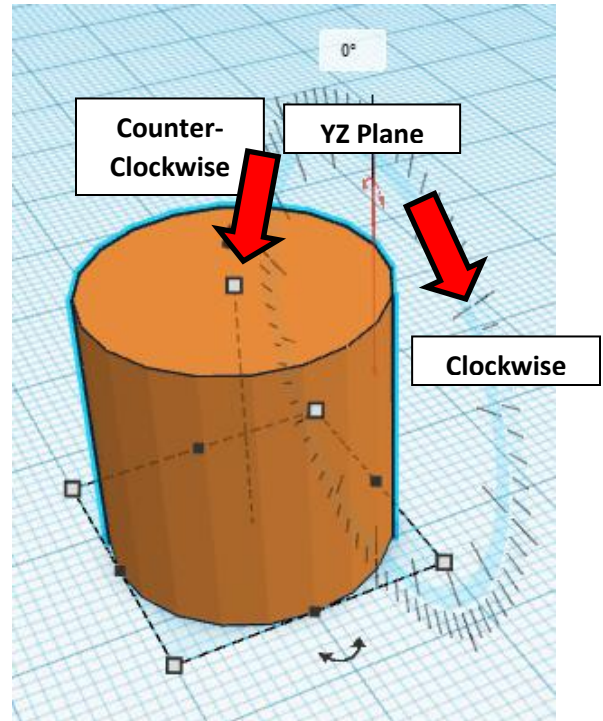
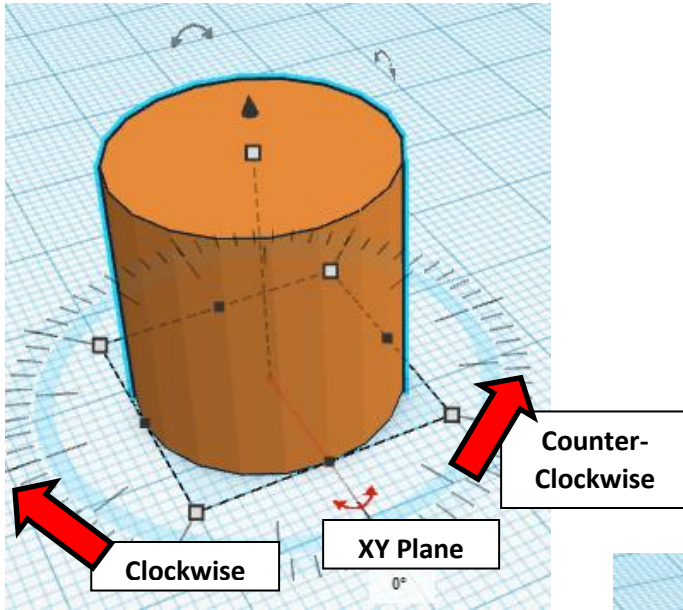
Aligning:



Flip or Mirror and Move:



Rotate:



Referee Whistle:

Let's start with the base. Go to "Create new design".

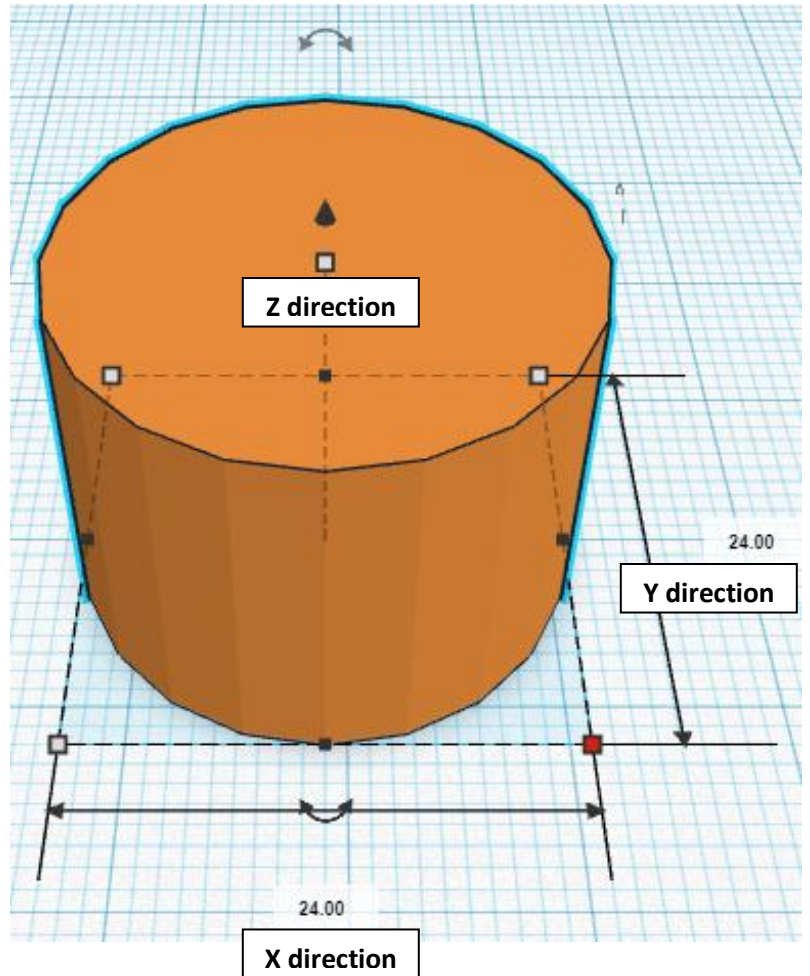
Click on "Cylinder" and pull it out to the Workspace and place it close to the middle.

Change the dimensions:

Select the Cylinder. Then click on the corner white square. The two dimensions should say 20 each.

Click on each dimension one at a time and type in 24, then enter.

Next select the Cylinder again and click on the center white square. Click on the 20 and type in 18 and enter.



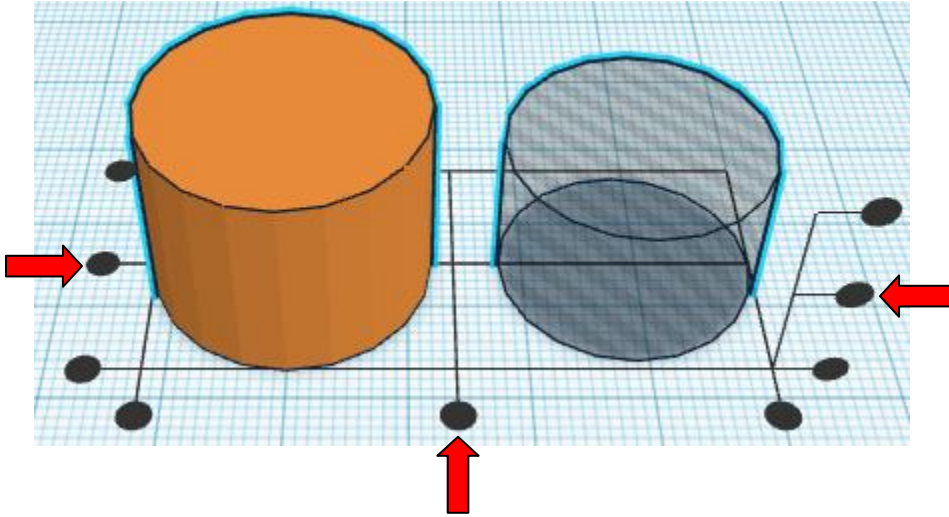
Hollow out the inside:

Click on "Cylinder" and pull it out to the Workspace.

Change the new Cylinder to a "Hole" by selecting it and typing "h".

Change the dimensions to 22mm X direction, 22mm Y direction, and 14mm Z direction.

Use the Align tool to align the Cylinders centered in the X, Y and Z plane.



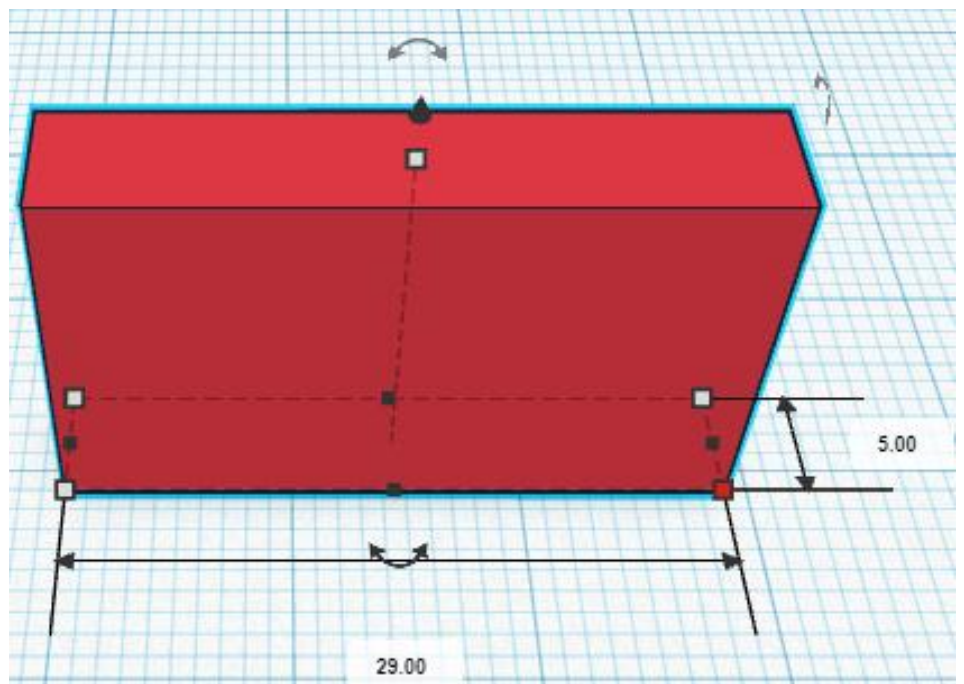
Group all.

Set this part to the side for now.

Add the rectangle part:

Click on "Box" and pull it out to the Workspace.

Change the dimensions to 29mm X direction, 5mm Y direction, and 18mm Z direction.

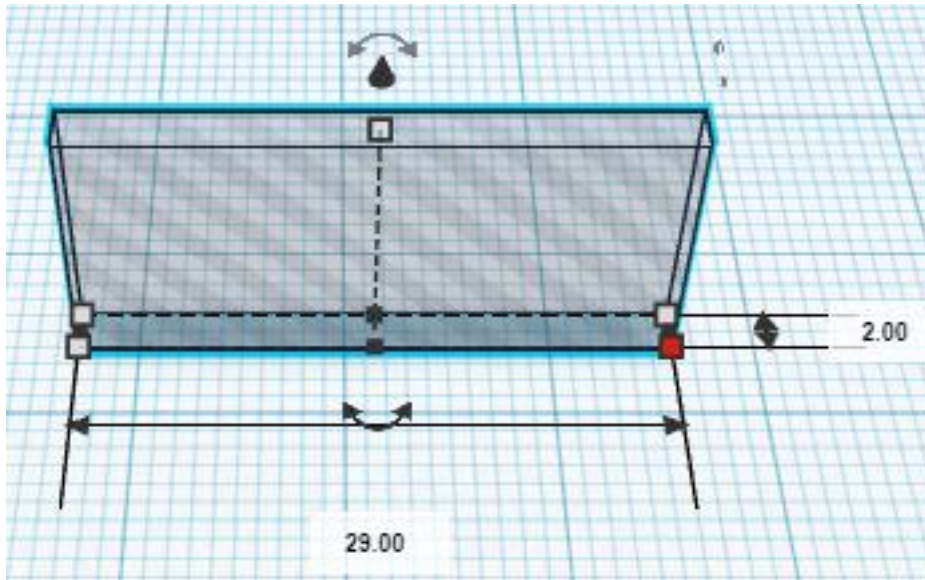


Hollow out the rectangle part:

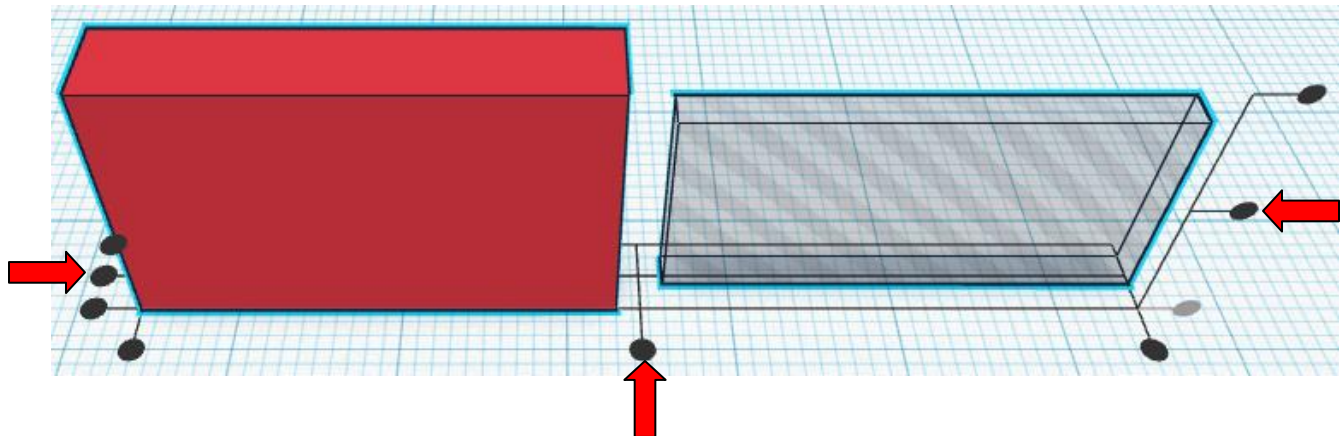
Click on "Box" and pull it out to the Workspace.

Change the new Box to a "Hole" by selecting it and typing "h".

Change the dimensions to 29mm X direction, 2mm Y direction, and 14mm Z direction.



Use the Align tool to align the Boxes centered in the X, Y and Z plane.

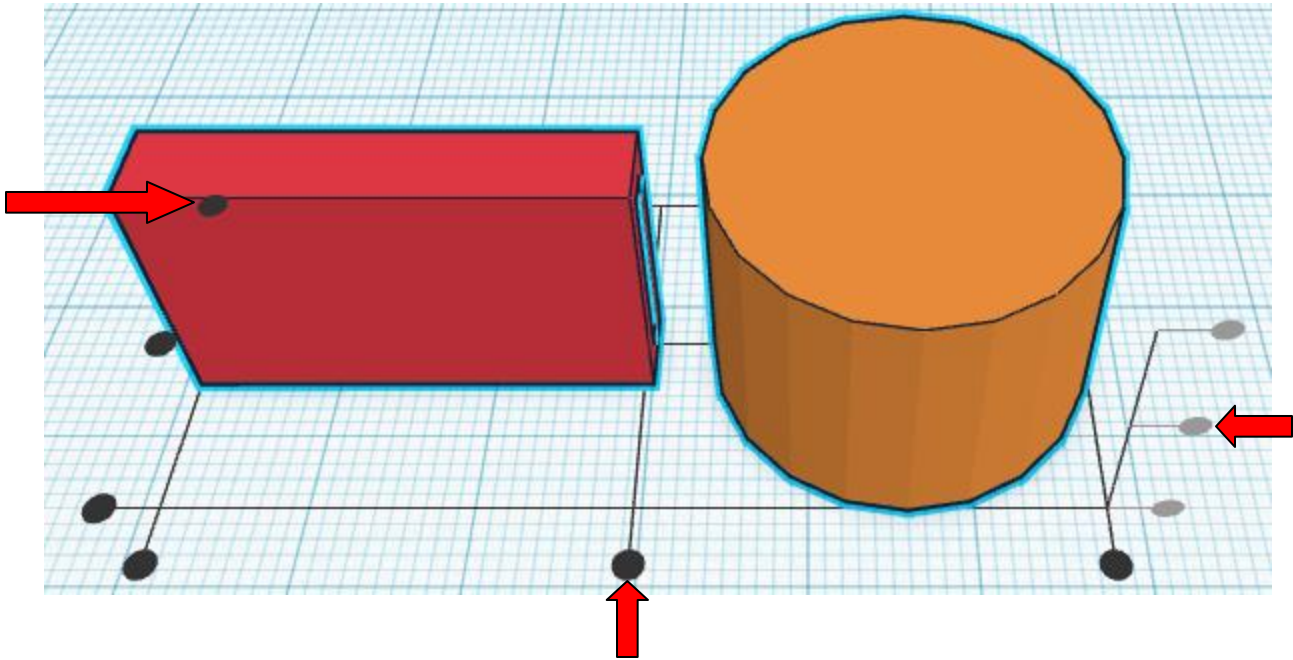


Group the two boxes.

Put two parts together.

Select the Cylinder and the Box.

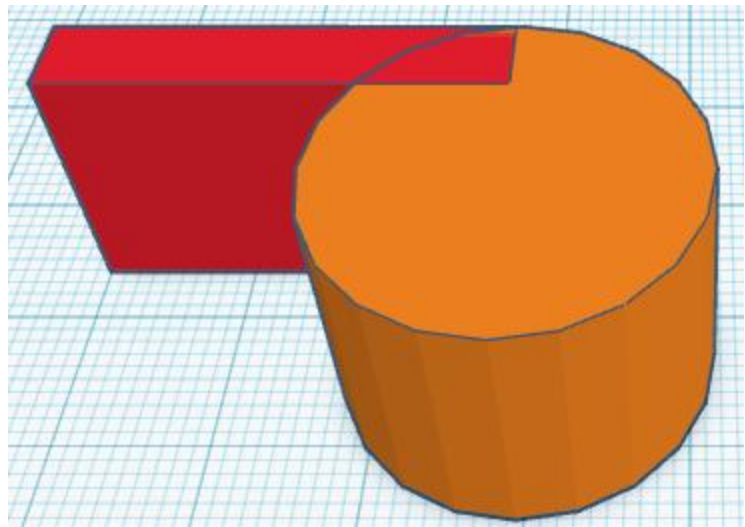
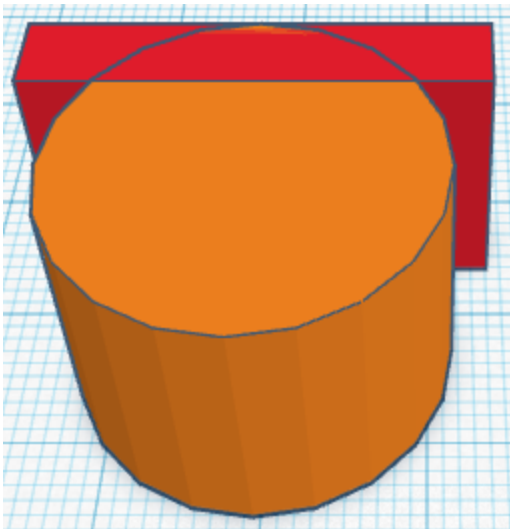
Use the Align tool to align the Cylinder and the Box centered in the X and Z plane and to the top of the Y plane.



Select the Box. Use the Left Arrow key to move the Box 15mm to the Left, (in the negative X direction).

Hint: To move Box 15mm left, select the box and push the left arrow key 15 times.

← 15mm left



Before Grouping! This is important!

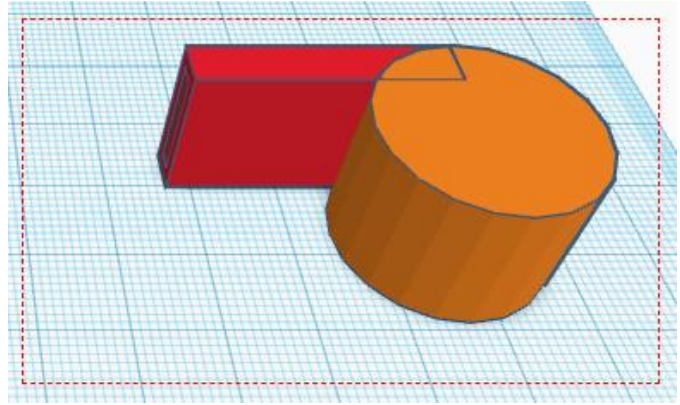
Select the Box and **ungroup**.

Select the Cylinder and **ungroup**.

Select all by:

Dragging a rectangle over both the Box and the Cylinder.

(Do not select all by using the Shift button and selecting each, you won't get the objects on the inside.)



Now Group all. This hollows out all of the inside of the whistle, not just part of it.

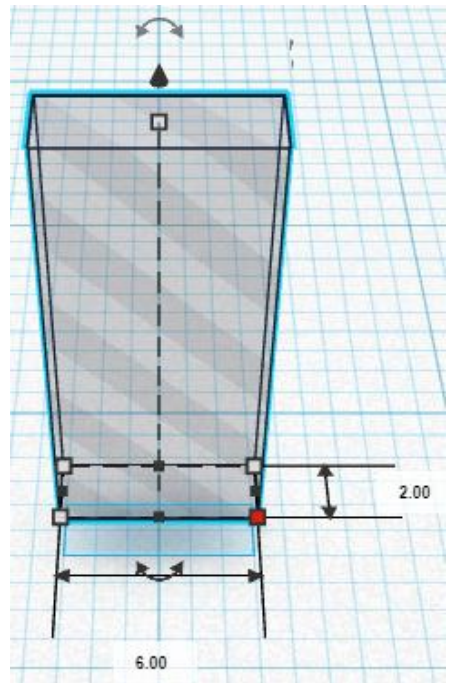
This will now be called the "Whistle" when referenced.

Cut out the whistle hole:

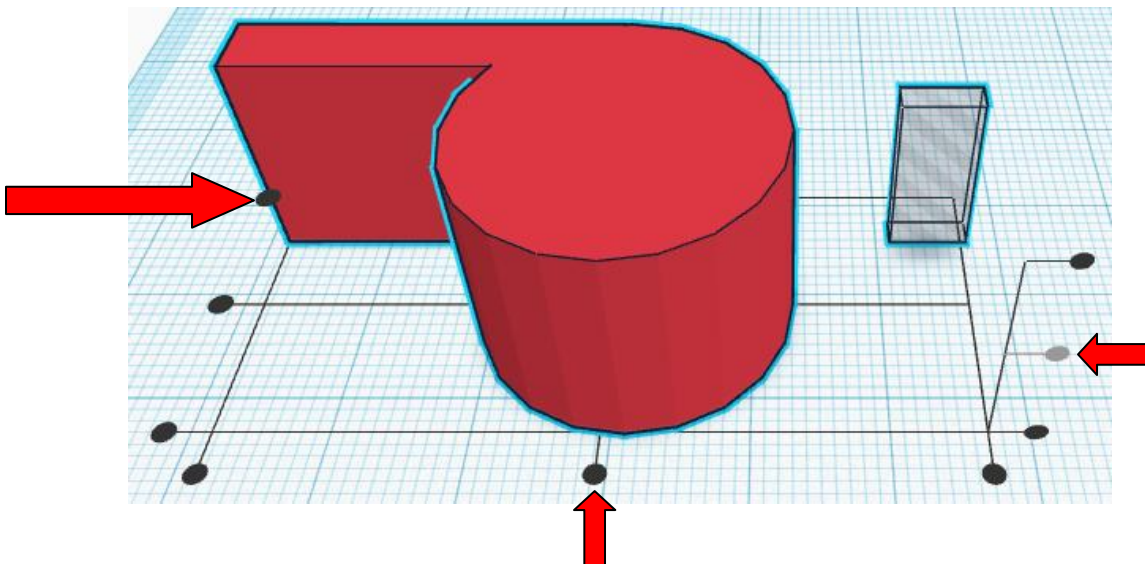
Click on "Box" and pull it out to the Workspace.

Change the Box to a "Hole" by selecting it and typing "h".

Change the dimensions to
6mm X direction,
2mm Y direction, and
14mm Z direction.

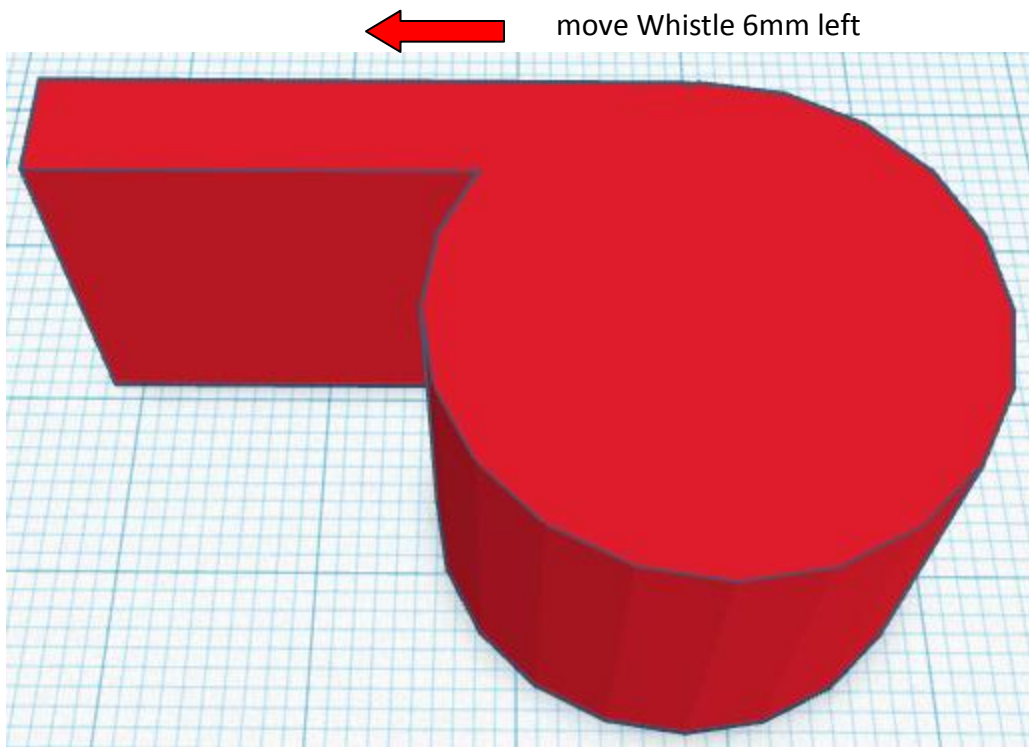


Use the Align tool to align the Cylinders centered in the X and Z plane and to the top of the Y plane.



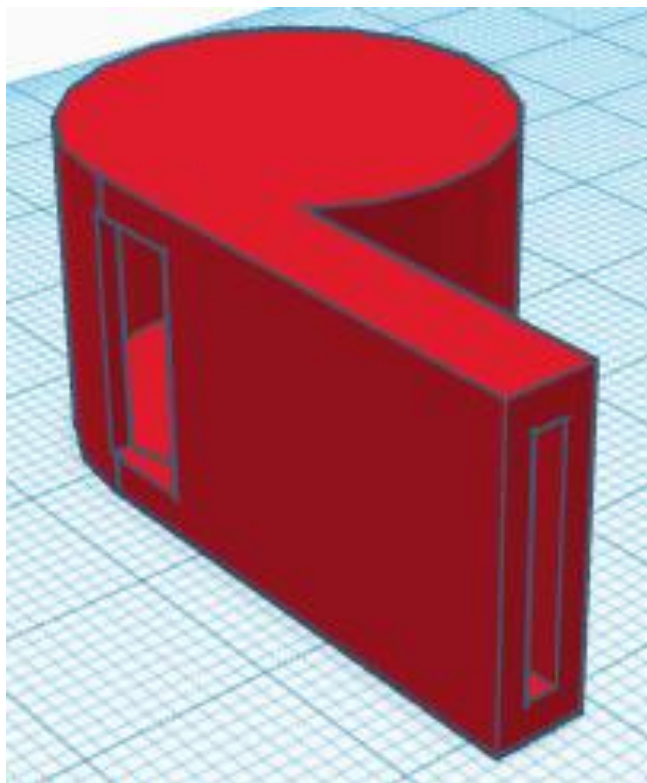
Select the Whistle. Use the Left Arrow key to move the Box 6mm to the Left, (the negative X direction).

Hint: To move Whistle 6mm left, select the box and push the left arrow key 6 times.



Group all.

Congratulation, you have completed the Referee Whistle!



Train Whistle:

Let's start with the base. Go to "Create new design".

Click on "Cylinder" and pull it out to the Workspace and place it close to the middle.

Change the dimensions:

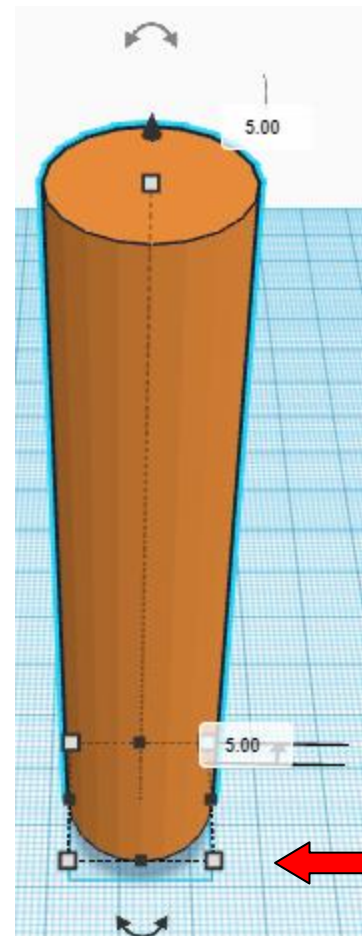
Select the Cylinder. We will call this the Main Cylinder from now on.

Change the dimensions to
20mm X direction,
20mm Y direction, and
100mm Z direction.

Grab the black cone above the Cylinder and move it up 5mm above the workplane, (move Up 5mm in positive Z direction).

From now on this will be called the Main Cylinder.

Set this to the side for later use.



Make the mouth piece:

Click on "Sphere" and pull it out to the Workspace.

Create blow hole in mouth piece:

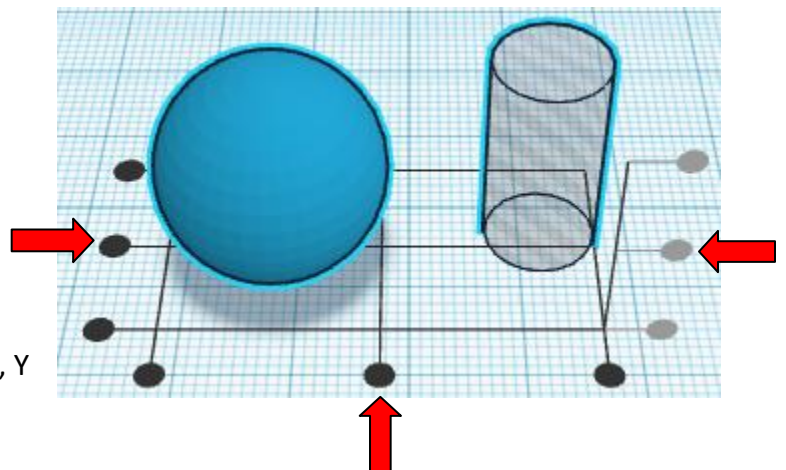
Click on "Cylinder" and pull it out to the Workspace.

Change the dimensions to
10mm X direction,
10mm Y direction, and
20mm Z direction.

Change the Cylinder from a solid to a hole by selecting it and typing "h".

Align the Sphere and the Cylinder, centered in the X, Y and Z plane

Group the Sphere and the Cylinder.



Cut the bottom off the mouth piece:

Grab the black cone above the Sphere and move it down -3.69mm below the workplane.

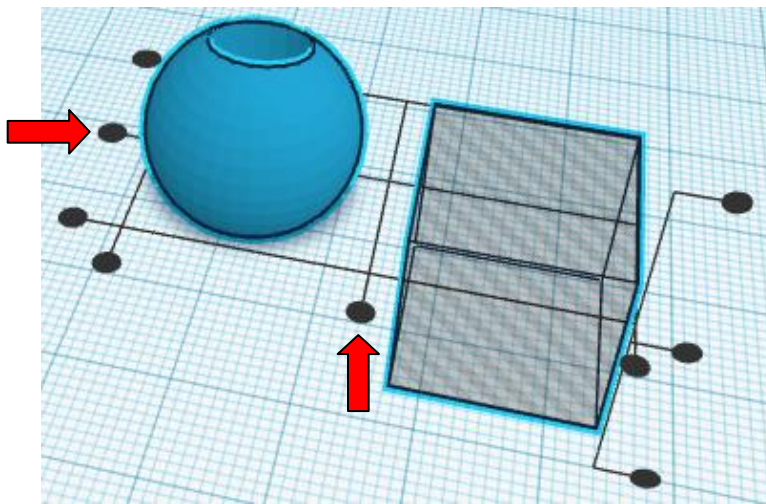
Hint: to get exactly -3.69mm, click on the black cone, then click on the lower dimension that appears and type in -3.69 and enter, (move Down 3.69mm in negative Z direction).

Click on "Box" and pull it out to the Workspace.

Change the Box from a solid to a hole by selecting it and typing "h".

Grab the black cone above the Box and move it down -20mm below the workplane, (move Down 20mm in negative Z direction).

Align the Sphere and the Box, centered in the XY plane.



Group the Sphere and Box.

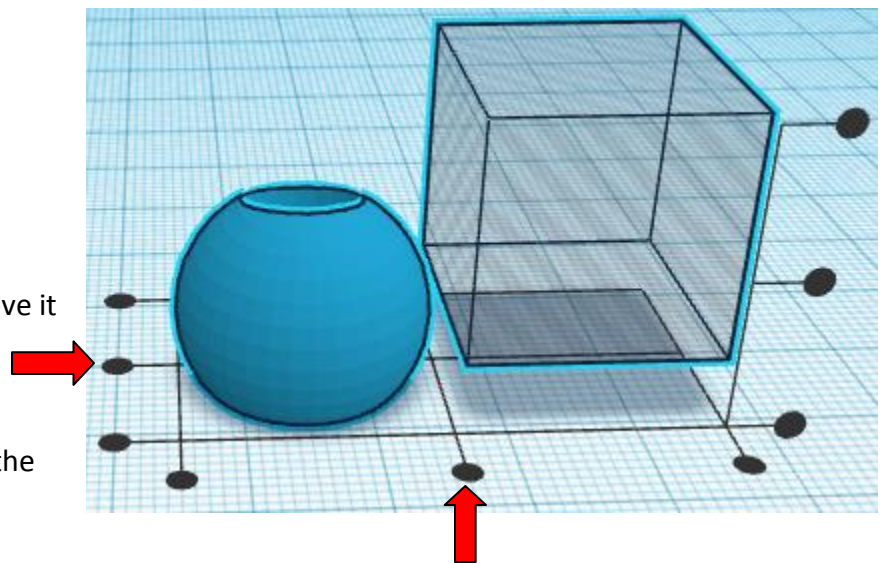
Cut the top off the mouth piece:

Click on "Box" and pull it out to the Workspace.

Change the Box from a solid to a hole by selecting it and typing "h".

Grab the black cone above the Box and move it up 5mm above the workplane. (move Up 5mm in positive Z direction).

Align the Sphere and the Box, centered in the XY plane.

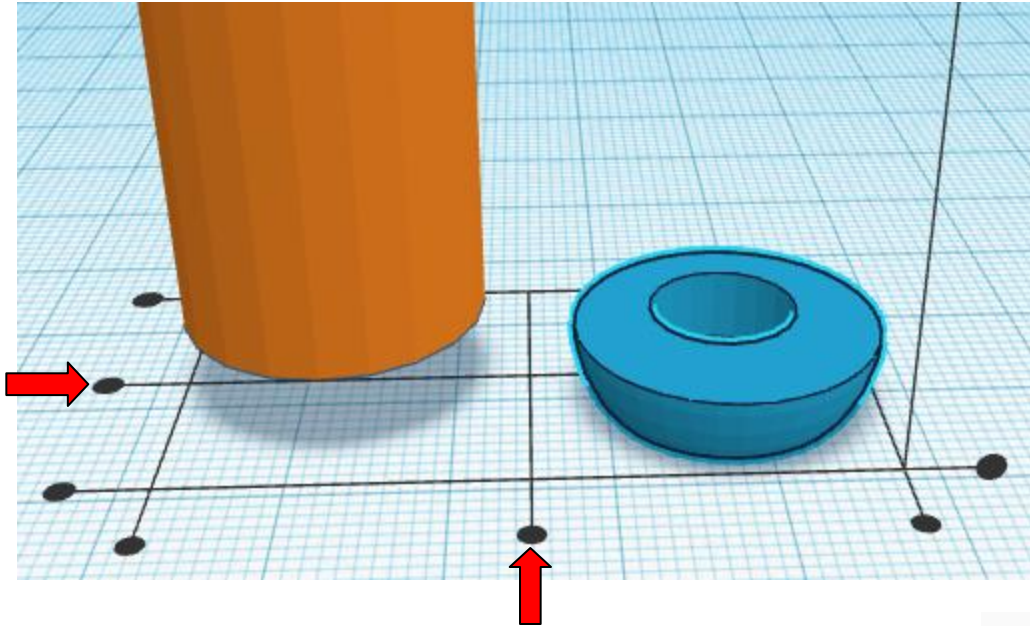


Group the Sphere and Box.

From now on this will be called the Mouth Piece.

Put the mouth piece on the Main Cylinder:

Align the Mouth Piece and the Main Cylinder, centered in the XY plane.



Select all and group the mouth piece and the Main Cylinder.

Create the 1st blow Cylinder:

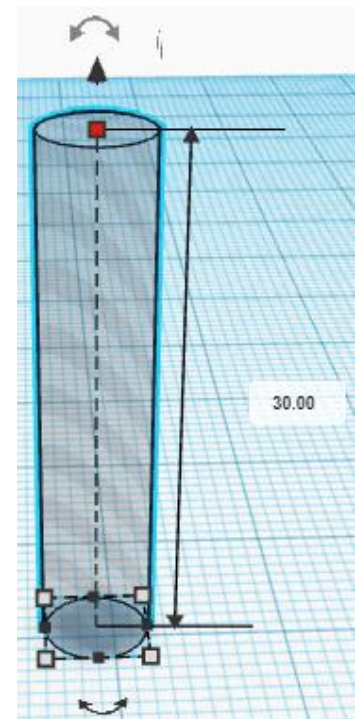
Click on "Cylinder" and pull it out to the Workspace.

Change the Cylinder from a solid to a hole by selecting it and typing "h".

Change the dimensions to
6mm X direction,
6mm Y direction, and
30mm Z direction.

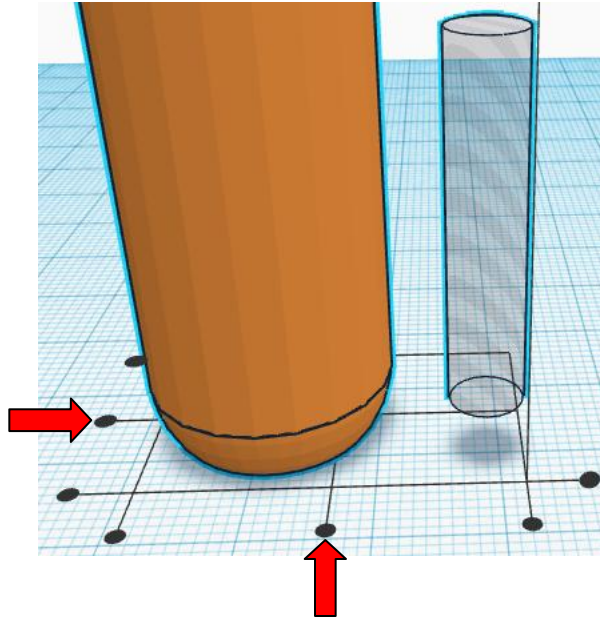


Grab the black cone above the Cylinder and move it up
5mm above the workplane,
(move Up 5mm in positive Z direction).



Put 1st Cylinder in place:

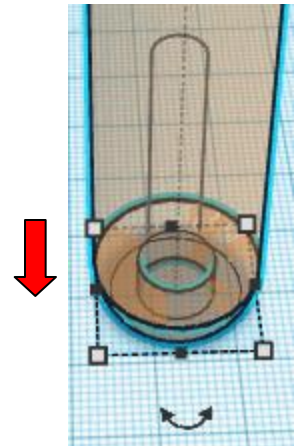
Align the 1st blow Cylinder and the Main Cylinder, centered in the XY plane.



Select and Move the Main Cylinder down 5mm, (in the negative y direction).

Hint: To better see the progress inside the whistle, select the Main Cylinder and type "t". This makes the part transparent.

Select Main Cylinder and push down arrow 5 times.



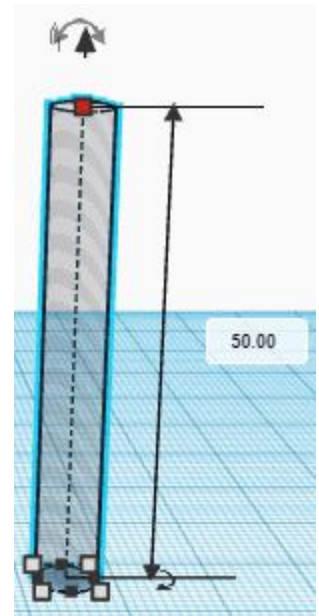
Select all and group the 1st blow Cylinder and the Main Cylinder.

Create the 2nd blow Cylinder:

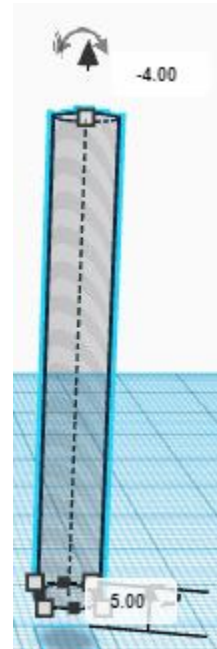
Click on "Cylinder" and pull it out to the Workspace.

Change the Cylinder from a solid to a hole by selecting it and typing "h".

Change the dimensions to
6mm X direction,
6mm Y direction, and
50mm Z direction.

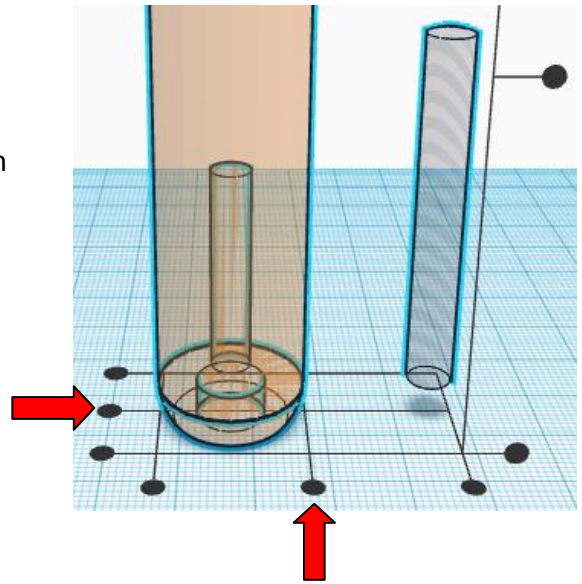


Grab the black cone above the Cylinder and move it up
5mm above the workplane,
(move Up 5mm in positive Z direction).



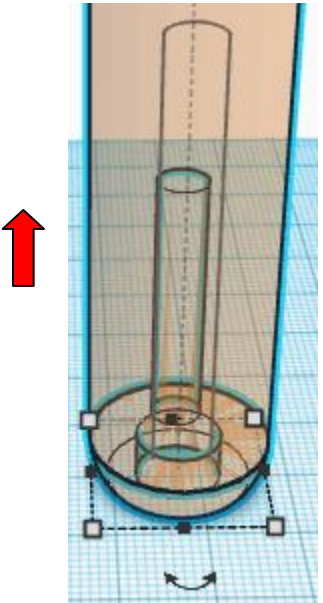
Put 2nd Cylinder in place:

Align the 2nd blow Cylinder and the Main Cylinder, centered in the XY plane.



Select and Move the Main Cylinder up 5mm, (in the positive y direction).

Select Main Cylinder and push up arrow 5 times.



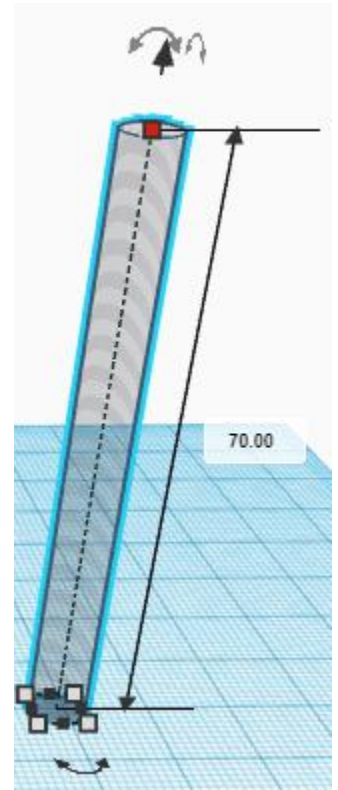
Group the 2nd blow Cylinder and the Main Cylinder.

Create the 3rd blow Cylinder:

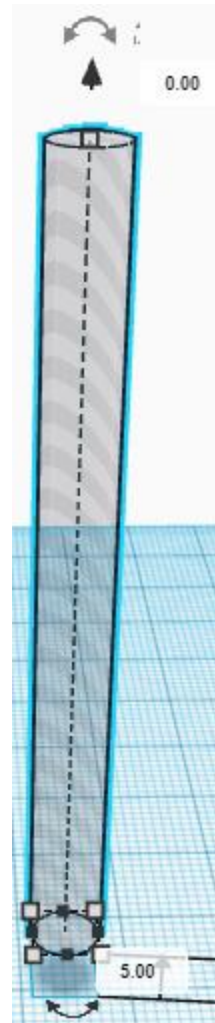
Click on "Cylinder" and pull it out to the Workspace.

Change the Cylinder from a solid to a hole by selecting it and typing "h".

Change the dimensions to
6mm X direction,
6mm Y direction, and
70mm Z direction.

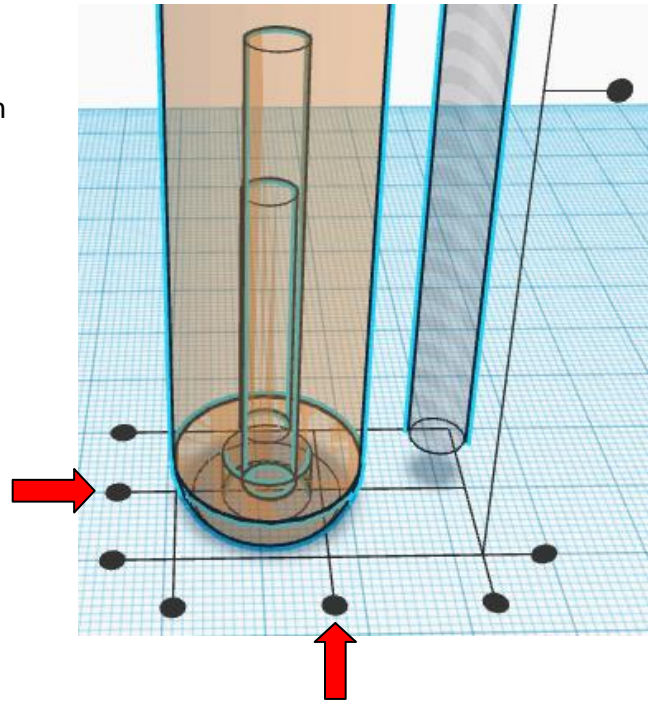


Grab the black cone above the Cylinder and move it up
5mm above the workplane,
(move Up 5mm in positive Z direction).




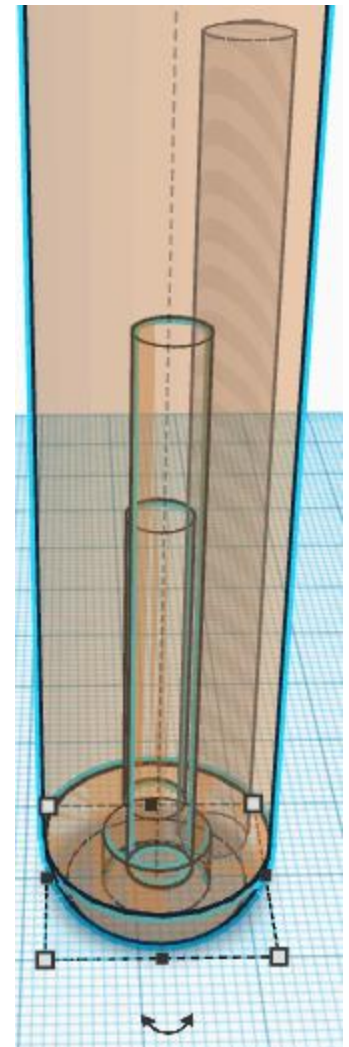
Put 3rd Cylinder in place:

Align the 3rd blow Cylinder and the Main Cylinder, centered in the XY plane.



Select and Move the Main Cylinder left 5mm, (in the negative x direction).

Select Main Cylinder and push left arrow 5 times. 



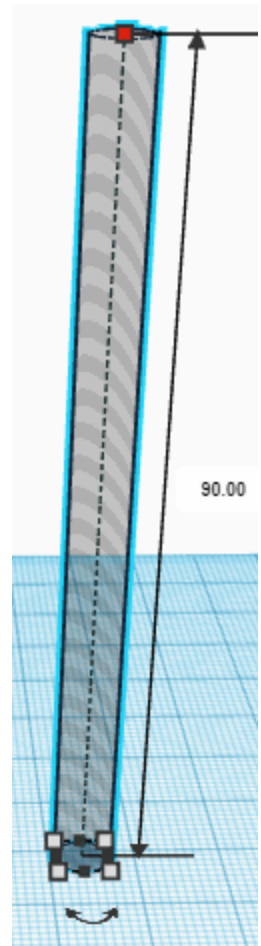
Group the 3rd blow Cylinder and the Main Cylinder.

Create the 4th blow Cylinder:

Click on "Cylinder" and pull it out to the Workspace.

Change the Cylinder from a solid to a hole by selecting it and typing "h".

Change the dimensions to
6mm X direction,
6mm Y direction, and
90mm Z direction.

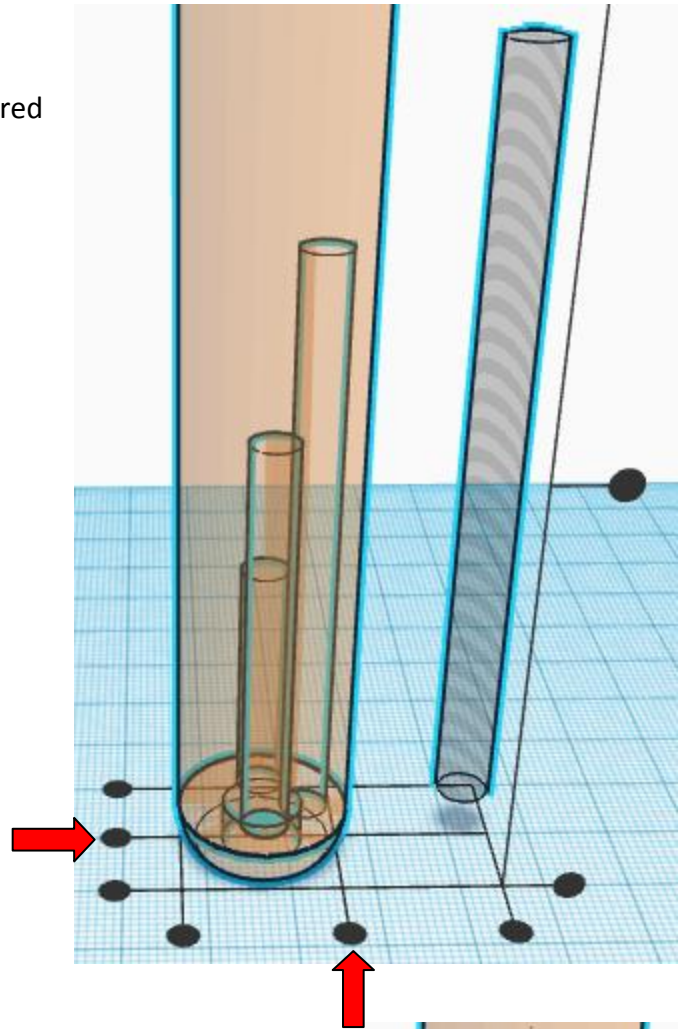


Grab the black cone above the Cylinder and move it up
5mm above the workplane,
(move Up 5mm in positive Z direction).




Put 4th Cylinder in place:

Align the 4th blow Cylinder and the Main Cylinder, centered in the XY plane.

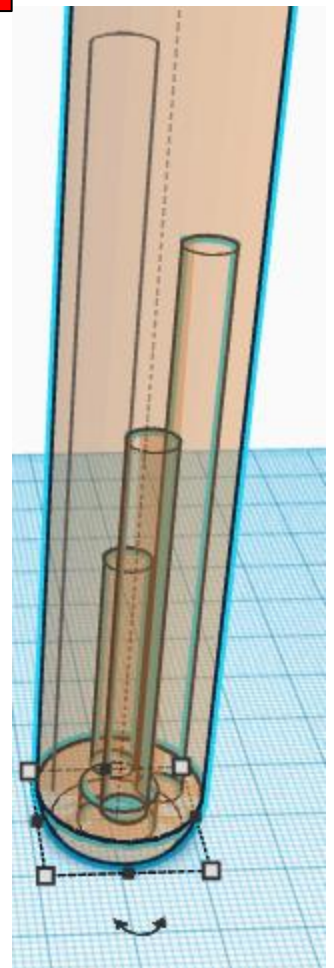


Move the Main Cylinder right 5mm, (in the positive x direction).

Select Main Cylinder and push right arrow 5 times. 

Group the 4th blow Cylinder and the Main Cylinder.

Select the Main Cylinder and type "t" to make it non-transparent again.



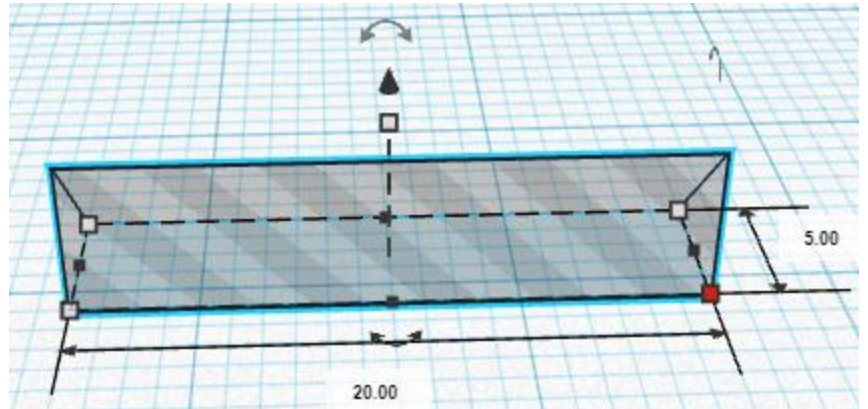
Create the Wedge cuts:

Click on "Wedge" and pull it out to the Workspace.

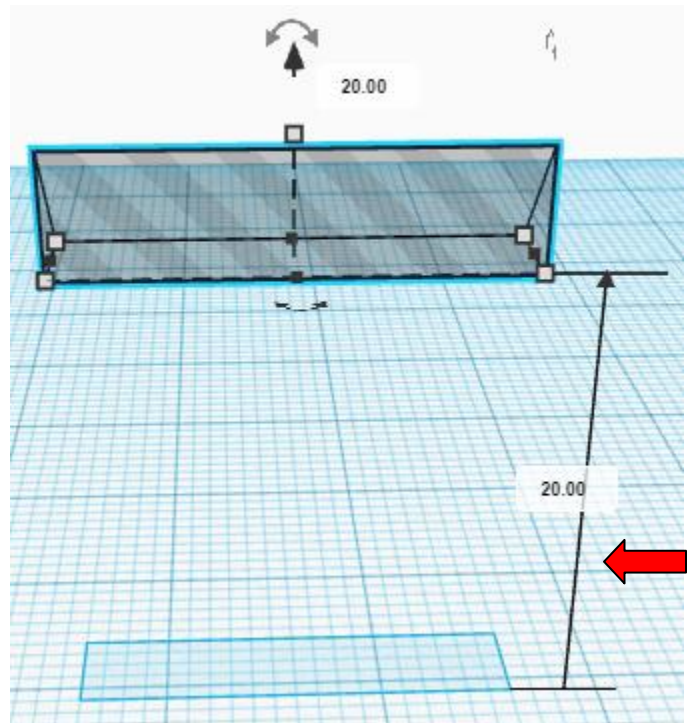
Hint: The wedge is in the basic shapes on the left 6 shapes down.

Change the Wedge from a solid to a hole by selecting it and typing "h".

Change the dimensions to 20mm in the x direction, 5mm in the y direction, and a height of 5mm in the z direction.



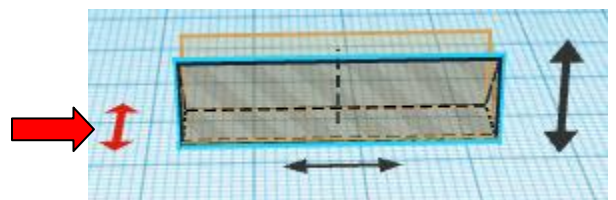
Grab the black cone above the Wedge and move it up 20mm above the workplane, (move Up 20mm in positive Z direction).



Duplicate the Wedge.

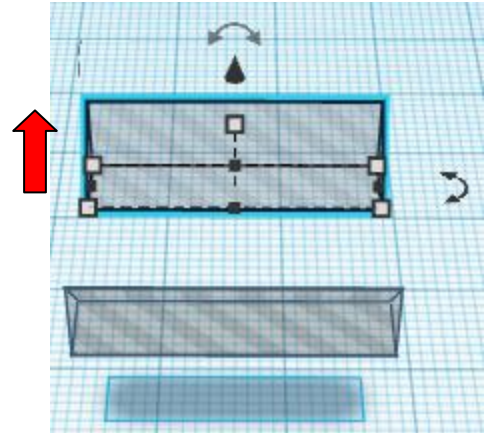
Flip the Wedge by selecting the 1 Wedge and Type "m".

Then select the arrows pointing in the y plane direction.



Move the flipped Wedge 15mm up, in the positive y direction.
The points of the Wedges should be facing each other.

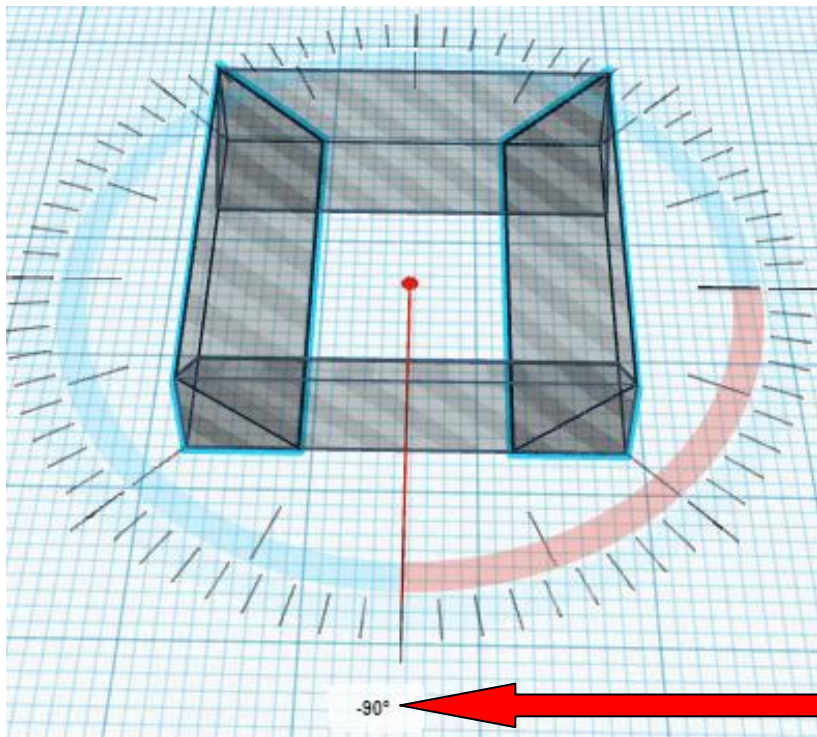
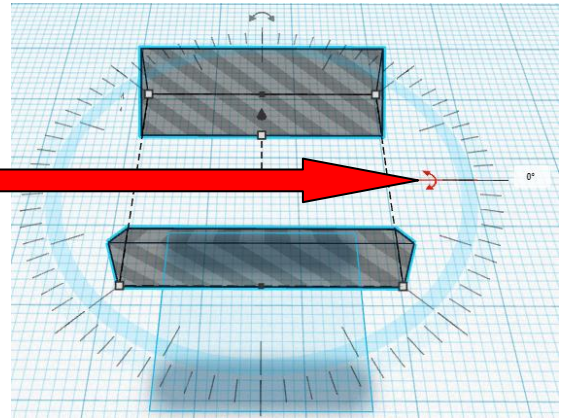
Select flipped Wedge and
push up arrow 15 times.



Group the 2 Wedges.

Duplicate the Wedges.

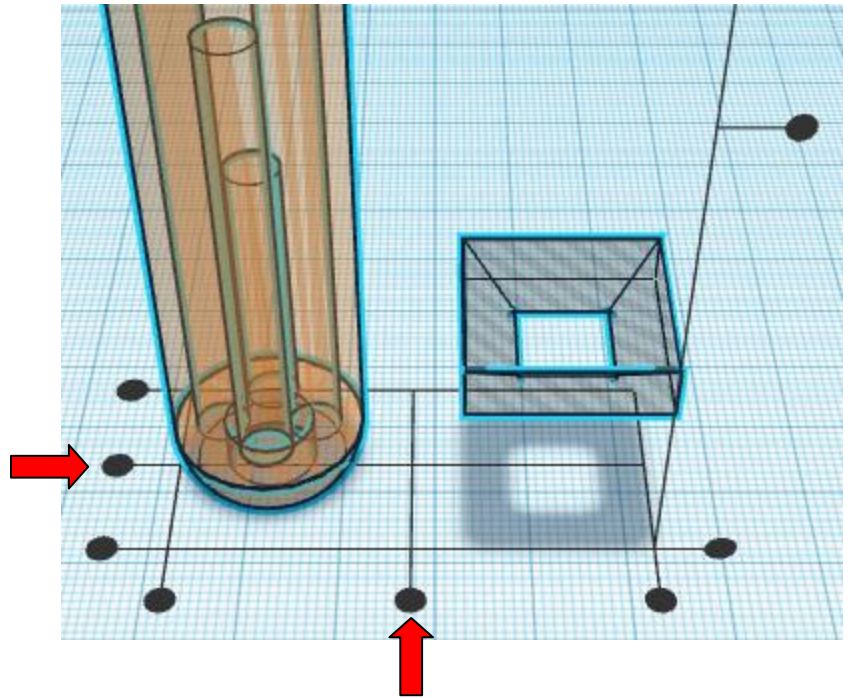
Rotate 1 set of Wedges in the XY plane 90 degrees.



Group all Wedges.

Align the Wedges and the Main Cylinder, centered in the XY plane.

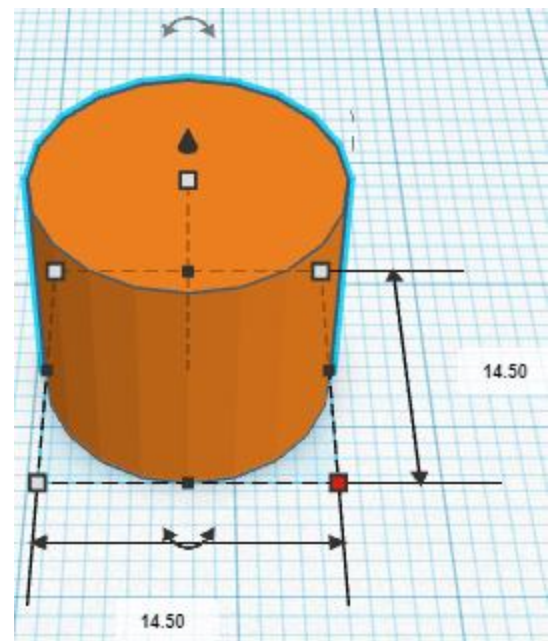
Group all.



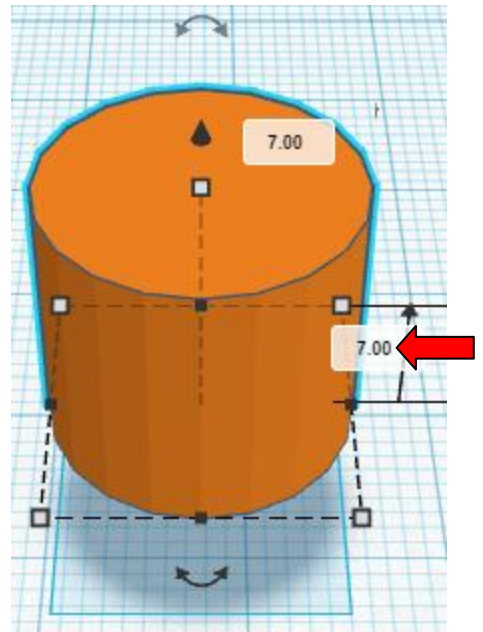
Create the Inner Cylinder:

Click on "Cylinder" and pull it out to the Workspace.

Change the dimensions to
14.5mm X direction,
14.5mm Y direction, and
13mm Z direction.

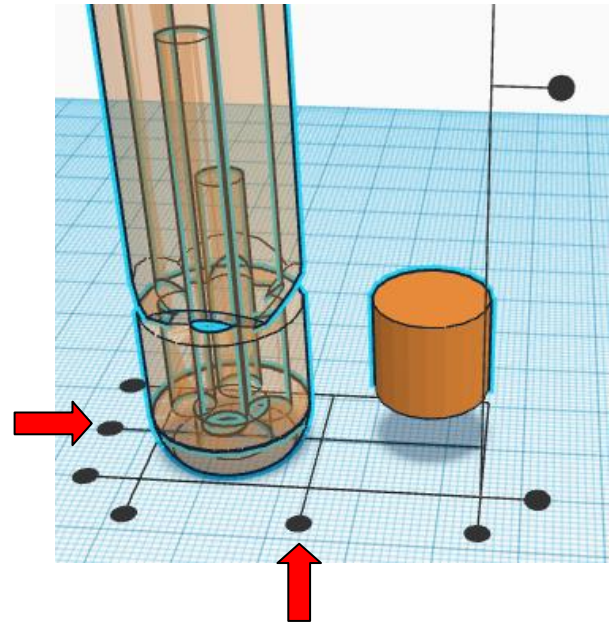


Grab the black cone above the Cylinder and move it up 7mm above the workplane,
(move Up 7mm in positive Z direction).



Align the Inner Cylinder and the Main Cylinder,
centered in the XY plane.

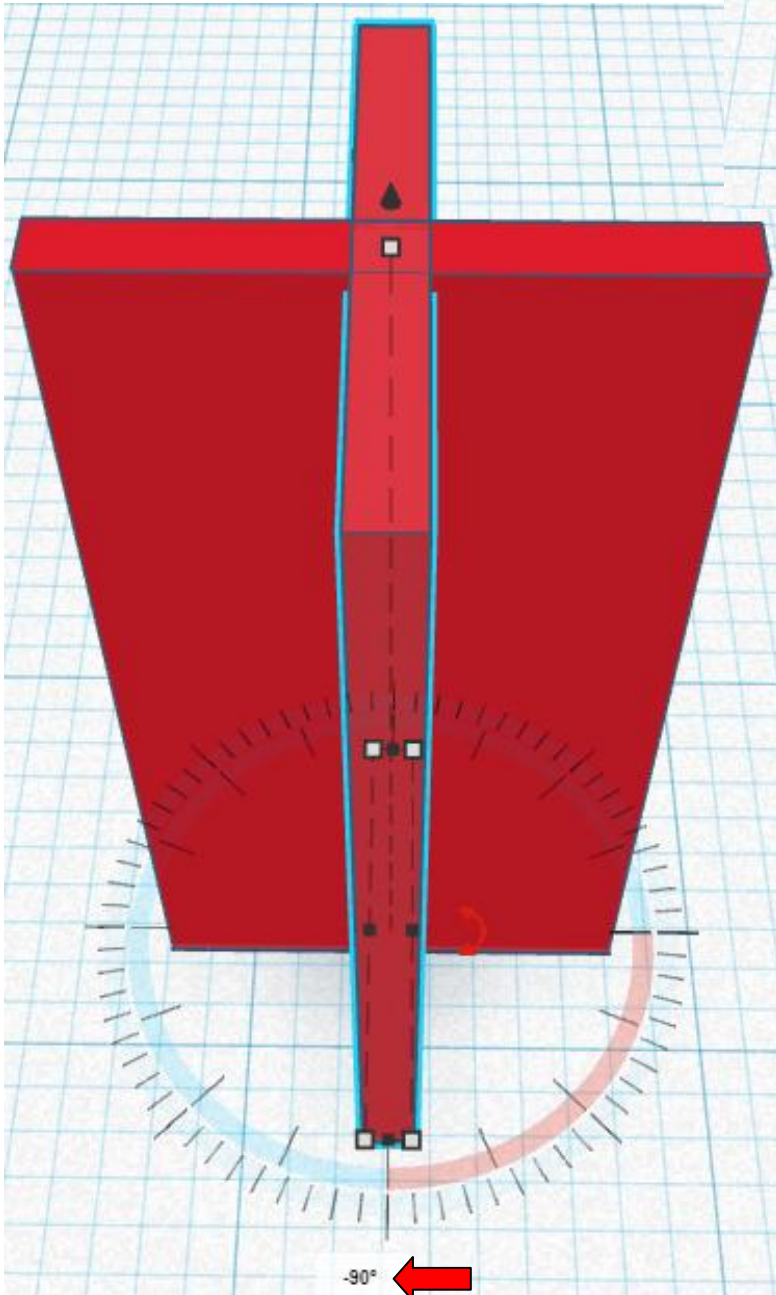
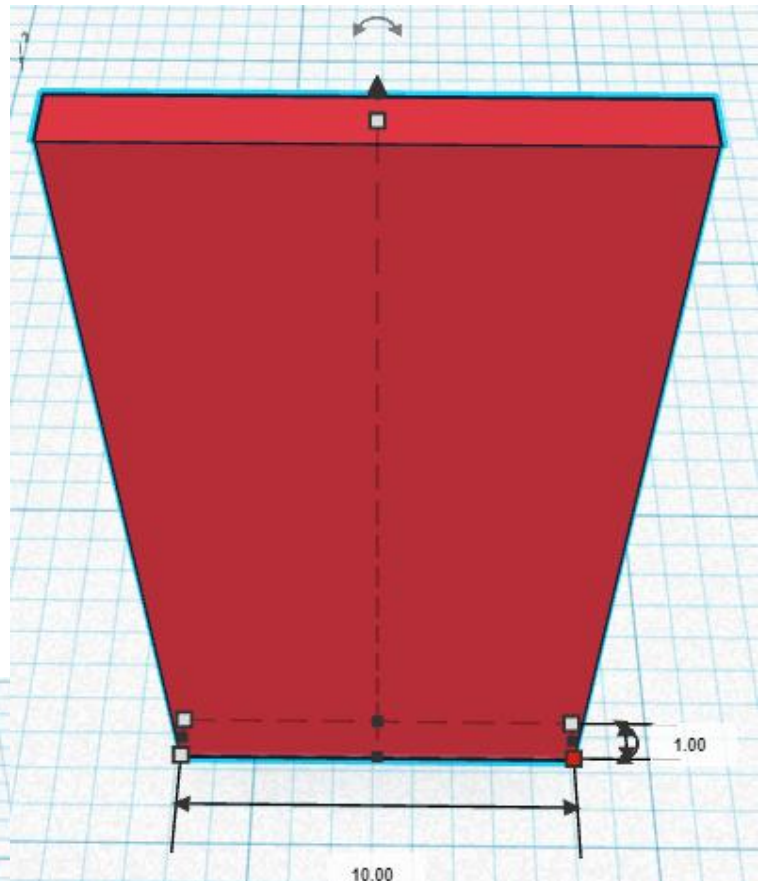
Group the Inner Cylinder and the Main Cylinder.



Create the Center Support:

Click on "Box" and pull it out to the Workspace.

Change the dimensions to 10mm in the x direction, 1mm in the y direction, and a height of 20mm in the z direction.

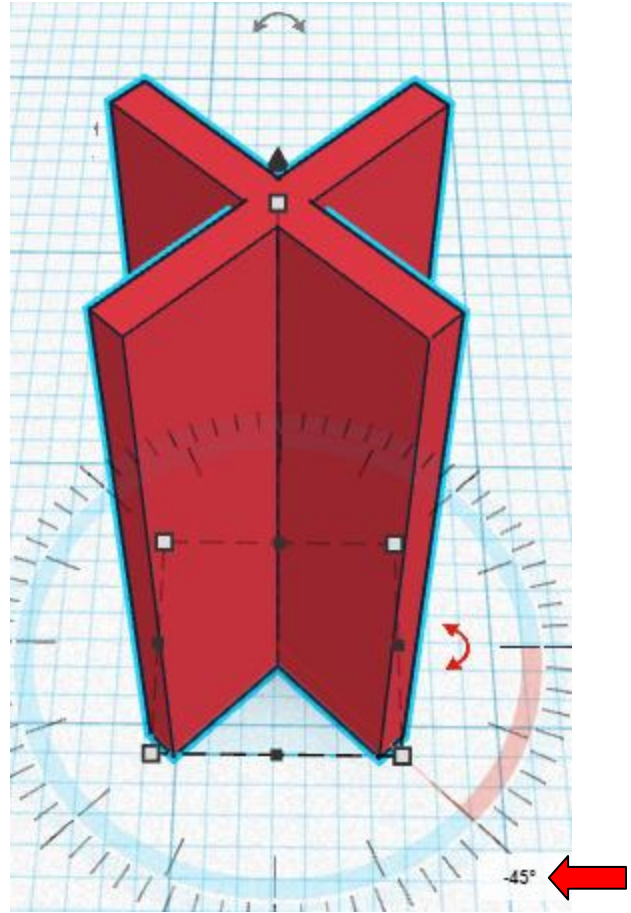


Duplicate the Center Support.

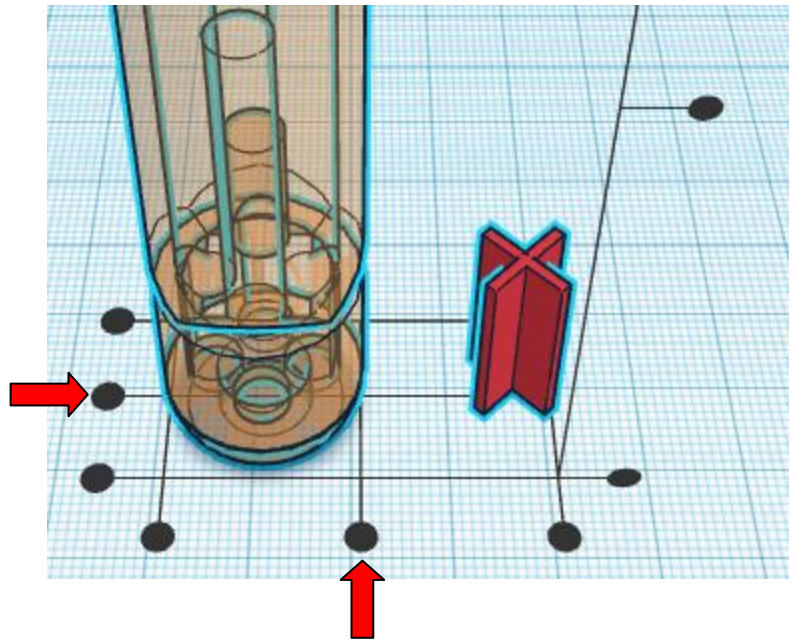
Rotate the Center Support in the XY plane 90 degrees.

Group the 2 Center Supports.

Rotate the Center Supports in the XY plane 45 degrees.



Align the Center Supports and the Main Cylinder, centered in the XY plane.



Group the Center Supports and the Main Cylinder.

Your train whistle is done. You should be able to print with no supports. Have fun!

Slide Whistle:

Let's start with the base. Go to "Create new design".

Click on "Cylinder" and pull it out to the Workspace and place it close to the middle.

Create the Slide Plunger:

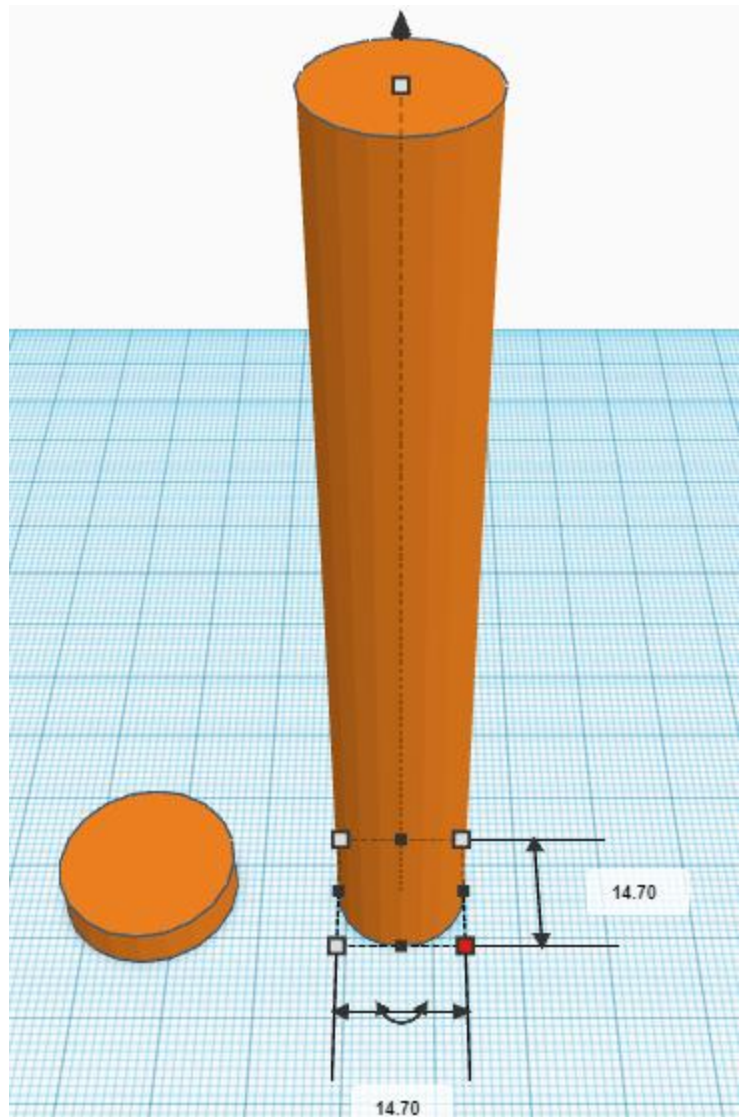
Select the Cylinder. This is the handle.

Change the dimensions to 20mm X direction, 20mm Y direction, and 5mm Z direction.

Click on another "Cylinder" and pull it out to the Workspace.

Select the Cylinder. This is the Plunger.

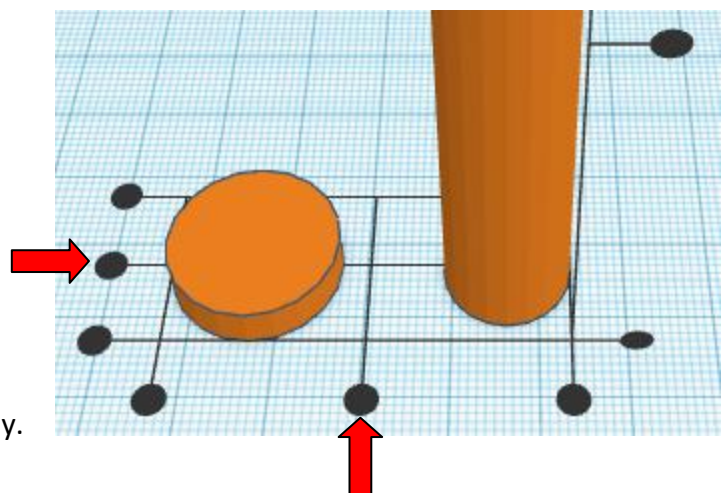
Change the dimensions to 14.7mm X direction, 14.7mm Y direction, and 100mm Z direction.



Align the Handle and the Plunger, centered in the XY plane.

Group the Handle and the Plunger. We will now call this the Slide Plunger.

This piece is done, set it aside for now out of the way.

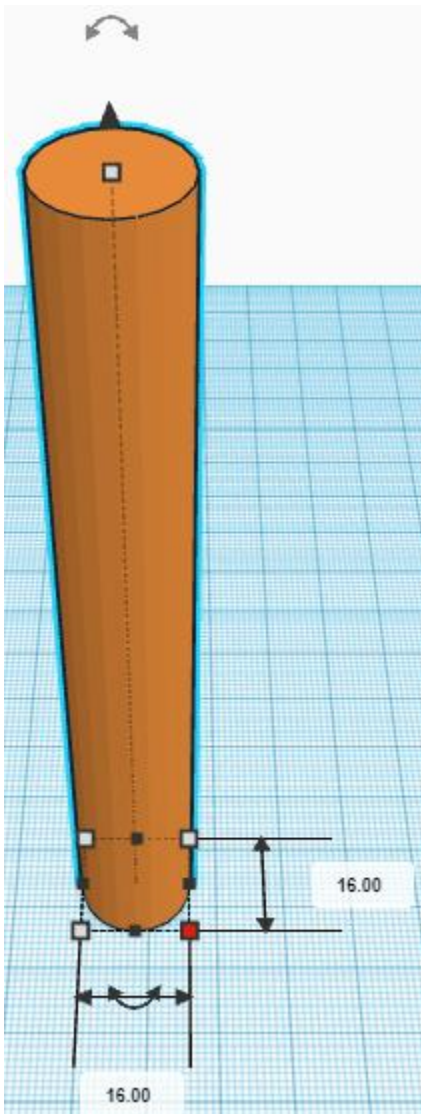
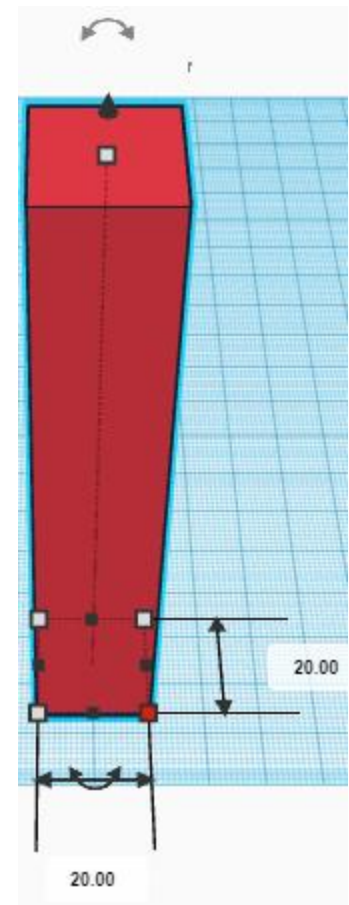


Create the Main Body:

Click on “Box” and pull it out to the Workspace and place it close to the middle.

Select the Box. This is the Main Body.

Change the dimensions to 20mm in the X direction, 20mm in the Y direction, and 120mm in the Z direction.



Create the Main Hole:

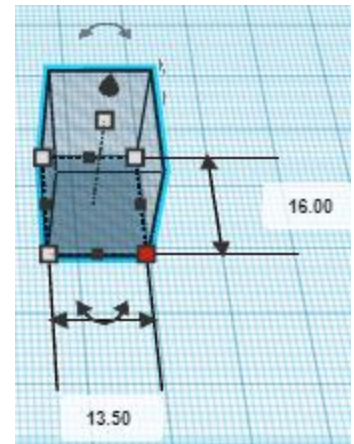
Click on “Cylinder” and pull it out to the Workspace.

Change the dimensions to 16mm in the X direction, 16mm in the Y direction, and 120mm in the Z direction.

Click on "Box" and pull it out to the Workspace.

Change the Box from a solid to a hole by selecting it and typing "h".

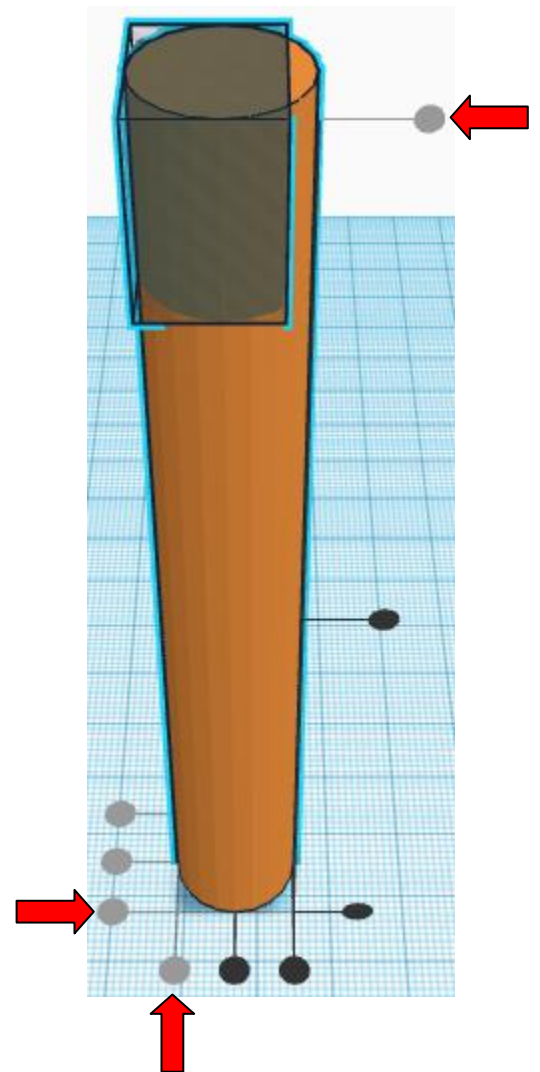
Change the dimensions to
13.5mm in the X direction,
16mm in the Y direction, and
20mm in the Z direction.



Align the Box and the Main Hole,
centered in the Y plane,
to the Left in the X plane, and
to the Top in the Z plane.

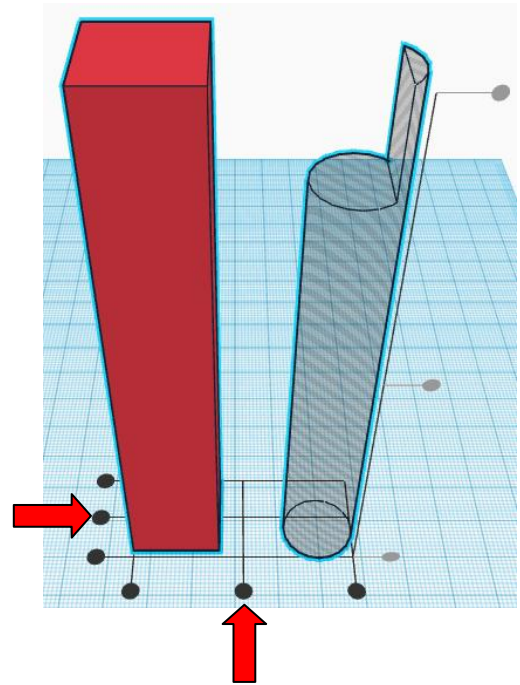
Group the Box and the Main Hole.

Change the Main Hole from a solid
to a hole by selecting it and typing "h".



Align the Main Body and the Main Hole, centered in the XY plane.

Group the Main Body and the Main Hole.



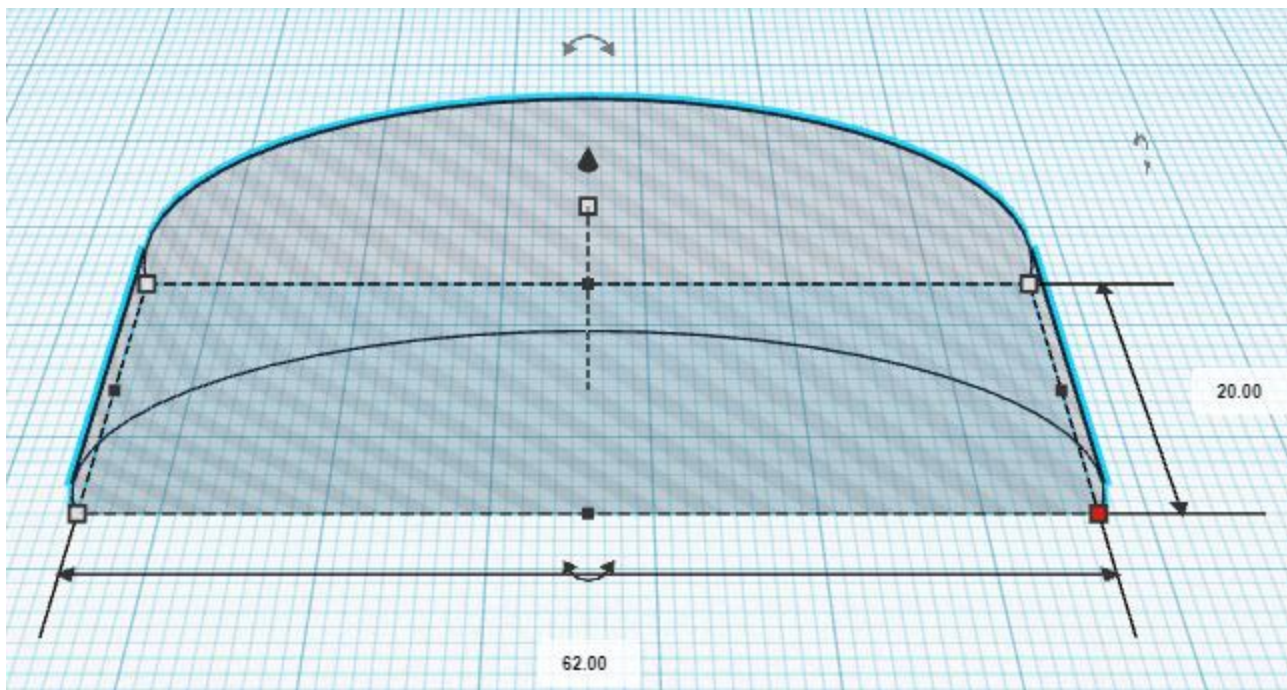
Create the Mouth Cutout:

Click on "Round Roof" and pull it out to the Workspace.

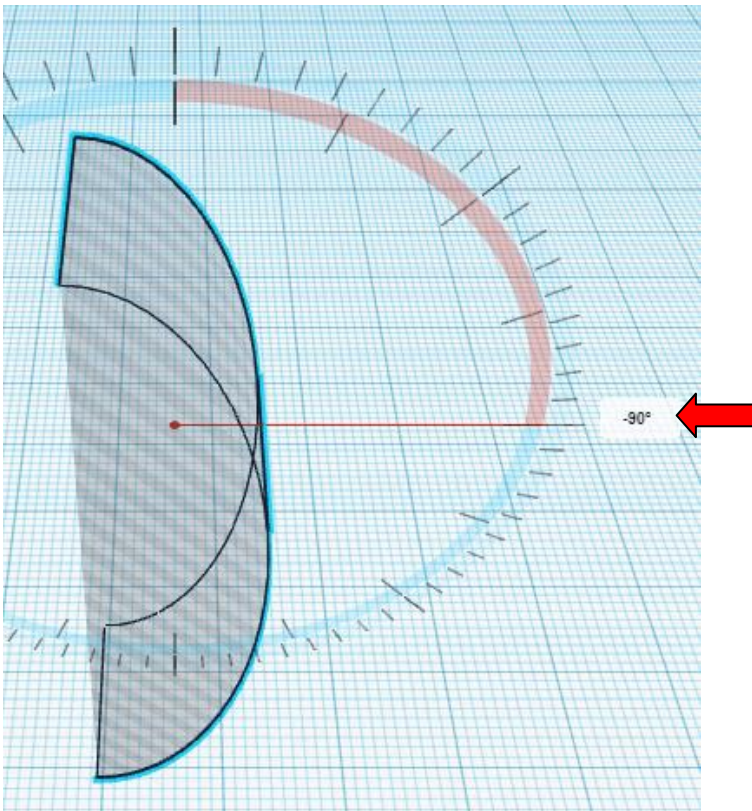
Hint: The Round Roof is in the basic shapes on the left 5 shapes down.

Change the dimensions to 62mm in the X direction, 20mm in the Y direction, and 16mm in the Z direction.

Change the Round Roof from a solid to a hole by selecting it and typing "h".



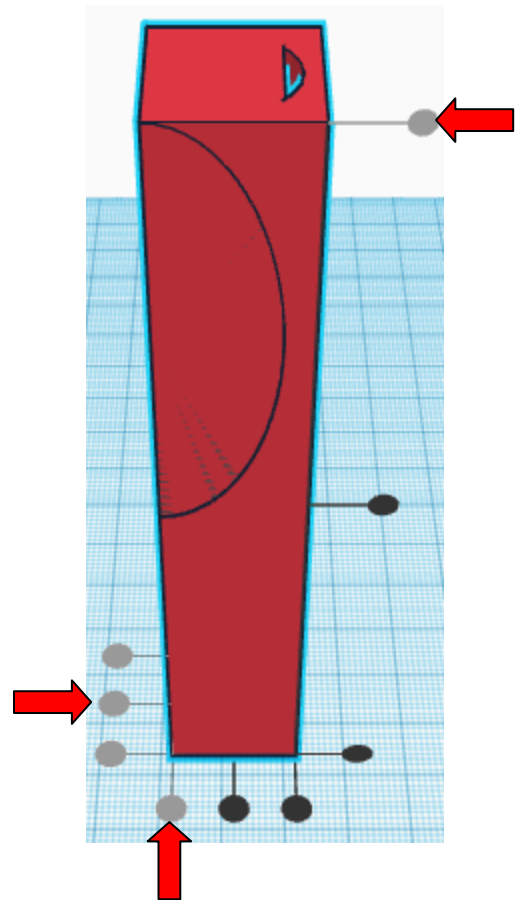
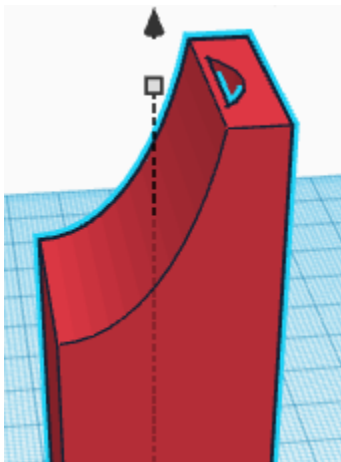
Rotate the Round Roof 90 degree clockwise in the XZ plane.



Align the Main Body and the Round Roof, to the Left in the X plane, centered in the Y plane, and to the Top in the Z plane.

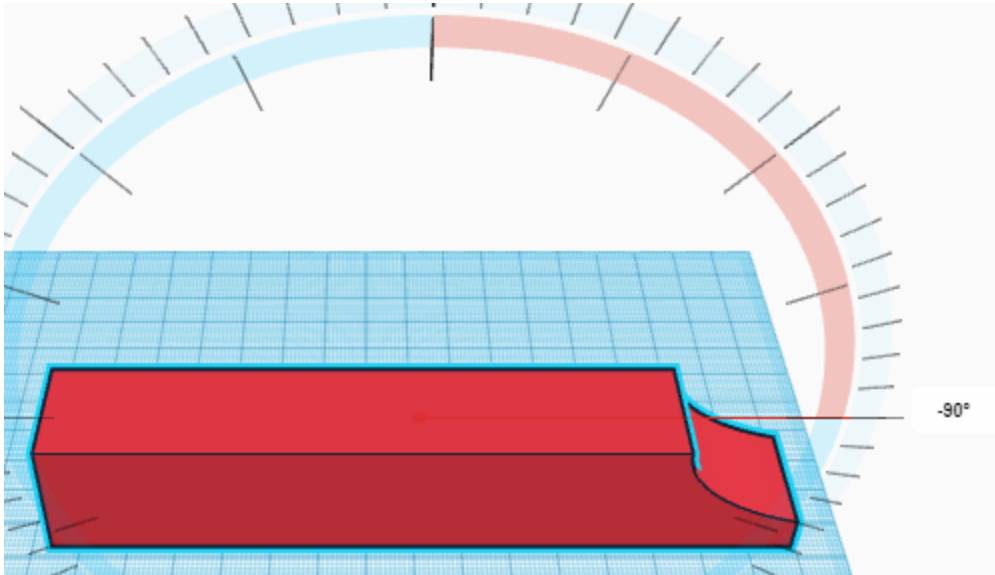
Move the Main Body down:
Select the Main Body and move it down, in the negative Z direction 43mm.
Hint: Hold down the Control button and press the down arrow 43 times.

Group the Main Body and the Mouth Cutout.



Ready Whistle for printing:

Rotate Main Body clockwise 90 degrees in the XZ plane.



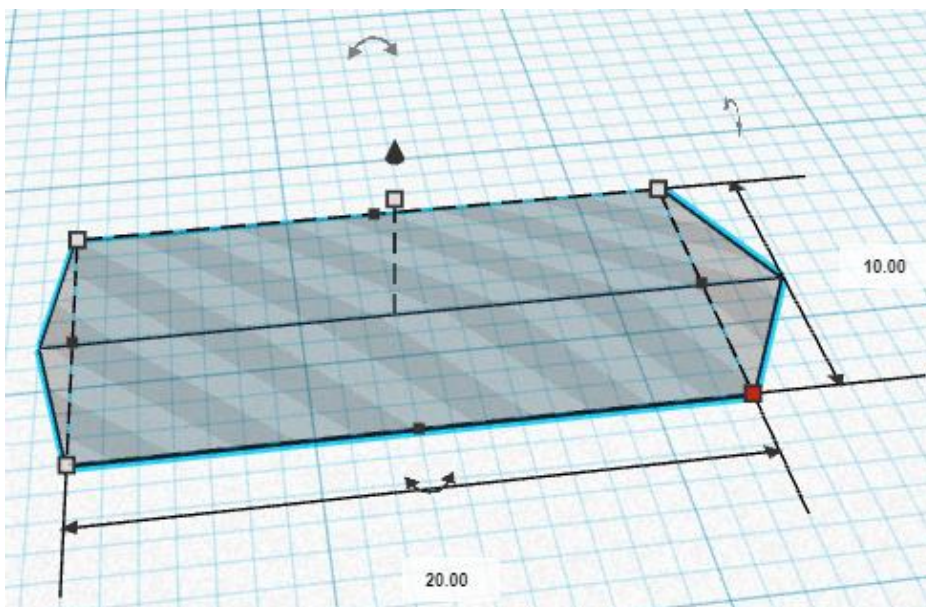
Select the Main Body and type "D", this will set the Main Body on top of the workplane.

Create the Air Cutout:

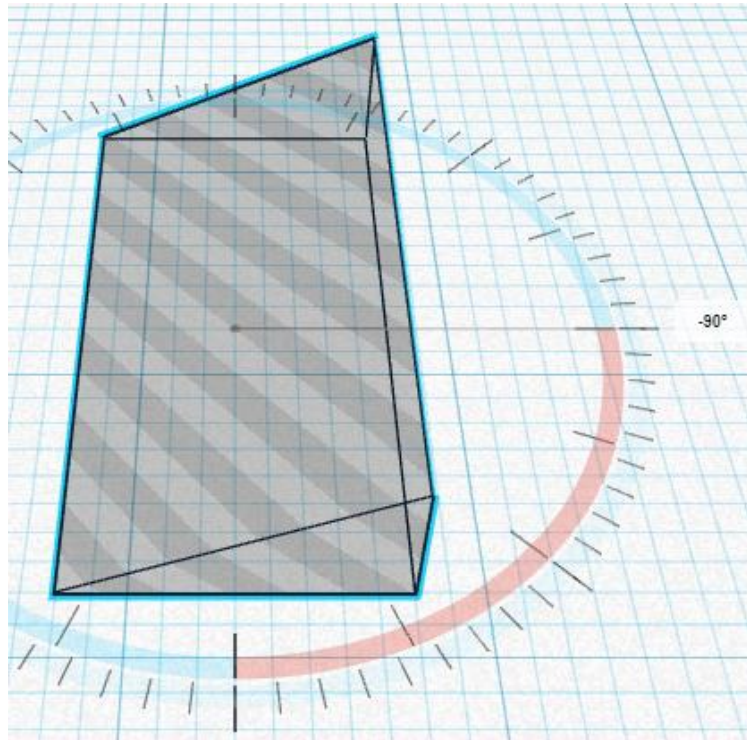
Click on "Wedge" and pull it out to the Workspace. This will be called the Air Cutout.
Hint: The Wedge is in the basic shapes on the left 6 shapes down.

Change the dimensions to
20mm in the X direction,
10mm in the Y direction, and
4.5mm in the Z direction.

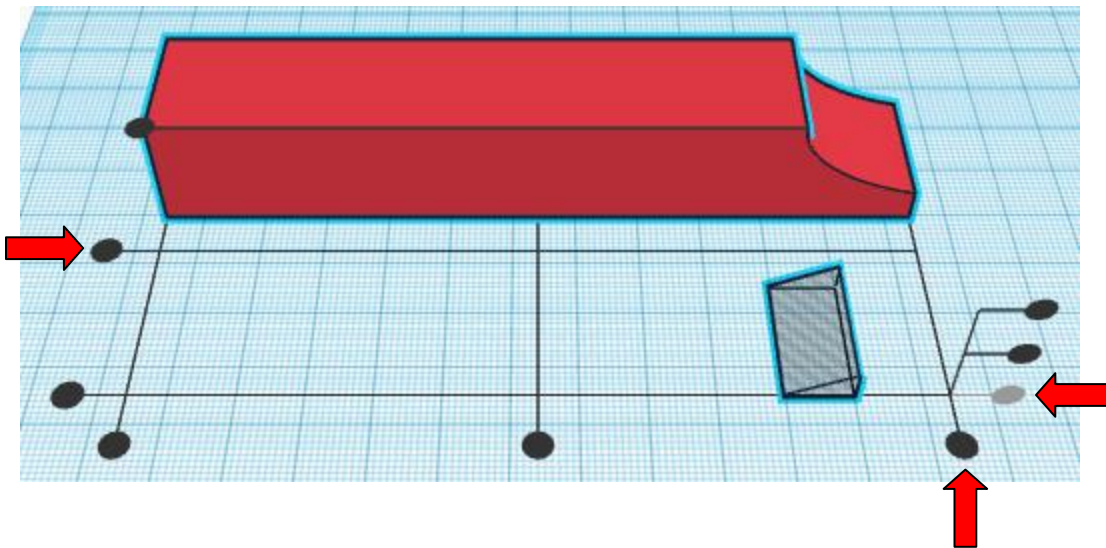
Change the Air Cutout from a solid to a hole by selecting it and typing "h".



Rotate Air Cutout counter-clockwise 90 degrees.



Align the Main Body and the AirCutout, centered in the Y plane, to the Right in the X plane, and to the Bottom in the Z plane.



Move the Main Body Right:
Select the Main Body and move it right, in the positive X direction 20mm.
Hint: Hold down the Shift button and press the right arrow 2 times.

Group all.

Congratulations, you are done. Print and enjoy your whistle!