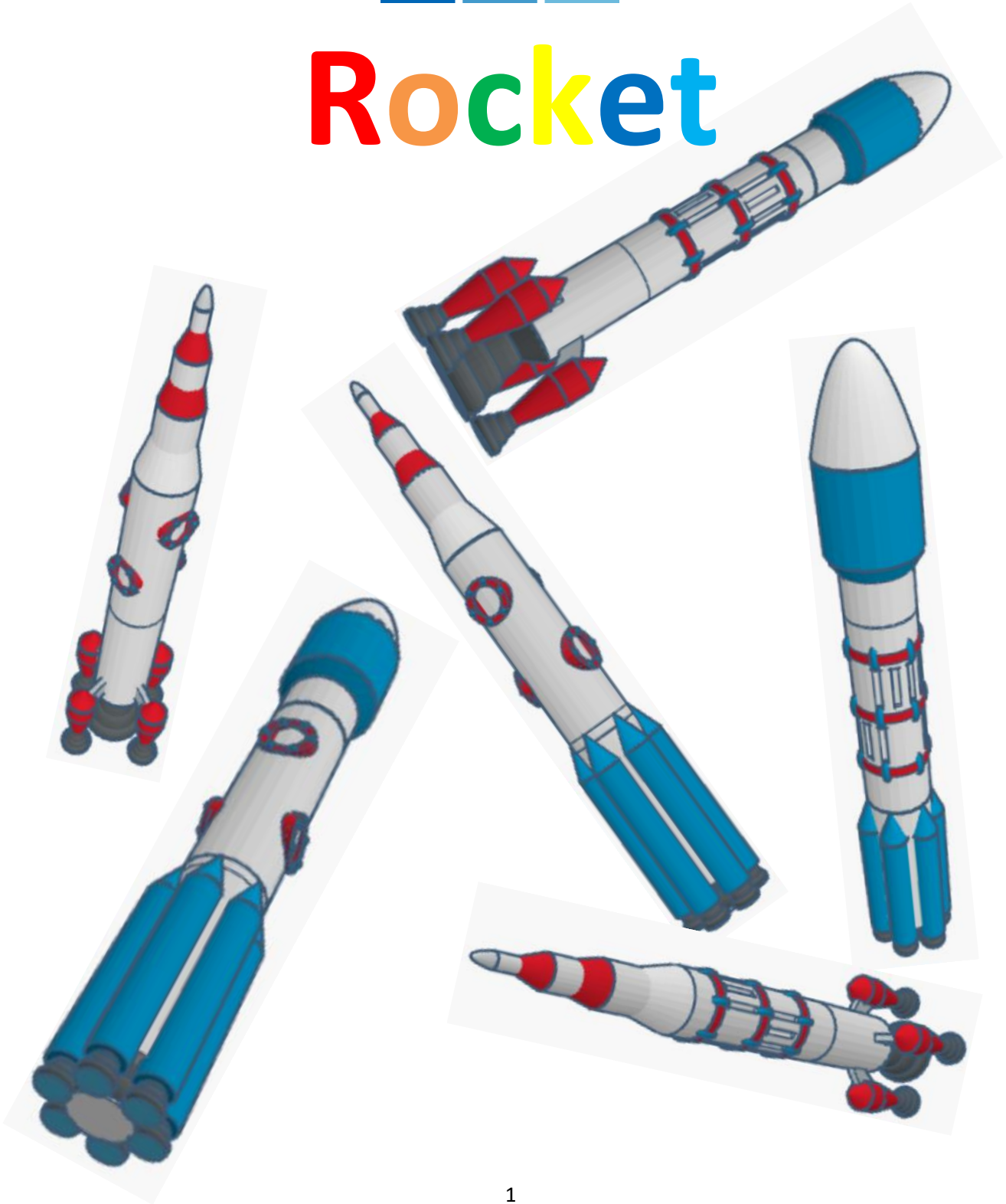


T I N
K E R
C A D

Rocket



Contents:

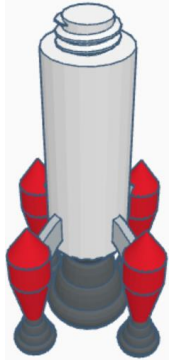
| | |
|---------------------------------|-----------|
| Cover..... | 1 |
| Table of Contents..... | 2 |
| Choose your Rocket | 3 |
| Retro Rocket Base | 4 |
| Modern Base..... | 26 |
| Window Middle..... | 41 |
| Modern Middle..... | 54 |
| Retro Top..... | 70 |
| Modern Top..... | 82 |
| References..... | 91 |
| Tool Guide..... | 93 |

Disclaimer:

Locations of objects move on a regular basis in TinkerCAD. Although locations of objects are stated, that is the location at the time of publication. This publication has no association with TinkerCAD and does not control when TinkerCAD moves objects.

To accommodate for objects moving locations, it is suggested to add the most used objects to “Favorites”. This acts as a shortcut to the object no matter where it is moved to. To add objects to Favorites, hover the mouse over the object and in the upper right corner, an outlined star will appear. Click on the star changing it to yellow in color. The object will now appear in the Favorites area.

Choose your Rocket Base:



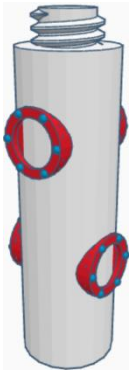
Retro Base
Go to page 4

or



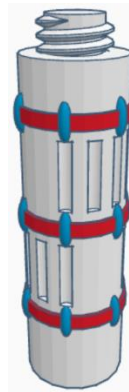
Modern Base
Go to page 26

Choose your Rocket Middle:



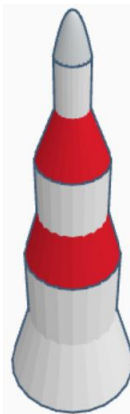
Window Middle
Go to page 41

or



Modern Middle
Go to page 54

Choose your Rocket Top:



Retro Top
Go to page 70

or

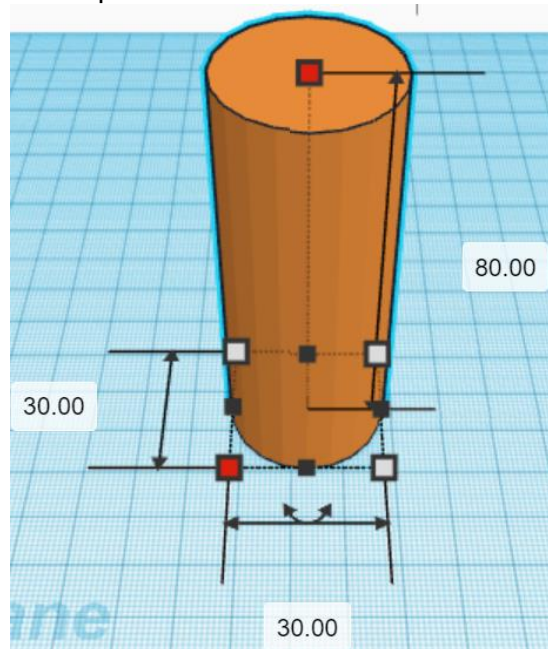


Modern Top
Go to page 82

Retro Rocket Base:

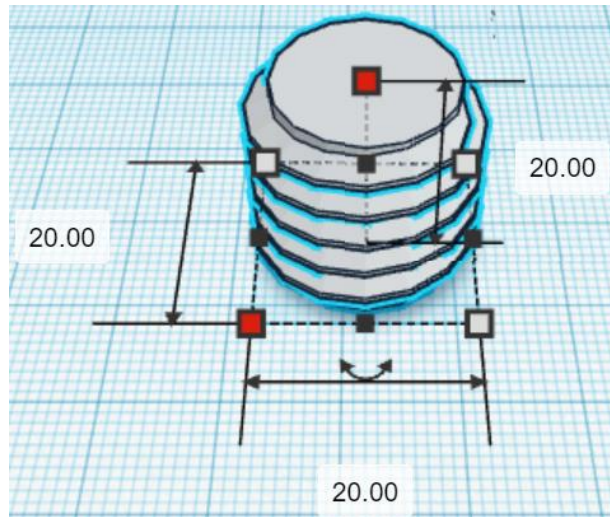
Bring in a Cylinder, located in Basic Shapes on the left 2 shapes down.
From now on this will be called the **Base Cylinder**.

Change the dimensions to
30mm X direction,
30mm Y direction, and
80mm Z direction.



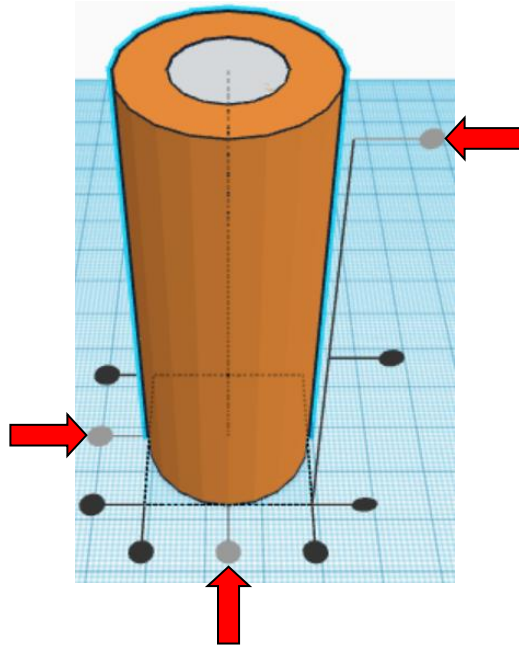
Bring in a ISO Metric Thread, located in Shape Generators, under Featured, (things in Featured move each time that TinkerCad adds items to Featured), this was last seen on the left, 3 shapes down.
From now on this will be called the **Base Thread**.

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



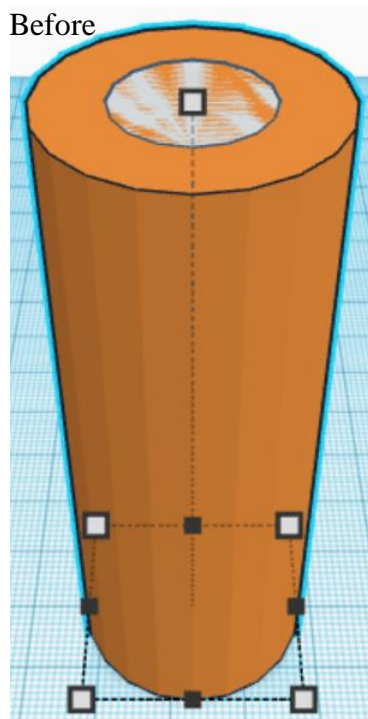
Align Base Cylinder and Base Thread

centered in X direction,
centered of Y direction, and
top of Z direction.

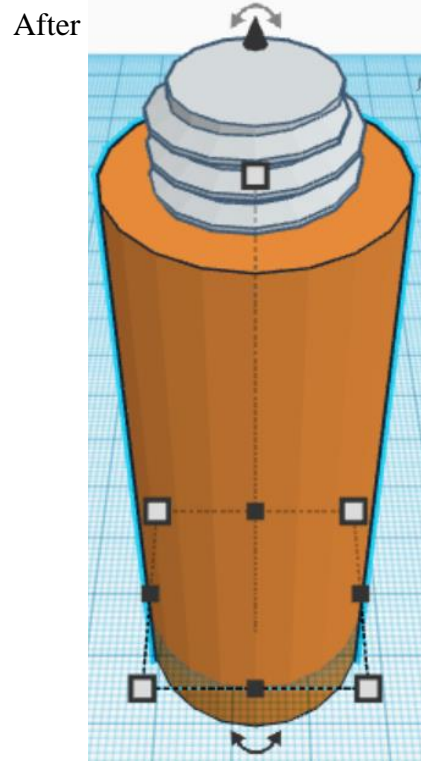


Move Base Cylinder (Must be in home view for this to work!)
move down in negative Z direction 10mm

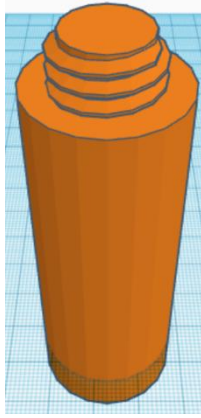
Hint: Select Base Cylinder and hold control and push down arrow key 10 times.
Or
Select Base Cylinder and hold control and hold shift and push down arrow key 1 time.



10mm
Down
(Hold Control)

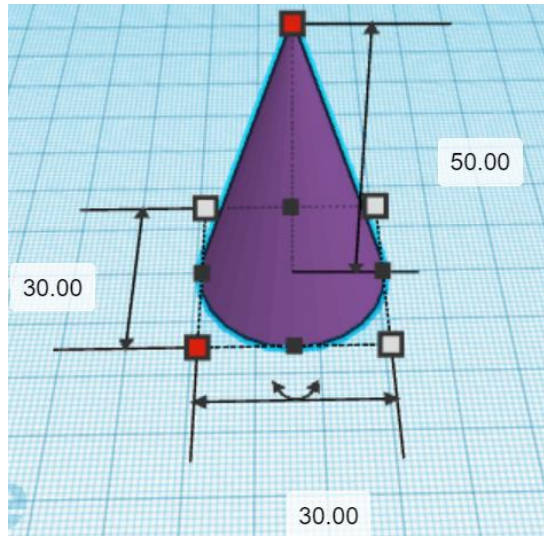
A red arrow pointing downwards, indicating the direction of movement for the cylinder.

Group Base Cylinder and Base Thread
From now on this will be called the **Base**



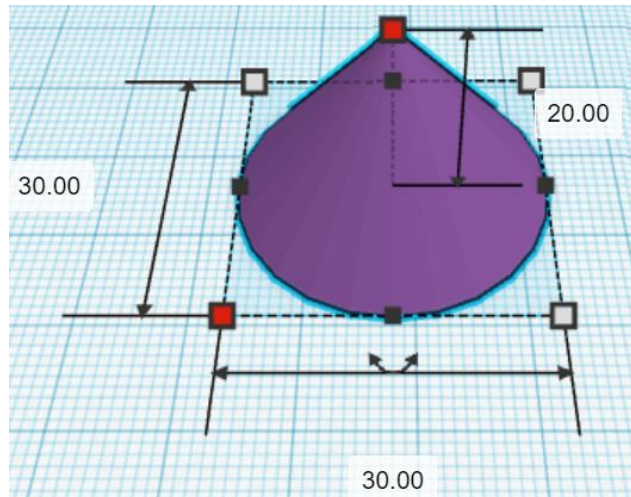
Bring in a Cone, located in Basic Shapes in the middle 3 shapes down.
From now on this will be called the **Booster**.

Change the dimensions to
30mm X direction,
30mm Y direction, and
50mm Z direction.



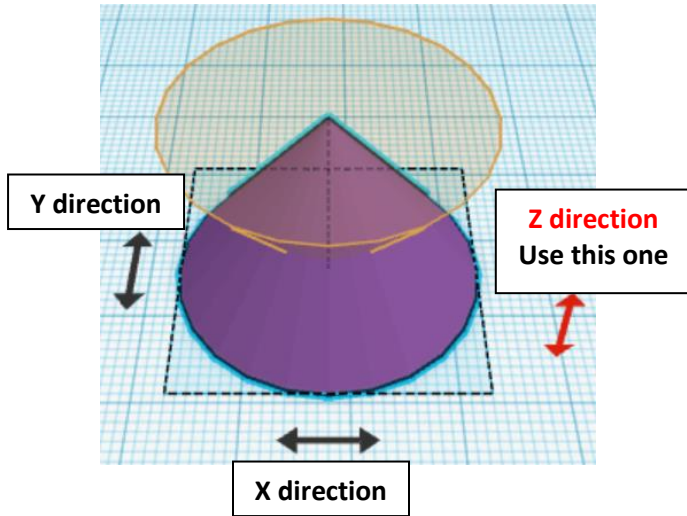
Bring in a Cone, located in Basic Shapes in the middle 3 shapes down.
From now on this will be called the **Booster Top**.

Change the dimensions to
30mm X direction,
30mm Y direction, and
20mm Z direction.

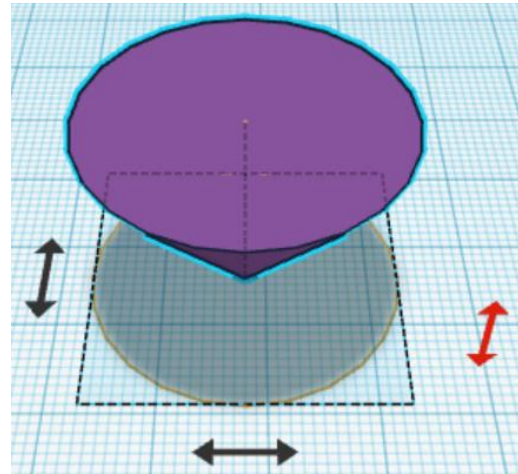


Flip Booster Top in Z direction.

Before

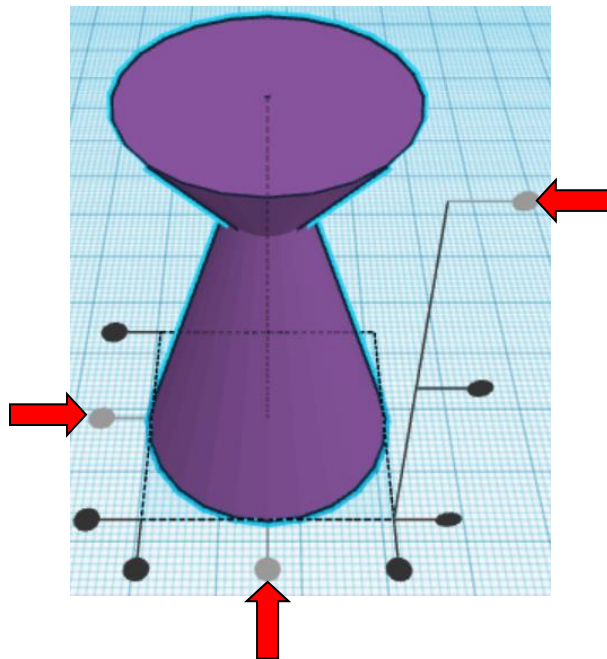


After



Align Booster and Booster Top

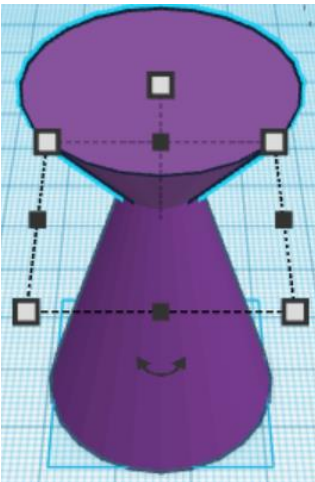
centered in X direction,
centered of Y direction, and
top of Z direction.



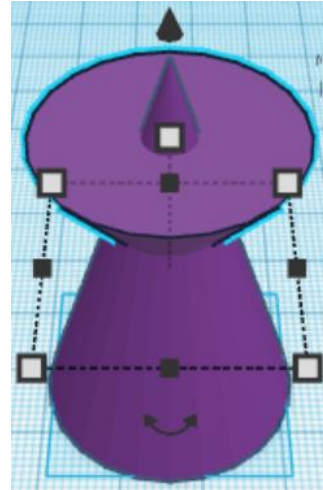
Move Booster Top (Must be in home view for this to work!)
move down in negative Z direction 10mm

Hint: Select Booster Top and hold control and push down arrow key 10 times.
Or
Select Booster Top and hold control and hold shift and push down arrow key 1 time.

Before

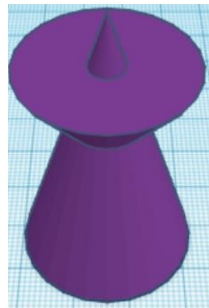


After



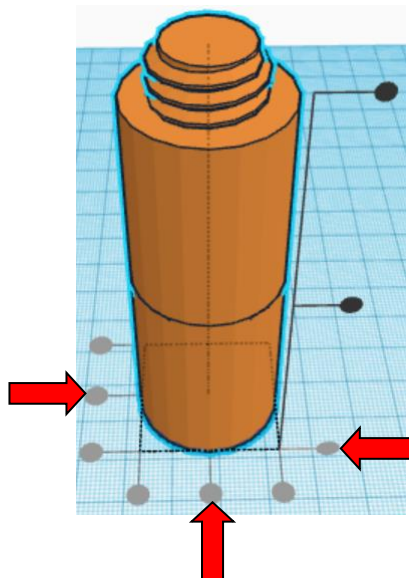
10mm
Down
(Hold Control)

Group Booster and Booster Top
From now on this will be called the **Booster**



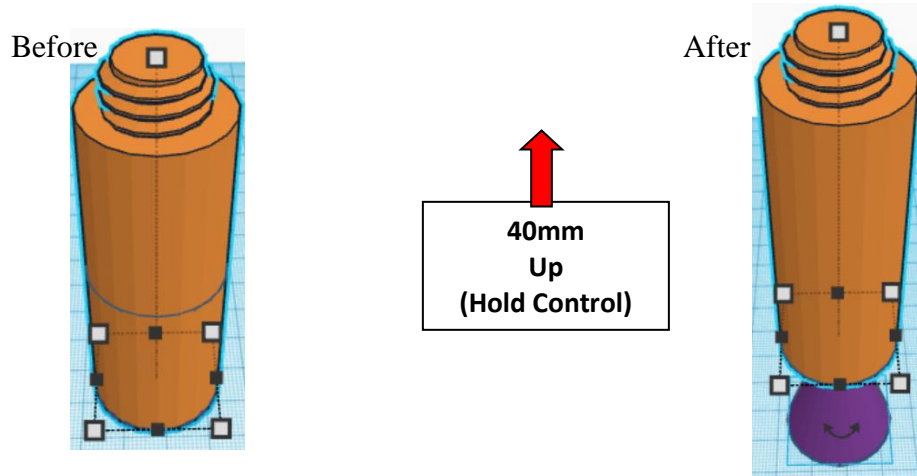
Align Booster and Base

centered in X direction,
centered of Y direction, and
bottom of Z direction.



Move Base (Must be in home view for this to work!)
move up in positive Z direction 40mm

Hint: Select **Base** and hold control and push up arrow key 40 times.
Or
Select **Base** and hold control and hold shift and push up arrow key 4 times.

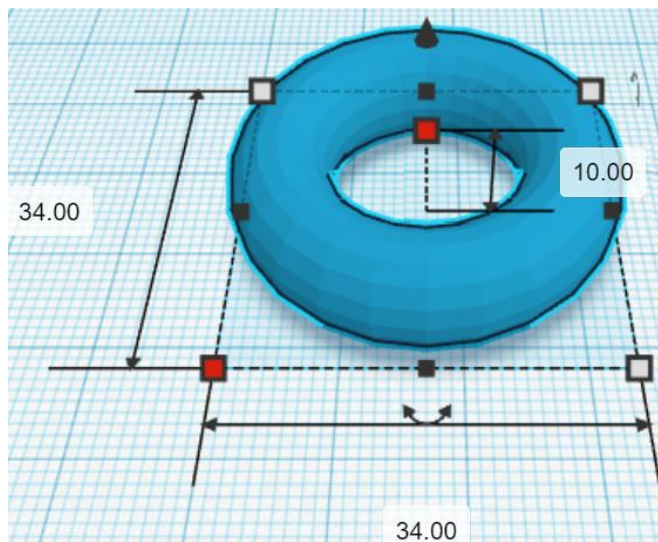


Group Booster and Base
From now on this will be called the **Base**



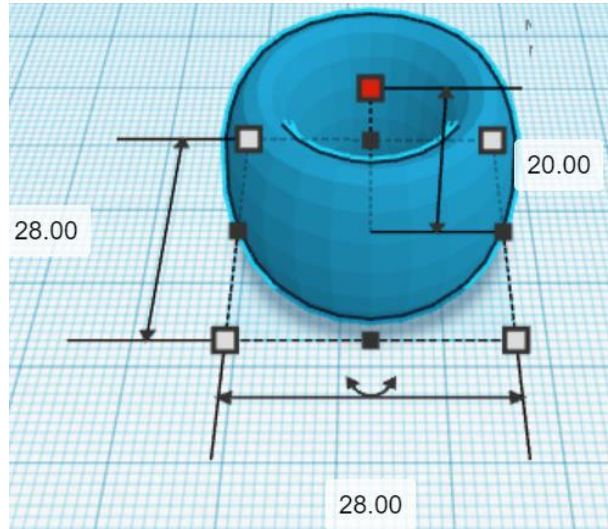
Bring in a Torus, located in Basic Shapes on the left 6 shapes down.
From now on this will be called the **Booster Bulge 1**.

Change the dimensions to
34mm X direction,
34mm Y direction, and
10mm Z direction.



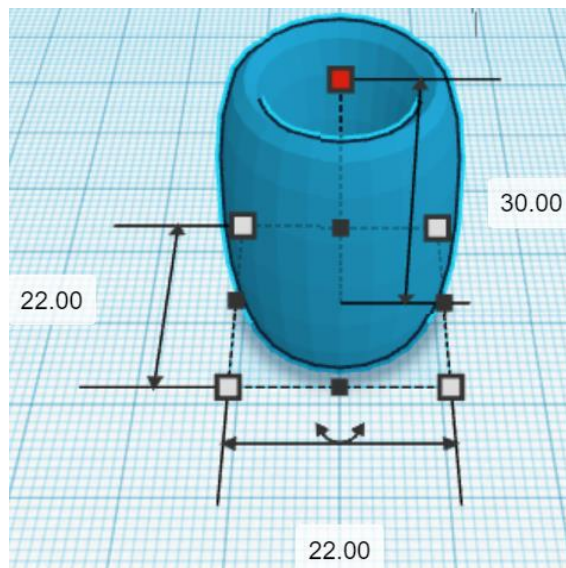
Bring in a Torus, located in Basic Shapes on the left 6 shapes down.
From now on this will be called the **Booster Bulge 2**.

Change the dimensions to
28mm X direction,
28mm Y direction, and
20mm Z direction.



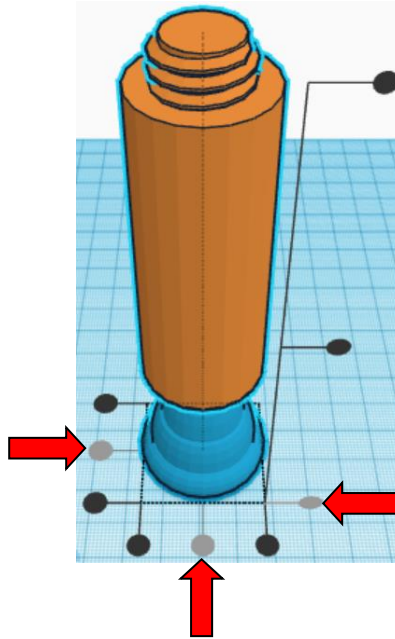
Bring in a Torus, located in Basic Shapes on the left 6 shapes down.
From now on this will be called the **Booster Bulge 3**.

Change the dimensions to
22mm X direction,
22mm Y direction, and
30mm Z direction.



Align Booster Bulge 1 and Booster Bulge 2 and Booster Bulge 3 and Base

centered in X direction,
centered of Y direction, and
bottom of Z direction.

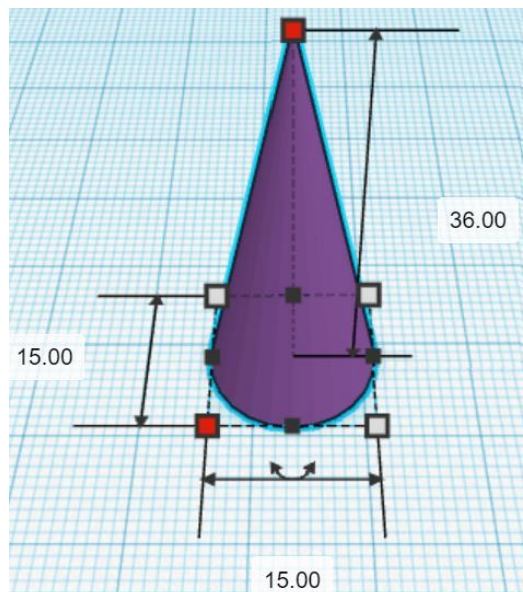


Group Booster Bulge 1 and Booster Bulge 2 and Booster Bulge 3 and Base
From now on this will be called the **Base**



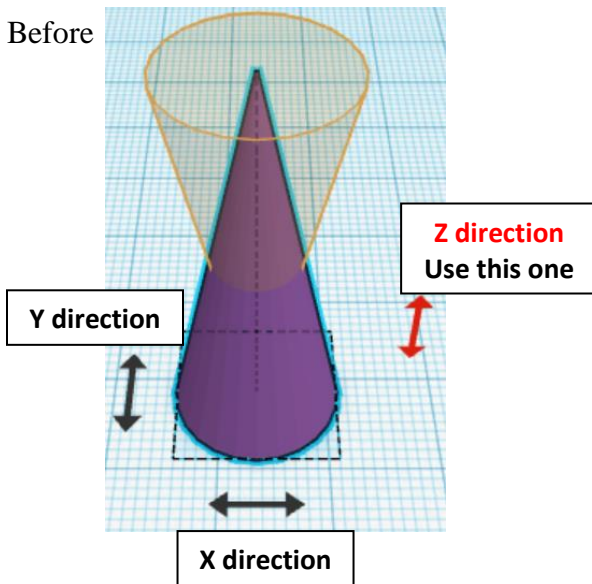
Bring in a Cone, located in Basic Shapes in the middle 3 shapes down.
From now on this will be called the **Rocket Top**.

Change the dimensions to
15mm X direction,
15mm Y direction, and
36mm Z direction.

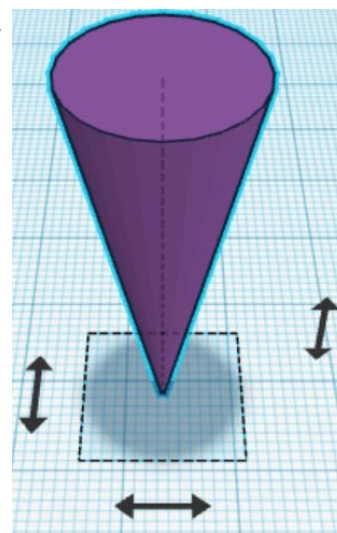


Flip Rocket Top in Z direction.

Before

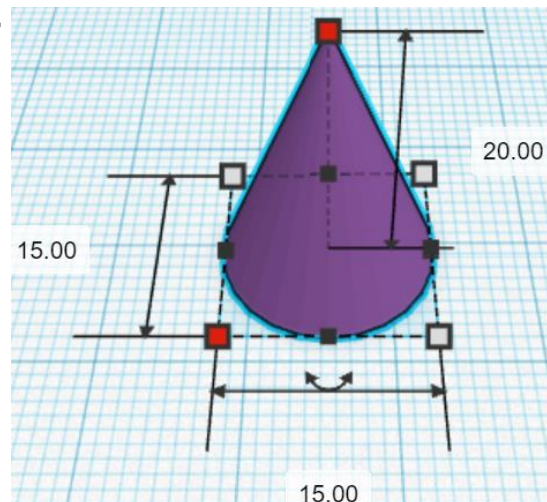


After



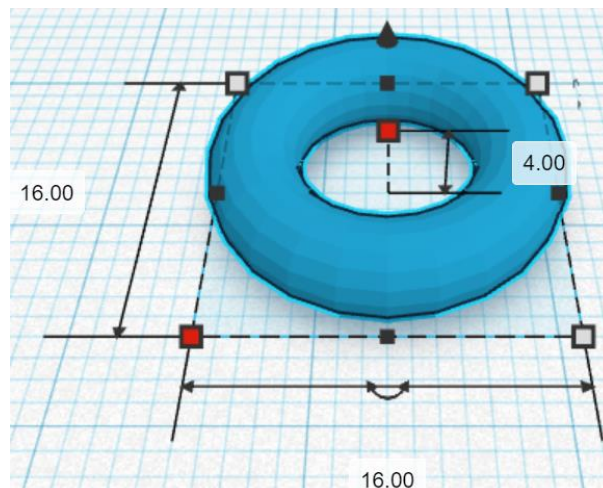
Bring in a Cone, located in Basic Shapes in the middle 3 shapes down.
From now on this will be called the **Rocket Bottom**.

Change the dimensions to
15mm X direction,
15mm Y direction, and
20mm Z direction.



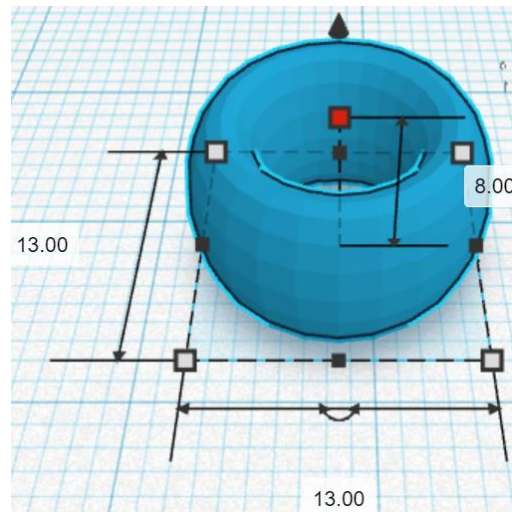
Bring in a Torus, located in Basic Shapes on the left 6 shapes down.
From now on this will be called the **Rocket Bulge 1**.

Change the dimensions to
16mm X direction,
16mm Y direction, and
4mm Z direction.



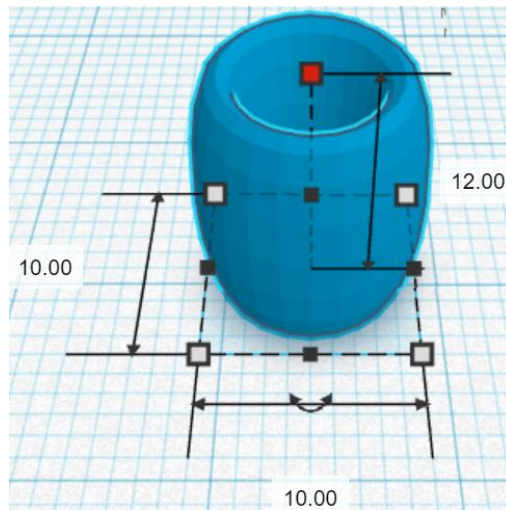
Bring in a Torus, located in Basic Shapes on the left 6 shapes down.
From now on this will be called the **Rocket Bulge 2**.

Change the dimensions to
13mm X direction,
13mm Y direction, and
8mm Z direction.



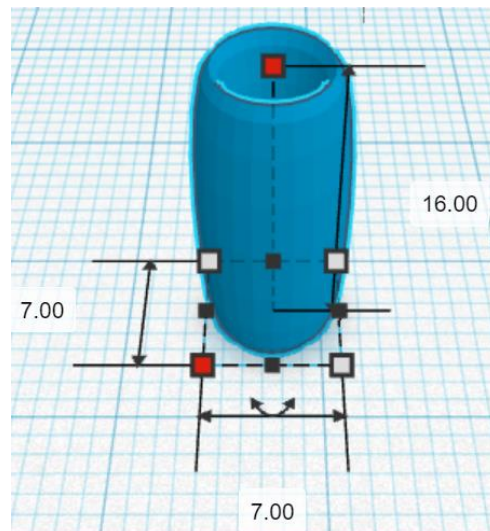
Bring in a Torus, located in Basic Shapes on the left 6 shapes down.
From now on this will be called the **Rocket Bulge 3**.

Change the dimensions to
10mm X direction,
10mm Y direction, and
12mm Z direction.



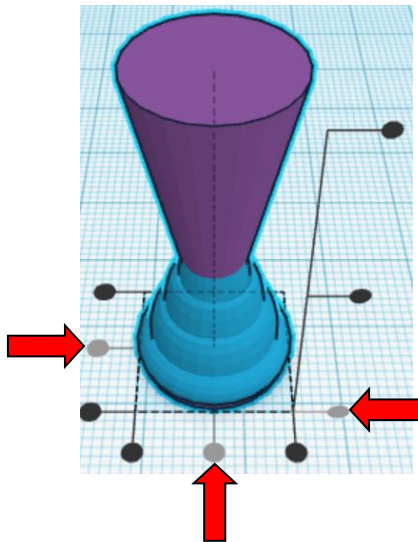
Bring in a Torus, located in Basic Shapes on the left 6 shapes down.
From now on this will be called the **Rocket Bulge 4**.

Change the dimensions to
7mm X direction,
7mm Y direction, and
16mm Z direction.

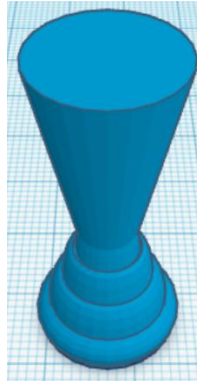


Align Rocket Bulge 1, Rocket Bulge 2, Rocket Bulge 3, Rocket Bulge 4, Rocket Top and Rocket Bottom

centered in X direction,
centered of Y direction, and
bottom of Z direction.

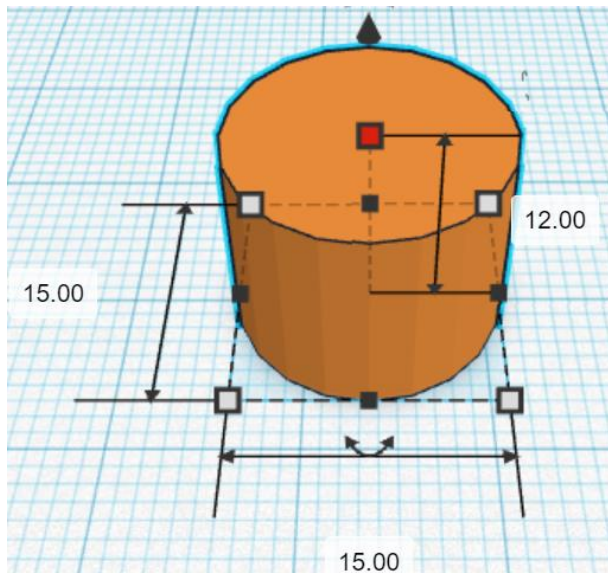


Group Rocket Bulge 1, Rocket Bulge 2, Rocket Bulge 3, Rocket Bulge 4, Rocket Top and Rocket Bottom
From now on this will be called the **Rocket**



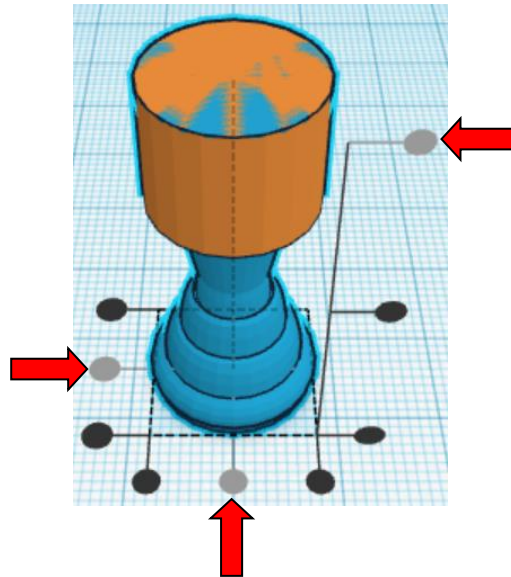
Bring in a Cylinder, located in Basic Shapes on the left 2 shapes down.
From now on this will be called the **Rocket Cylinder**.

Change the dimensions to
15mm X direction,
15mm Y direction, and
12mm Z direction.



Align Rocket and Rocket Cylinder

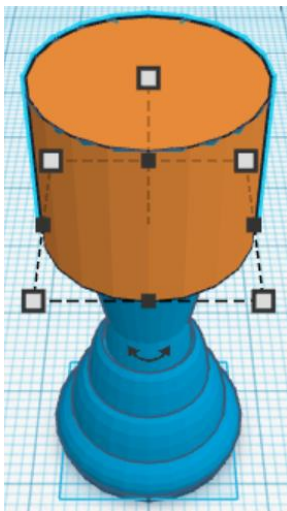
centered in X direction,
centered of Y direction, and
top of Z direction.



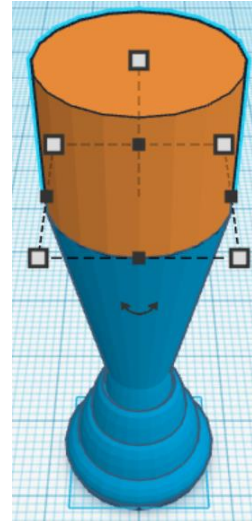
Move Rocket Cylinder (Must be in home view for this to work!)
move up in positive Z direction 12mm

Hint: Select Rocket Cylinder and hold control and push up arrow key 12 times.
Or
Select Rocket Cylinder and hold control and hold shift and push up arrow key 1 time,
then release shift and push up arrow key 2 more times.

Before

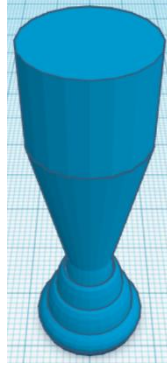


After

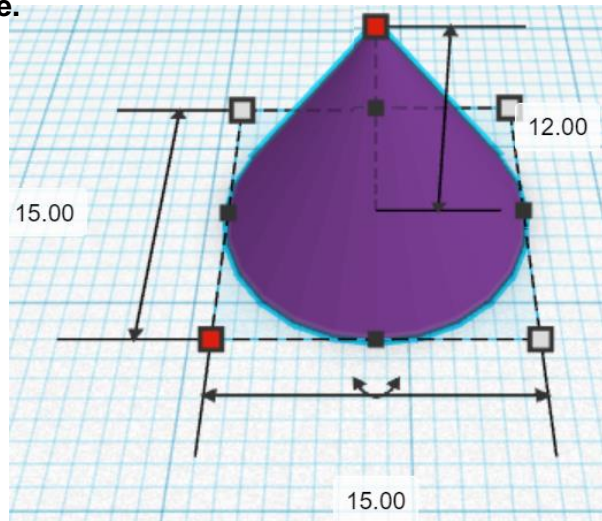


↑
12mm
Up
(Hold Control)

Group Rocket and Rocket Cylinder
From now on this will be called the **Rocket**

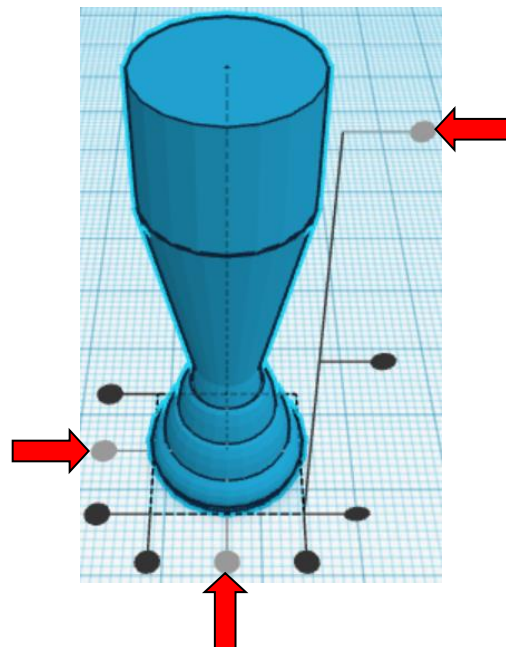


Bring in a Cone, located in Basic Shapes in the center 3 shapes down.
From now on this will be called the **Rocket Cone**.



Change the dimensions to
15mm X direction,
15mm Y direction, and
12mm Z direction.

Align Rocket and Rocket Cone

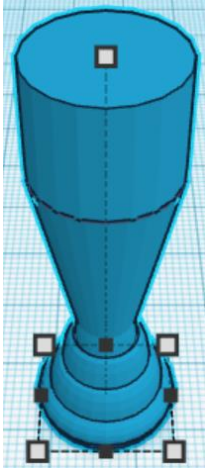


centered in X direction,
centered of Y direction, and
top of Z direction.

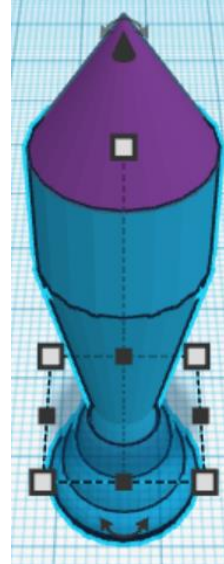
Move Rocket (Must be in home view for this to work!)
move down in negative Z direction 12mm

Hint: Select Rocket and hold control and push down arrow key 12 times.
Or
Select Rocket and hold control and hold shift and push down arrow key 1 time,
then release shift and push down arrow key 2 more times.

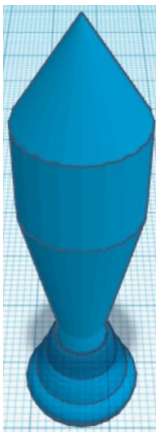
Before



After



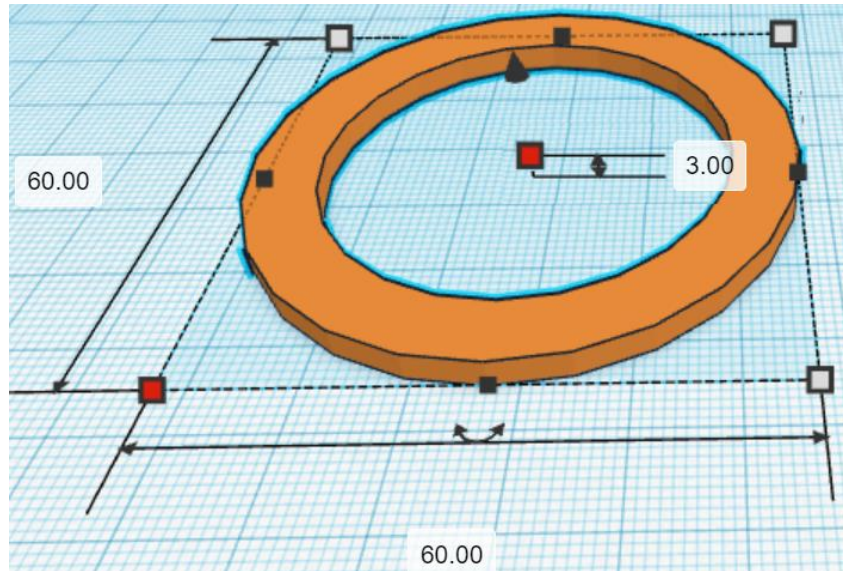
12mm
Down
(Hold Control)



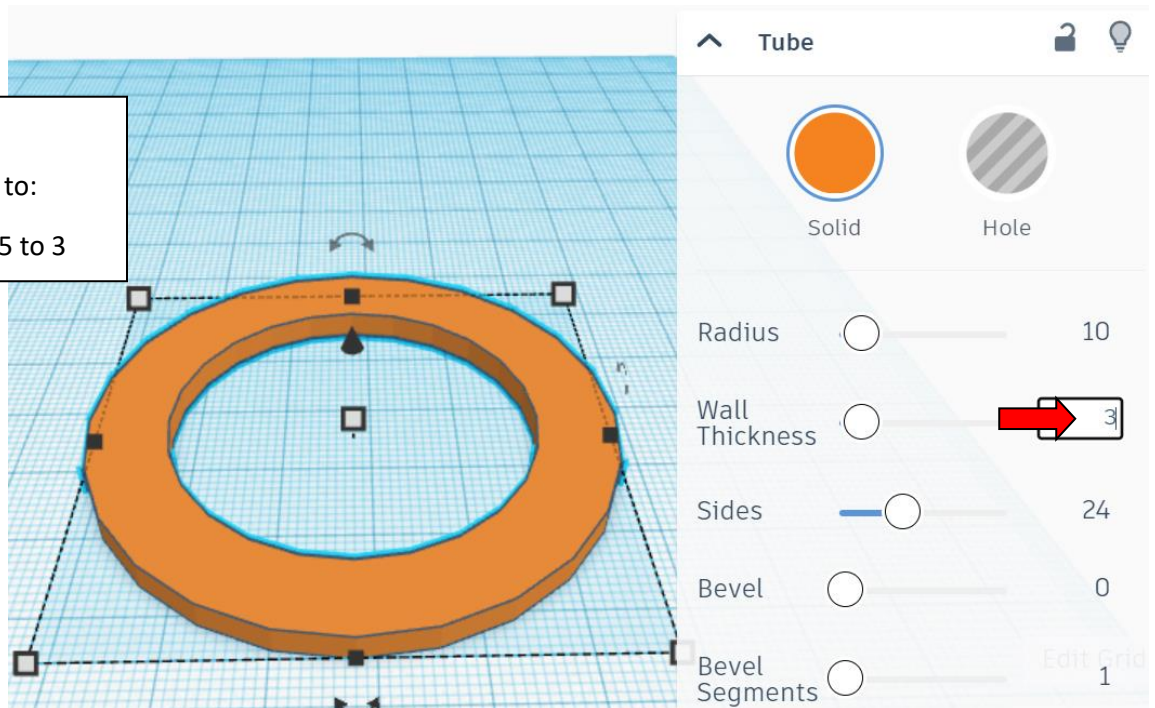
Group Rocket and **Rocket Cone**
From now on this will be called the **Rocket**

Bring in a Cone, located in Basic Shapes in the center 6 shapes down.
From now on this will be called the **Rocket Connector**.

Change the dimensions to
60mm X direction,
60mm Y direction, and
3mm Z direction.

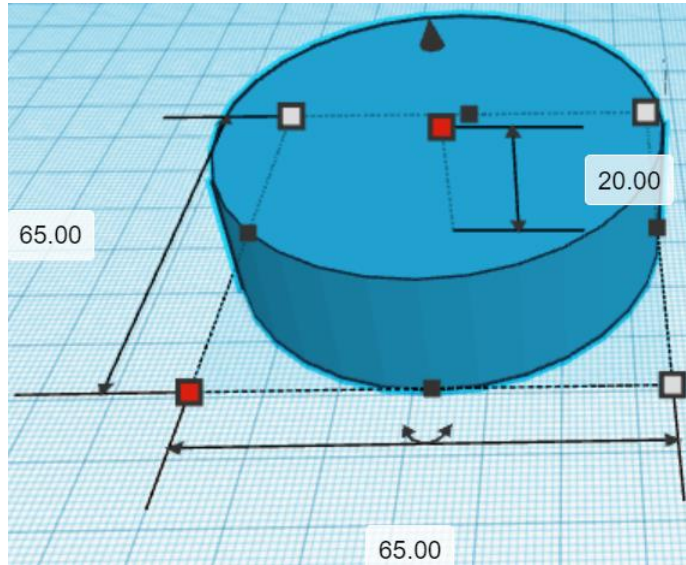


Rocket Connector:
Change Shape settings to:
Wall Thickness from 2.5 to 3



Bring in a Sliced Cylinder, located in Shape Generators, switch to All, on the right 18 shapes down.
(Things in All move each time that TinkerCad adds items to All, so the location may move.)
From now on this will be called the **Rocket Connector Cutout**.

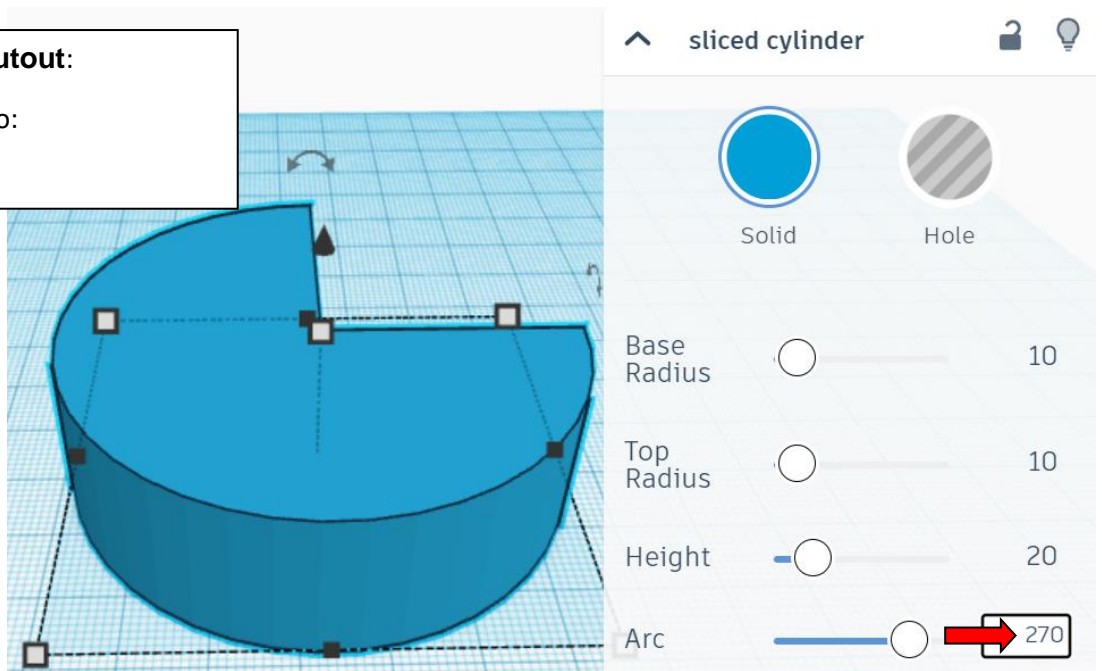
Change the dimensions to
65mm X direction,
65mm Y direction, and
20mm Z direction.



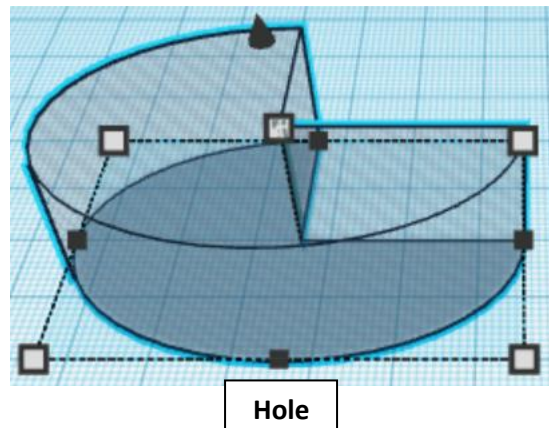
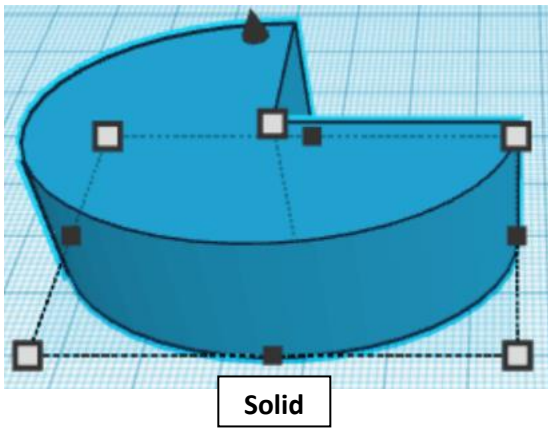
Rocket Connector Cutout:

Change Shape settings to:

Arc from 360 to 270

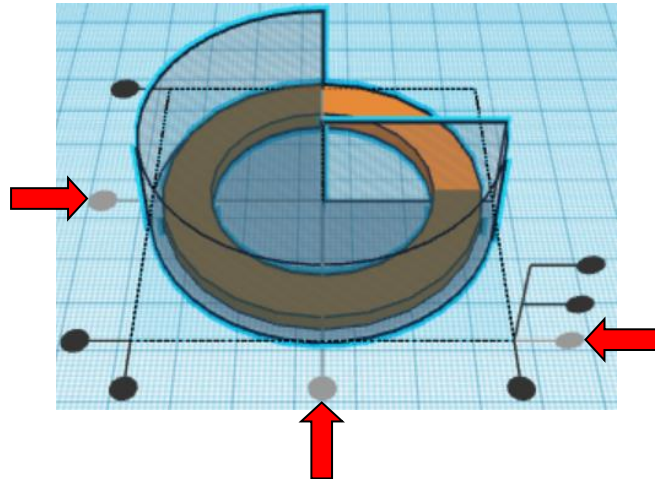


Change Rocket Connector Cutoff to **Hole** by selecting Rocket Connector Cutoff and typing “h”.

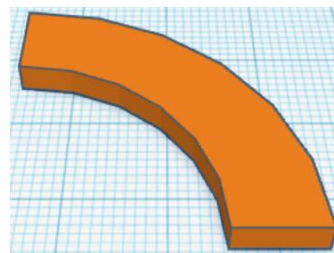


Align Rocket Connector and Rocket Connector Cutoff

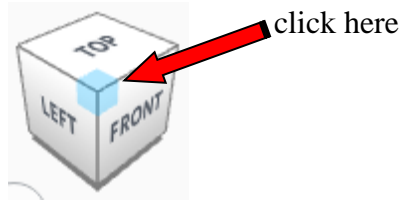
centered in X direction,
centered of Y direction, and
bottom of Z direction.



Group Rocket Connector and Rocket Connector Cutoff
From now on this will be called the **Rocket Connector**

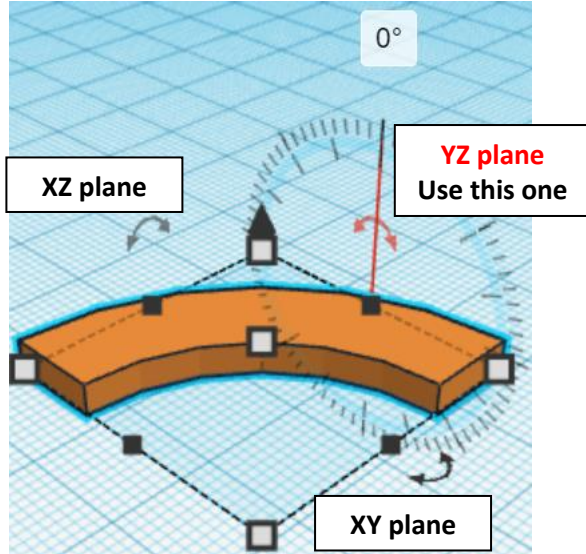


Go to TOP LEFT FRONT view for rotations

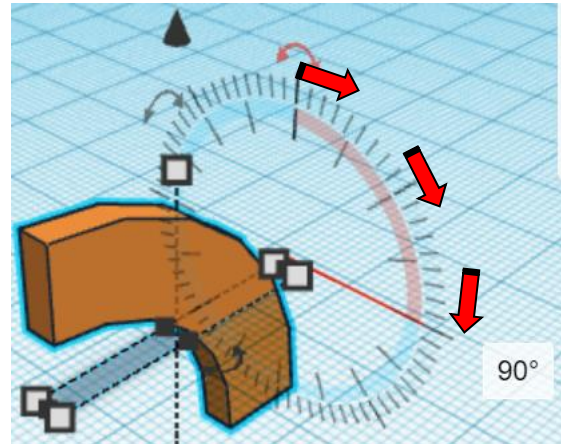


Rotate the Rocket Connector clockwise 90 degrees in YZ plane.

Before

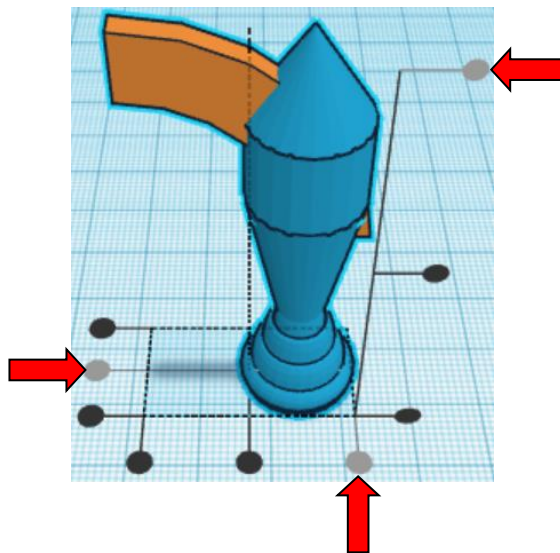


After



Align Rocket Connector and Rocket

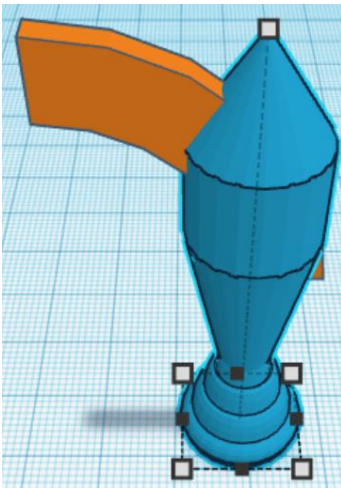
right in X direction,
centered of Y direction, and
top of Z direction.



Move Rocket (Must be in home view for this to work!)
move right in positive X direction 5mm

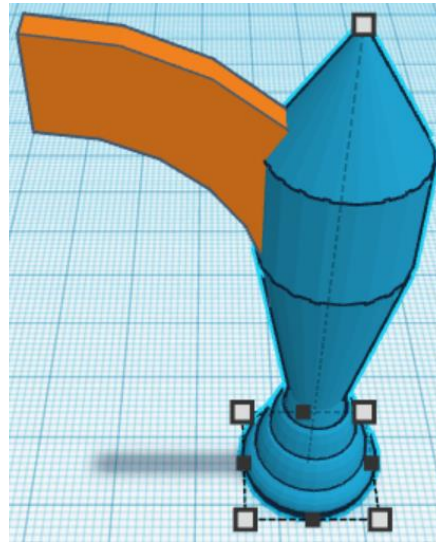
Hint: Select Rocket and push right arrow key 5 times.

Before

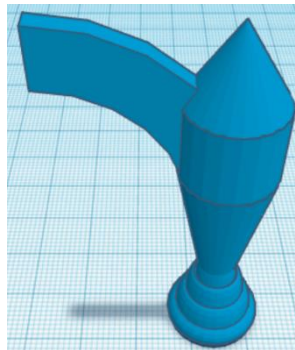


5mm
Right →

After



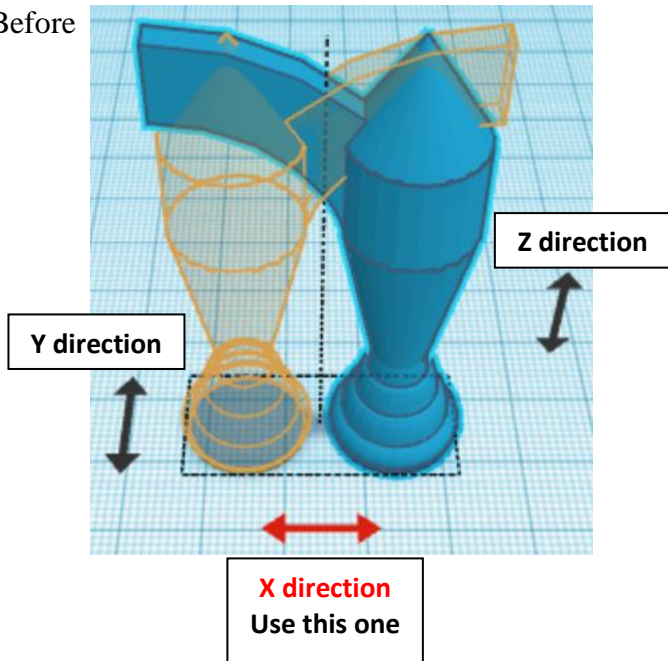
Group Rocket Connector and Rocket
From now on this will be called the **Rocket**



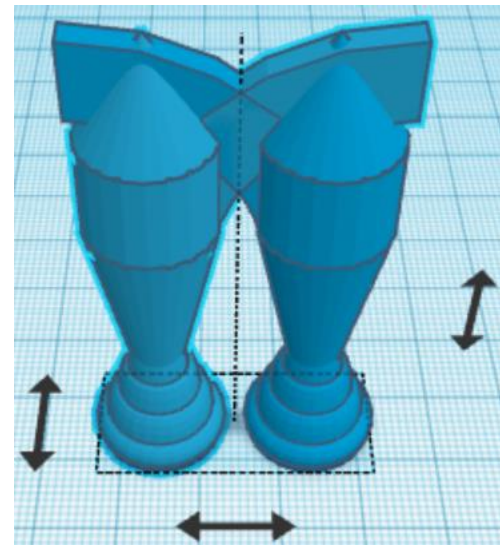
Duplicate Rocket 1 time
From now on this duplicate will be called the **Left Rocket**

Flip Rocket in X direction.

Before



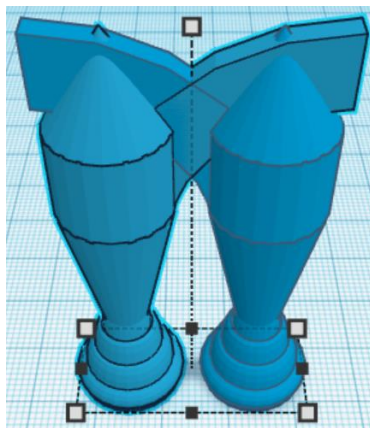
After



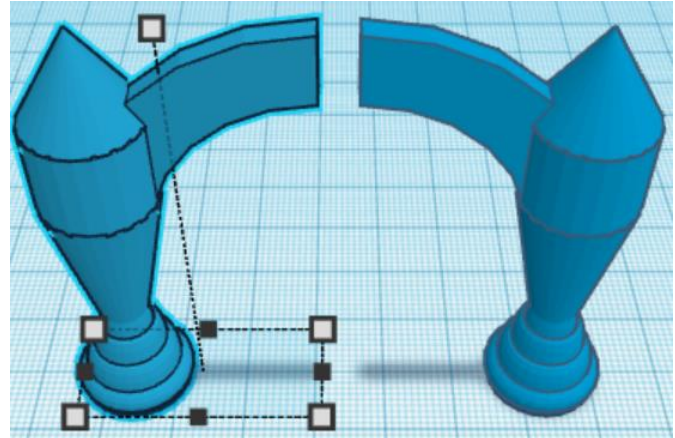
Move Left Rocket (Must be in home view for this to work!)
move left in Negative X direction 40mm

Hint: Select Left Rocket and push left arrow key 40 times.
Or
Select Left Rocket and hold shift and push left arrow key 4 times.

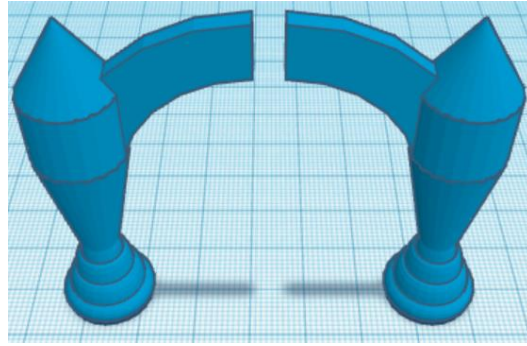
Before



After

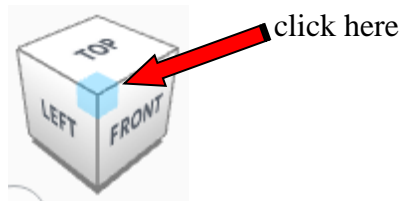


Group Rocket and Left Rocket
From now on this will be called the **Rockets**



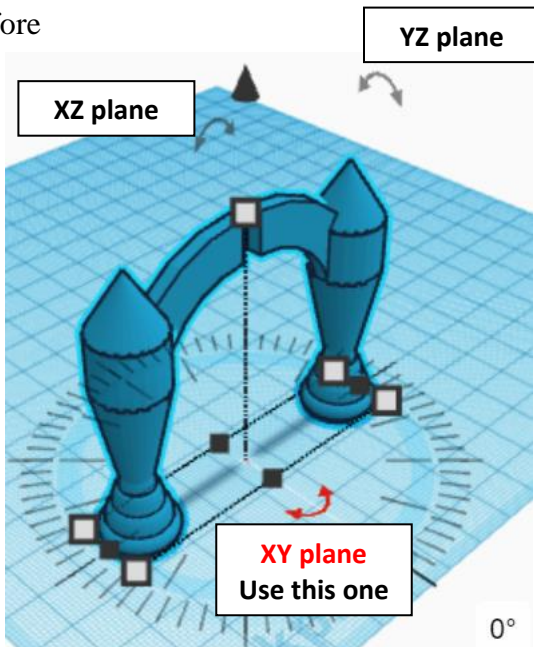
Duplicate Rockets 1 time
From now on this duplicate will be called the **Top & Bottom Rockets**

Go to TOP LEFT FRONT view for rotations

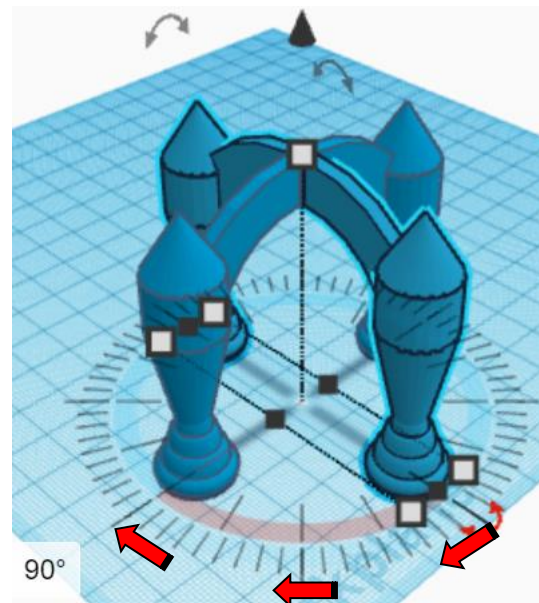


Rotate the Top & Bottom Rockets clockwise 90 degrees in XY plane.

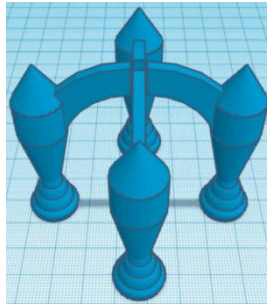
Before



After

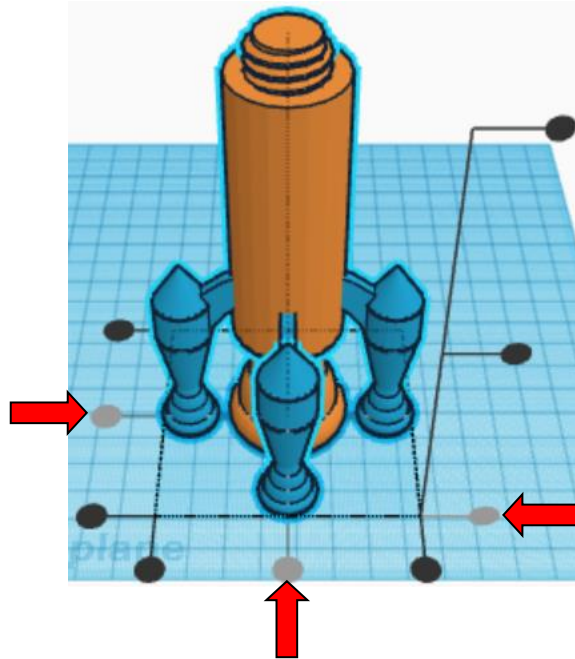


Group Rockets and Top & Bottom Rockets
From now on this will be called the **Rockets**

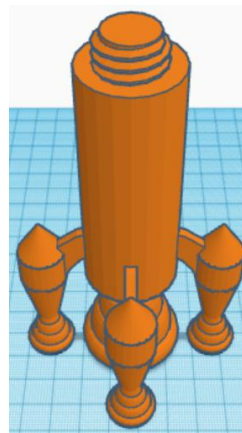


Align Base and Rockets

centered in X direction,
centered of Y direction, and
bottom of Z direction.



Group Rockets and Top & Bottom Rockets
From now on this will be called the **Retro Rocket Base**



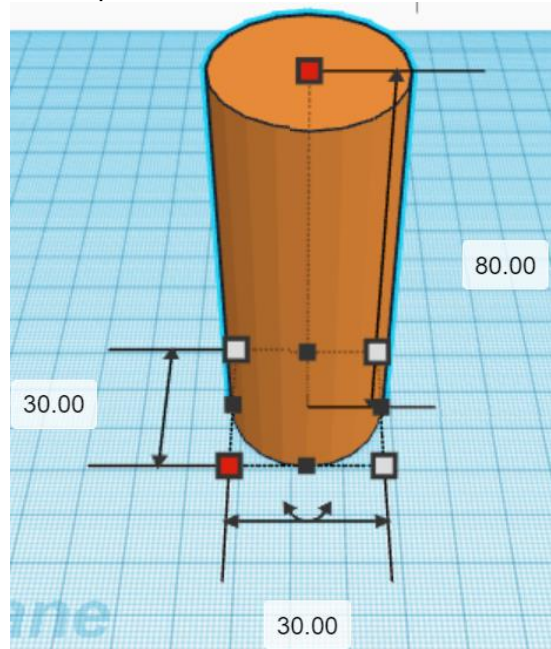
You are done with your Base!

Go back to page 3 to choose your middle.

Modern Base:

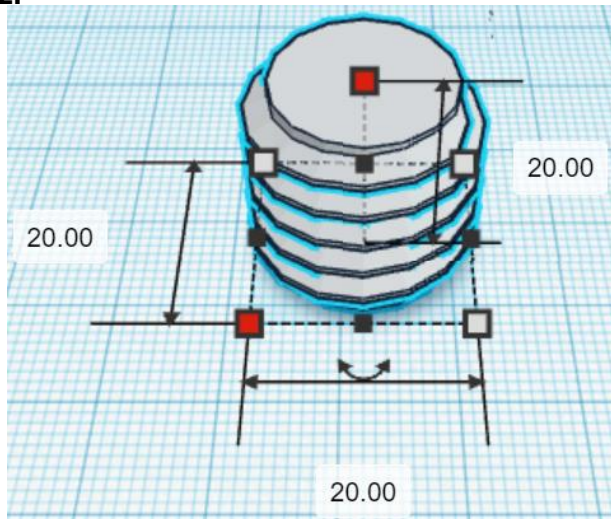
Bring in a Cylinder, located in Basic Shapes on the left 2 shapes down.
From now on this will be called the **Base Cylinder 2**.

Change the dimensions to
30mm X direction,
30mm Y direction, and
80mm Z direction.



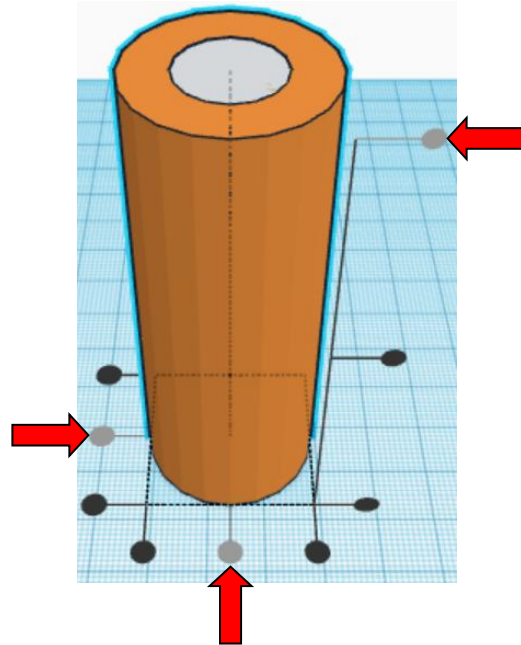
Bring in a ISO Metric Thread, located in Shape Generators, under Featured, (things in Featured move each time that TinkerCad adds items to Featured), this was last seen on the left, 3 shapes down.
From now on this will be called the **Base Thread 2**.

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



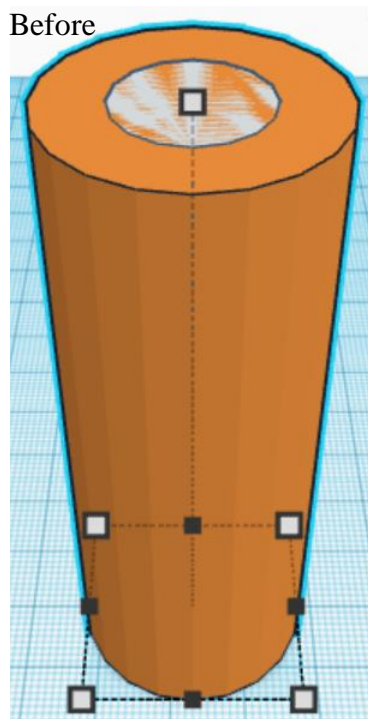
Align Base Cylinder 2 and Base Thread 2

centered in X direction,
centered of Y direction, and
top of Z direction.

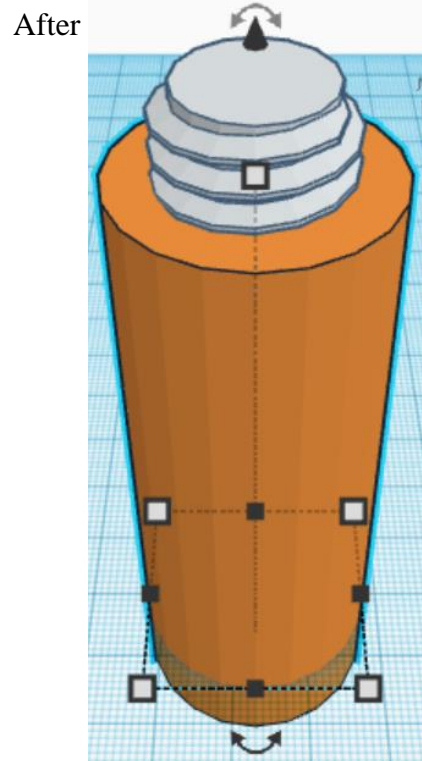


Move Base Cylinder 2 (Must be in home view for this to work!)
move down in negative Z direction 10mm

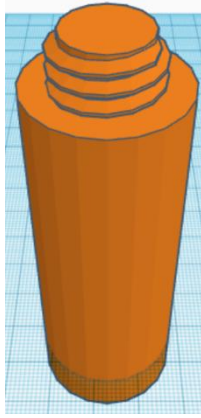
Hint: Select Base Cylinder 2 and hold control and push down arrow key 10 times.
Or
Select Base Cylinder 2 and hold control and hold shift and push down arrow key 1 time.



10mm
Down
(Hold Control)

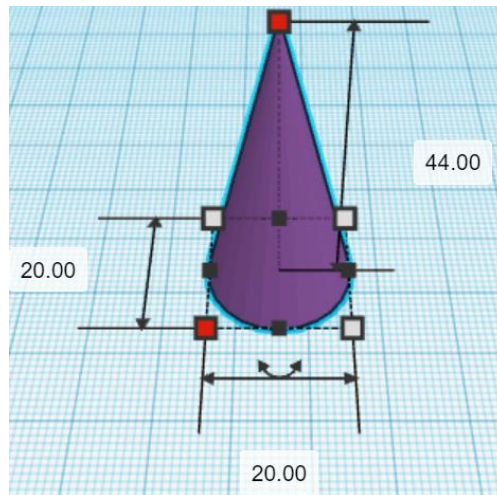
A red arrow pointing downwards from the text box.

Group Base Cylinder 2 and Base Thread 2
From now on this will be called the **Base 2**



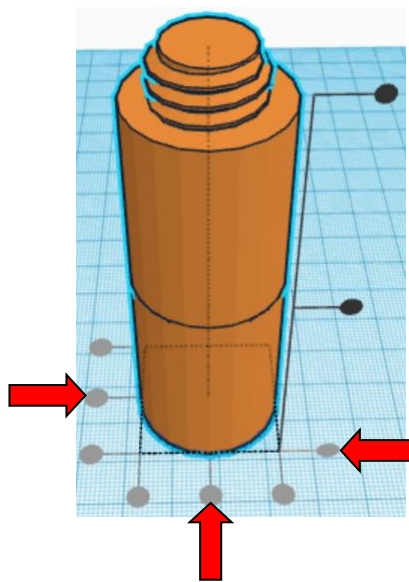
Bring in a Cone, located in Basic Shapes in the middle 3 shapes down.
From now on this will be called the **Booster 2**.

Change the dimensions to
20mm X direction,
20mm Y direction, and
44mm Z direction.



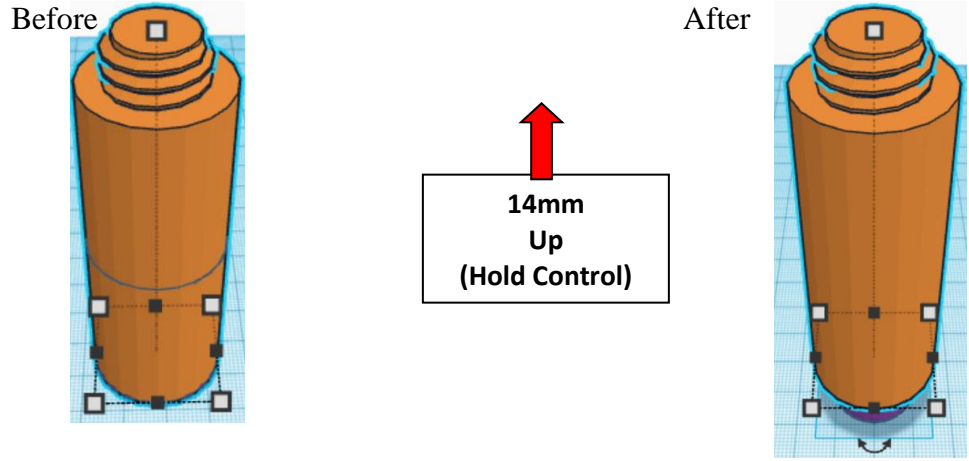
Align Booster 2 and Base 2

centered in X direction,
centered of Y direction, and
bottom of Z direction.

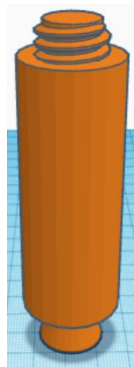


Move Base 2 (Must be in home view for this to work!)
move up in positive Z direction 14mm

Hint: Select Base and hold control and push up arrow key 14 times.
Or
Select Base and hold control and hold shift and push up arrow key 1 time,
then release shift and push up arrow key 4 more times.

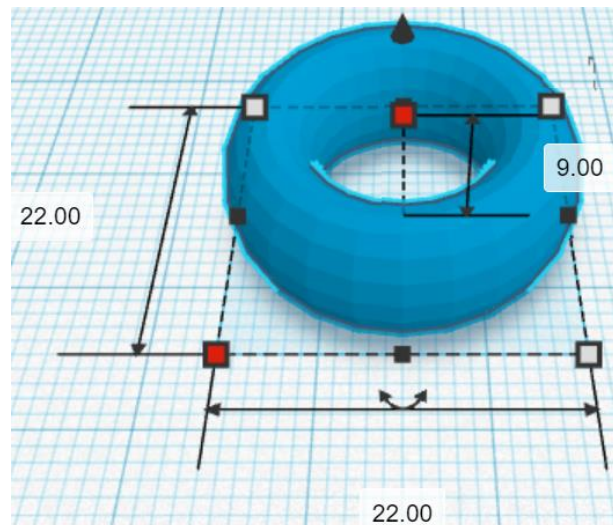


Group Booster 2 and Base 2
From now on this will be called the **Base 2**

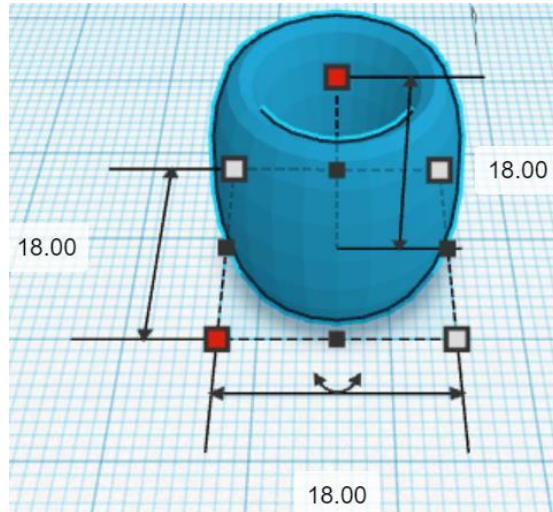


Bring in a Torus, located in Basic Shapes on the left 6 shapes down.
From now on this will be called the **Booster Bulge 4**.

Change the dimensions to
22mm X direction,
22mm Y direction, and
9mm Z direction.



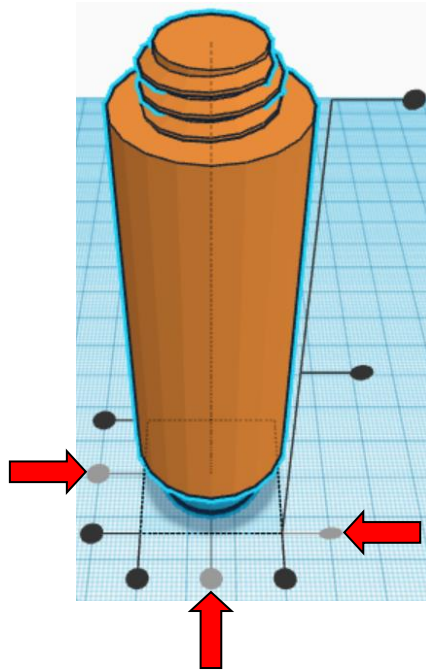
Bring in a Torus, located in Basic Shapes on the left 6 shapes down.
From now on this will be called the **Booster Bulge 5**.



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

Align Booster Bulge 4 and Booster Bulge 5 and Base 2

centered in X direction,
centered of Y direction, and
bottom of Z direction.

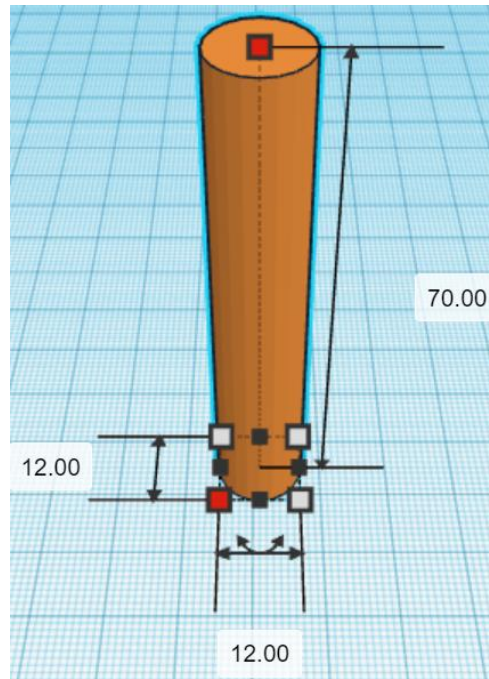


Group Booster Bulge 4 and Booster Bulge 5 and Base 2
From now on this will be called the **Base 2**



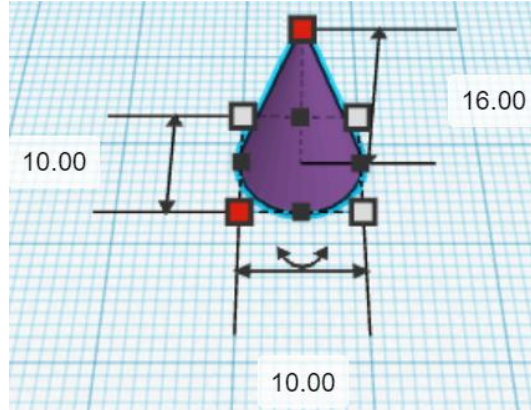
Bring in a Cylinder, located in Basic Shapes on the left 2 shapes down.
From now on this will be called the **Booster Rocket**.

Change the dimensions to
12mm X direction,
12mm Y direction, and
70mm Z direction.



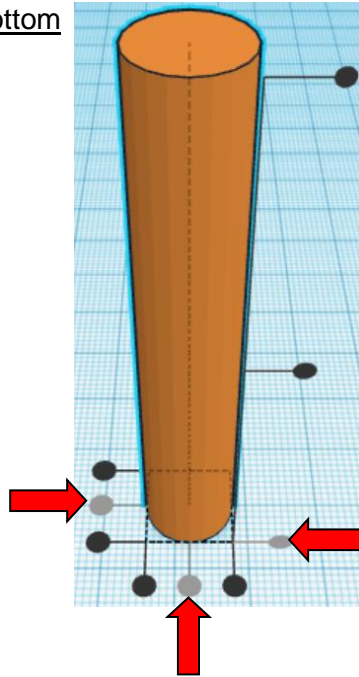
Bring in a Cone, located in Basic Shapes in the middle 3 shapes down.
From now on this will be called the **Booster Cone Bottom**.

Change the dimensions to
10mm X direction,
10mm Y direction, and
16mm Z direction.



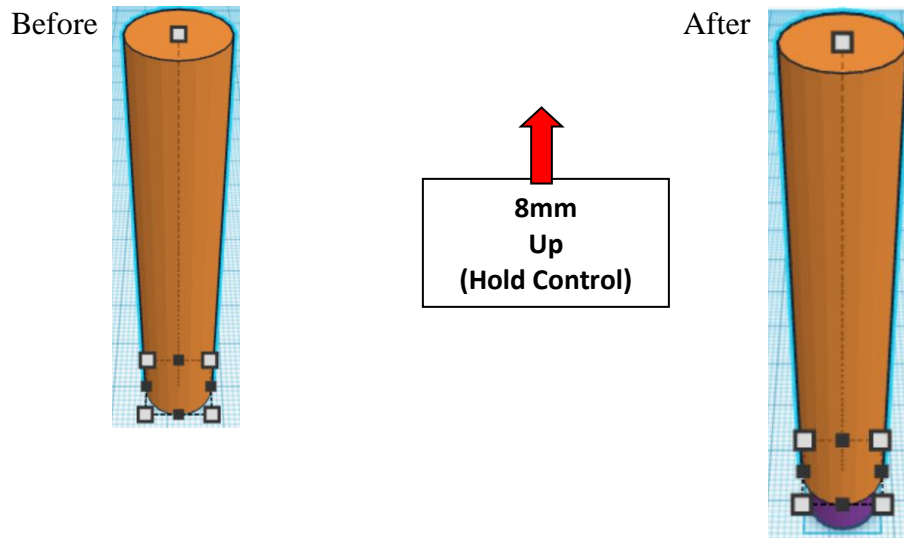
Align Booster Rocket and Booster Cone Bottom

centered in X direction,
centered of Y direction, and
bottom of Z direction.



Move Booster Rocket (Must be in home view for this to work!)
move up in positive Z direction 8mm

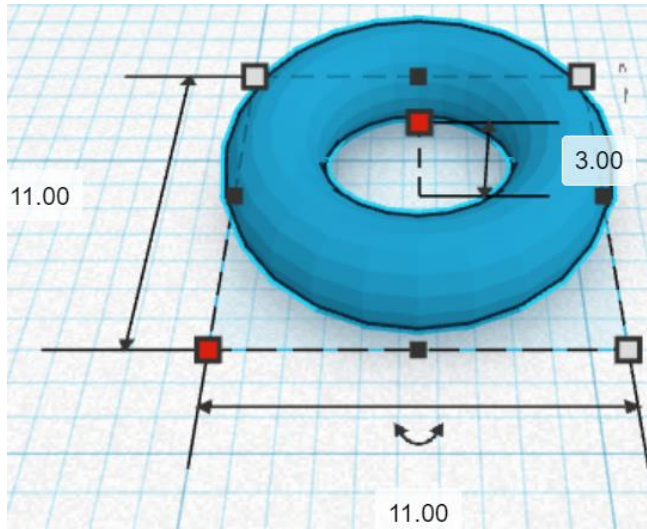
Hint: Select Booster Rocket and hold control and push up arrow key 8 times.





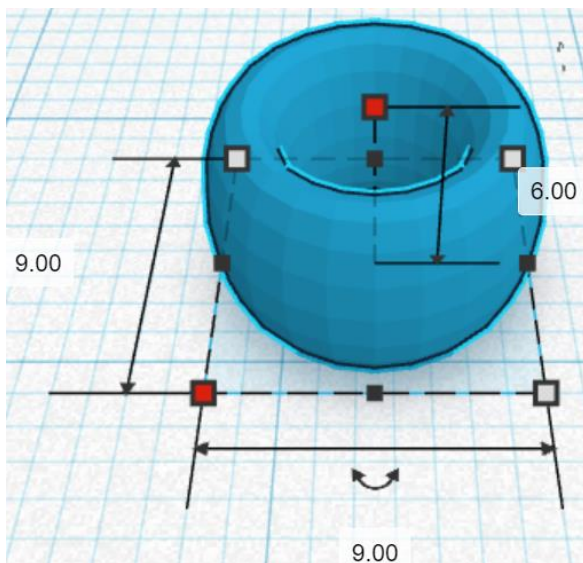
Group Booster Rocket and Booster Cone Bottom
From now on this will be called the **Booster Rocket**

Bring in a Torus, located in Basic Shapes on the left 6 shapes down.
From now on this will be called the **Booster Bulge 6**.



Change the dimensions to
11mm X direction,
11mm Y direction, and
3mm Z direction.

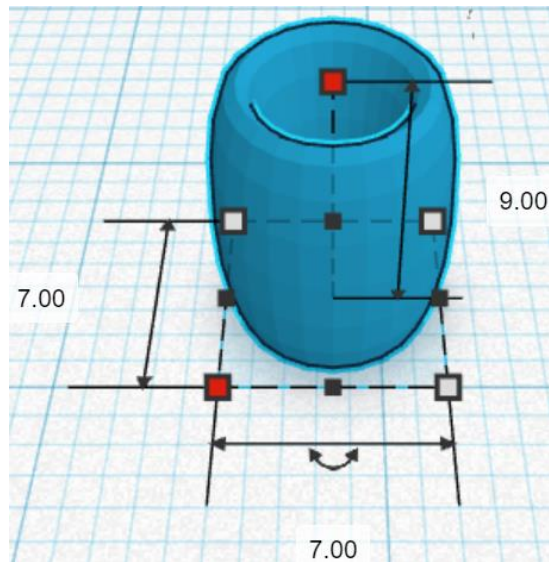
Bring in a Torus, located in Basic Shapes on the left 6 shapes down.
From now on this will be called the **Booster Bulge 7**.



Change the dimensions to
9mm X direction,
9mm Y direction, and
6mm Z direction.

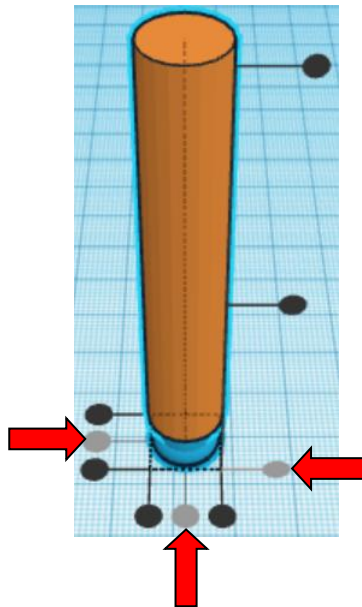
Bring in a Torus, located in Basic Shapes on the left 6 shapes down.
From now on this will be called the **Booster Bulge 8**.

Change the dimensions to
7mm X direction,
7mm Y direction, and
9mm Z direction.



Align Booster Rocket and Booster Bulge 6, Booster Bulge 7 and Booster Bulge 9

centered in X direction,
centered of Y direction, and
bottom of Z direction.

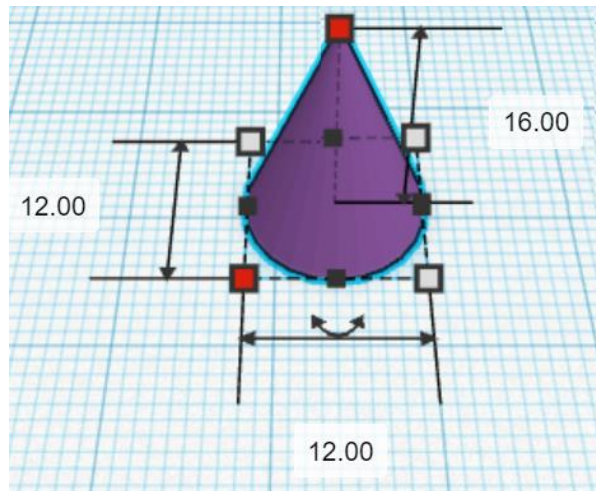


Group Booster Rocket and Booster Bulge 6, Booster Bulge 7 and Booster Bulge 9
From now on this will be called the **Booster Rocket**



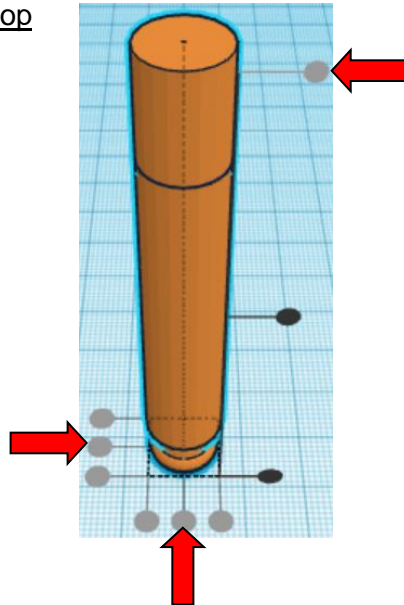
Bring in a Cone, located in Basic Shapes in the middle 3 shapes down.
From now on this will be called the **Booster Cone Top**.

Change the dimensions to
12mm X direction,
12mm Y direction, and
16mm Z direction.



Align Booster Rocket and Booster Cone Top

centered in X direction,
centered of Y direction, and
top of Z direction.



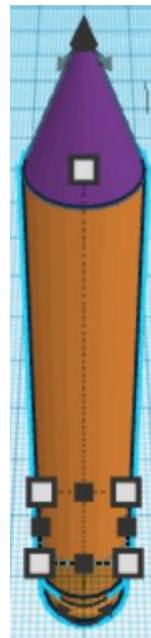
Move Booster Rocket (Must be in home view for this to work!)
move down in negative Z direction 16mm

Hint: Select Rocket and hold control and push down arrow key 16 times.
Or
Select Rocket and hold control and hold shift and push down arrow key 1 time,
then release shift and push down arrow key 6 more times.

Before



After



16mm
Down
(Hold Control)





Group Booster Rocket and Booster Cone Top
From now on this will be called the **Booster Rocket**

Set on Workplane:

Select the Booster Rocket and type "d" to set the body on the work plane.

Duplicate Booster Rocket 1 time

From now on this duplicate will be called the **Right Booster Rocket**

Move Right Booster Rocket (Must be in home view for this to work!)
move right in positive X direction 30mm

Hint: Select Rocket and push right arrow key 30 times.

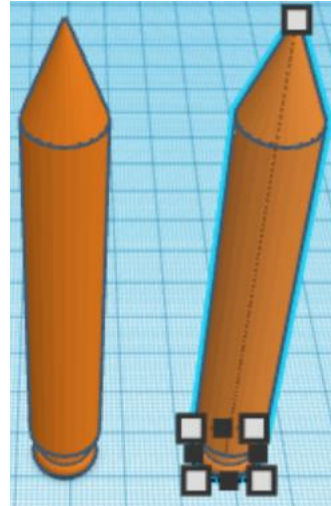
Or

Select Rocket and hold shift and push right arrow key 3 times.

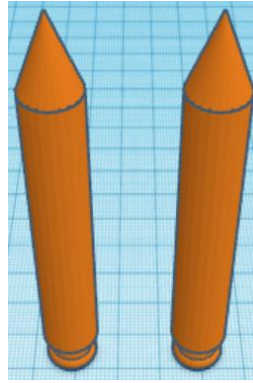
Before



After

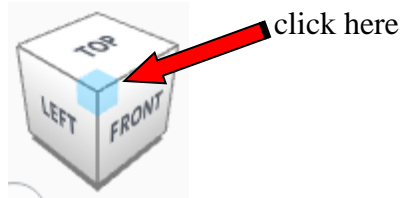


Group Booster Rocket and Right Booster Rocket
From now on this will be called the **Booster Rockets**



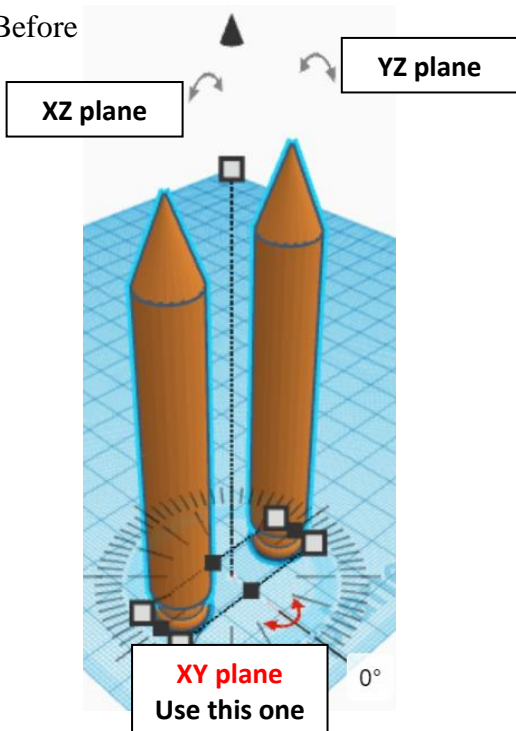
Duplicate Booster Rockets 1 time

Go to TOP LEFT FRONT view for rotations

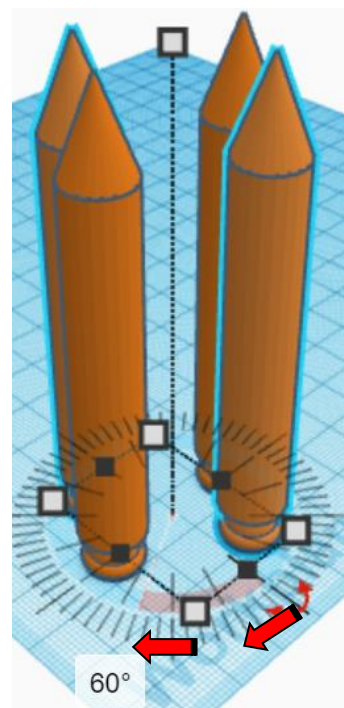


Rotate the Booster Rockets clockwise 60 degrees in XY plane.

Before

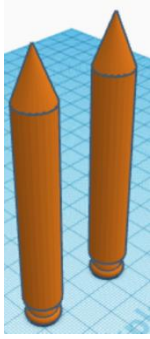


After

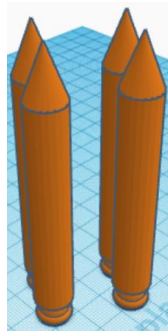


Immediately Duplicate Booster Rockets 1 time

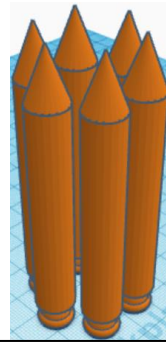
(This will **Duplicate** and repeat the **Rotate** 60 degrees as long as you don't do any other action.)



Original Duplicate



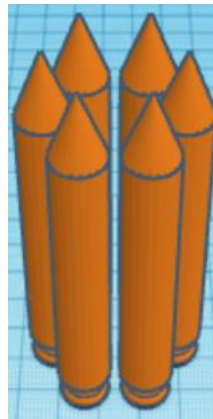
After first Duplicate and Rotate 60 degrees



After second Duplicate and 2nd Rotate 60 degrees

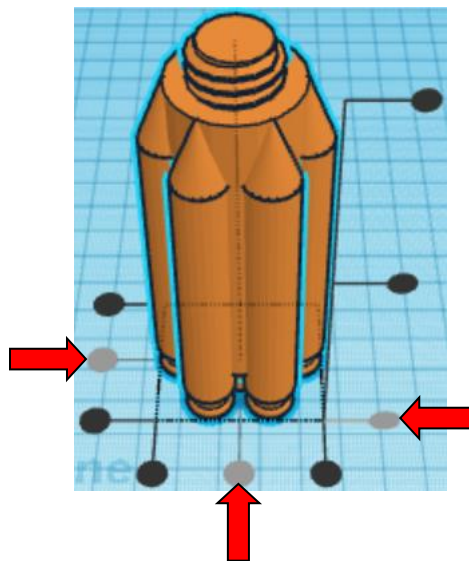
Group all Booster Rockets

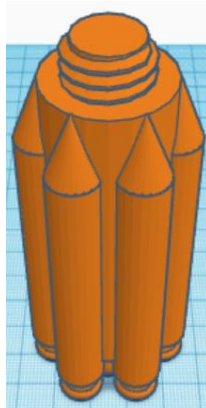
From now on this will be called the **Booster Rockets**



Align Booster Rockets and Base 2

centered in X direction,
centered of Y direction, and
bottom of Z direction.





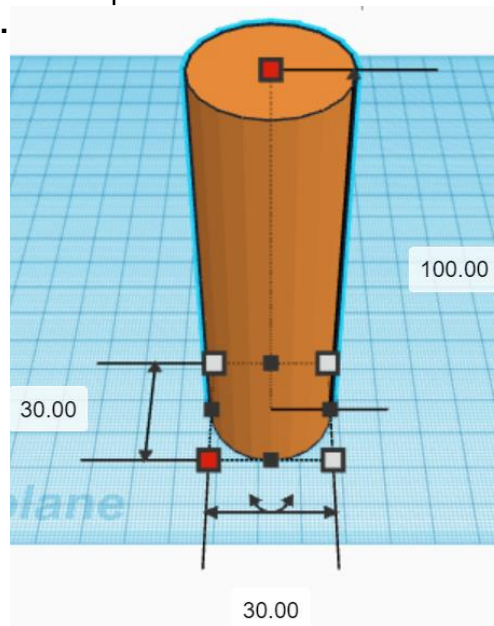
Group Booster Rockets and Base 2
From now on this will be called the **Modern Base**

You are done with your Base! Go back to page 3 to choose your middle.

Window Middle:

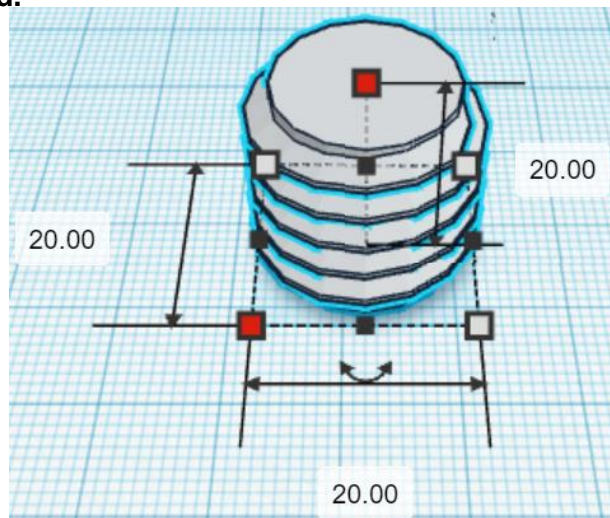
Bring in a Cylinder, located in Basic Shapes on the left 2 shapes down.
From now on this will be called the **Middle Cylinder**.

Change the dimensions to
30mm X direction,
30mm Y direction, and
100mm Z direction.



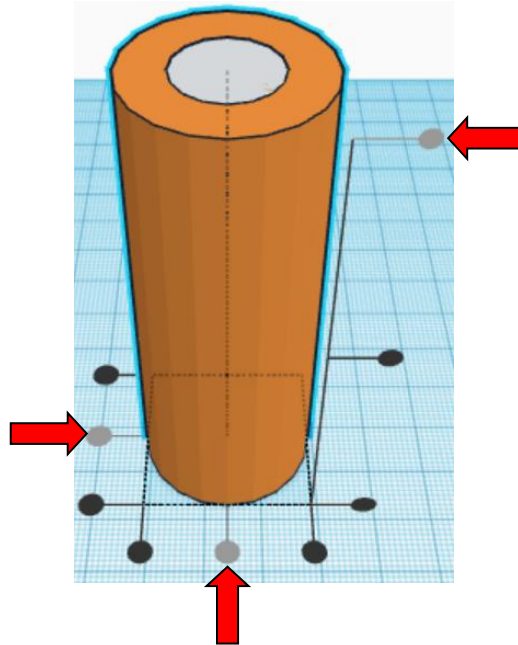
Bring in a ISO Metric Thread, located in Shape Generators, under Featured, (things in Featured move each time that TinkerCad adds items to Featured), this was last seen on the left, 3 shapes down.
From now on this will be called the **Middle Thread**.

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



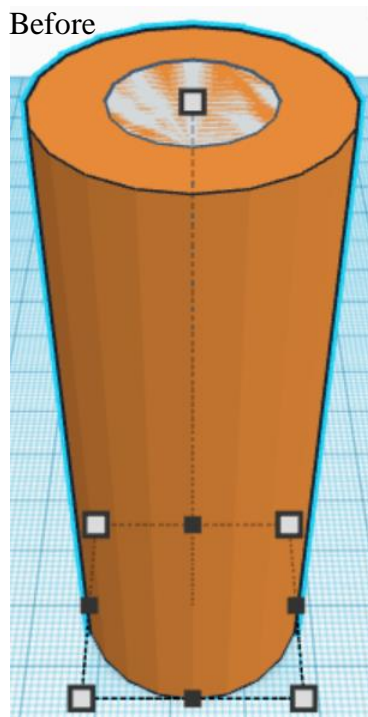
Align Middle Cylinder and Middle Thread

centered in X direction,
centered of Y direction, and
top of Z direction.

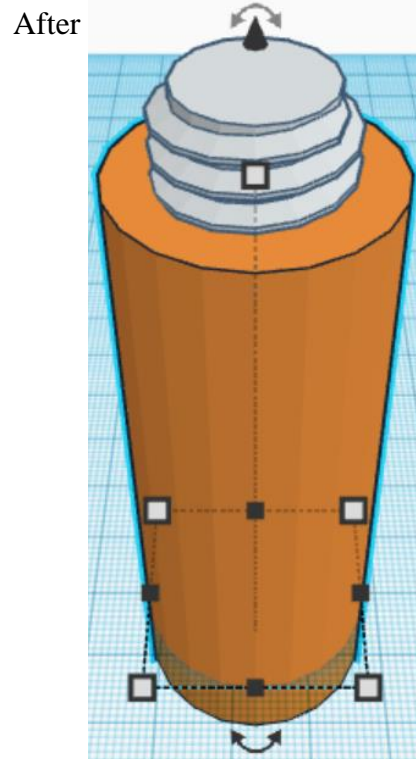


Move Middle Cylinder (Must be in home view for this to work!)
move down in negative Z direction 10mm

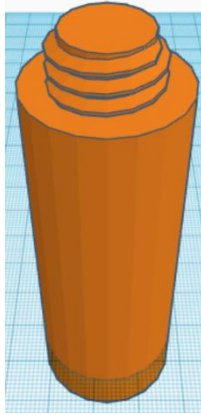
Hint: Select Middle Cylinder and hold control and push down arrow key 10 times.
Or
Select Middle Cylinder and hold control and hold shift and push down arrow key 1 time.



10mm
Down
(Hold Control)

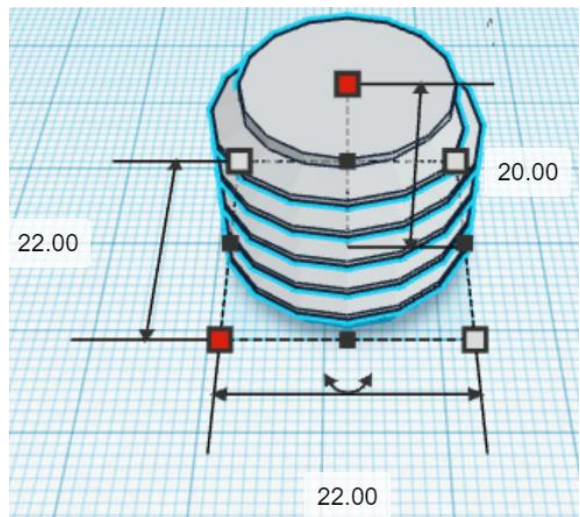


Group Middle Cylinder and Middle Thread
From now on this will be called the **Middle**



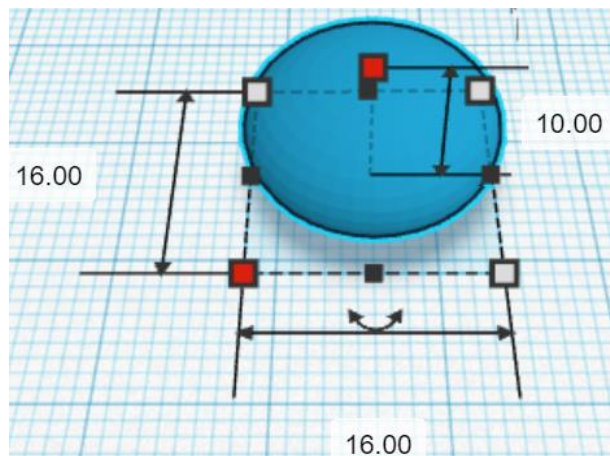
Bring in a ISO Metric Thread, located in Shape Generators, under Featured, (things in Featured move each time that TinkerCad adds items to Featured), this was last seen on the left, 3 shapes down.
From now on this will be called the **Middle Thread Cutout**.

Change the dimensions to
22mm X direction,
22mm Y direction, and
20mm Z direction.



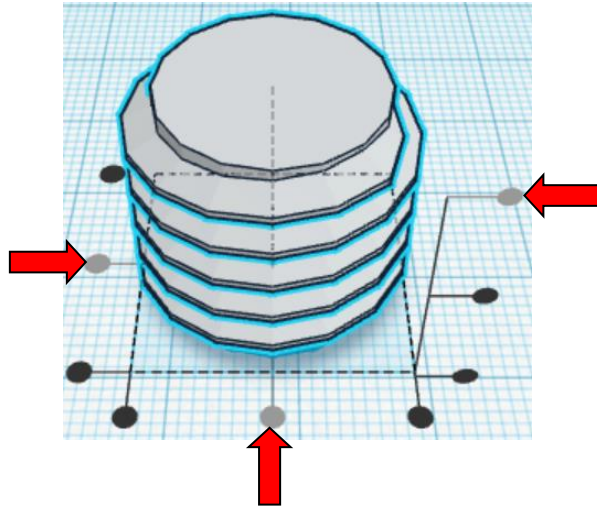
Bring in a Sphere, located in Basic Shapes in the center 2 shapes down.
From now on this will be called the **Middle Thread Cutout Top**.

Change the dimensions to
16mm X direction,
16mm Y direction, and
10mm Z direction.



Align Middle Thread Cutout and Middle Thread Cutout Top

centered in X direction,
centered of Y direction, and
top of Z direction.

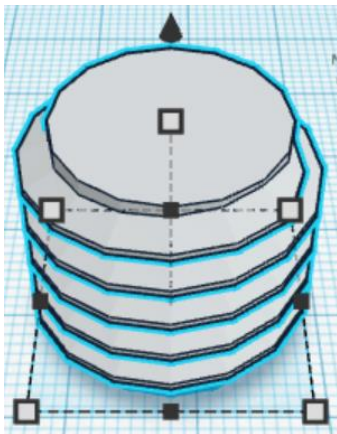


Move Middle Thread Cutout (Must be in home view for this to work!)

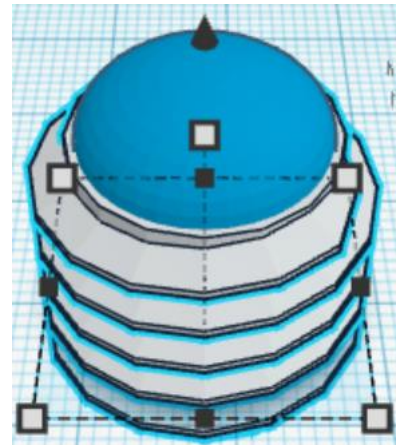
move down in negative Z direction 5mm

Hint: Select Middle Thread Cutout and hold control and push down arrow key 5 times.


Before



After

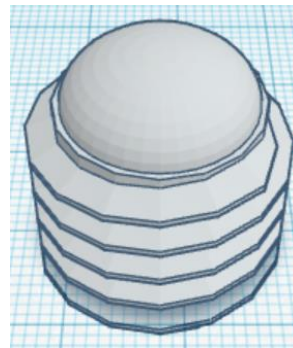


5mm
Down
(Hold Control)

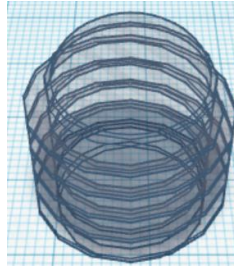


Group Middle Thread Cutout and Middle Thread Cutout Top

From now on this will be called the **Middle Thread Cutout**

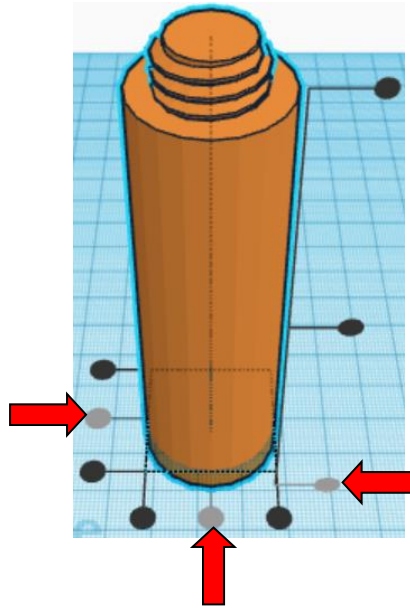


Change Middle Thread Cutout to Hole
by selecting Middle Thread Cutout and typing "h".



Align Middle Thread Cutout and Middle

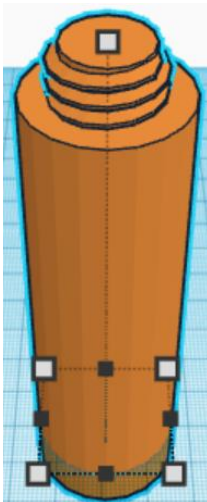
centered in X direction,
centered of Y direction, and
bottom of Z direction.



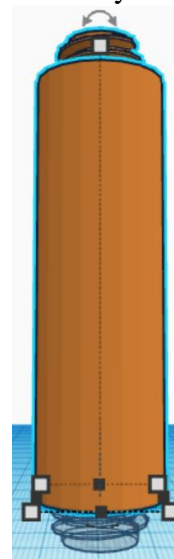
Move Middle (Must be in home view for this to work!)
move up in positive Z direction 10mm

Hint: Select Middle and hold control and push up arrow key 10 times.
Or
Select Middle and hold control and hold shift and push up arrow key 1 time.

Before

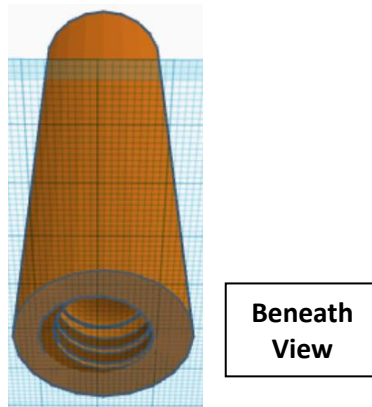


After



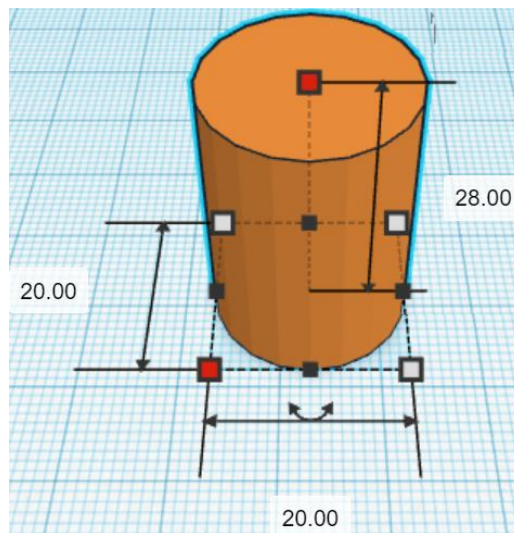
10mm
Up
(Hold Control)

Group Middle Thread Cutout and Middle
From now on this will be called the **Middle**



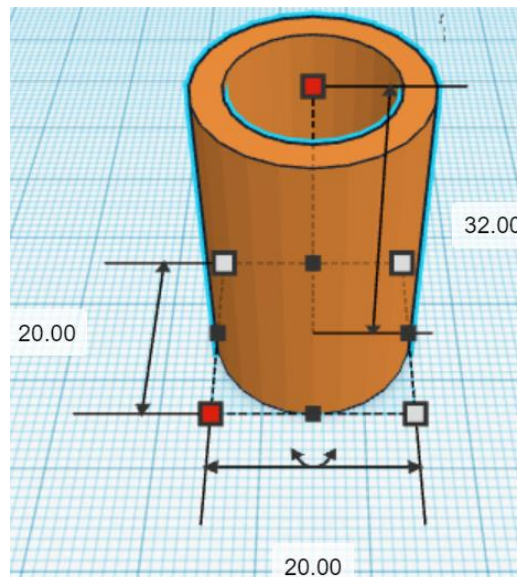
Bring in a Cylinder, located in Basic Shapes on the left 2 shapes down.
From now on this will be called the **Window**.

Change the dimensions to
20mm X direction,
20mm Y direction, and
28mm Z direction.



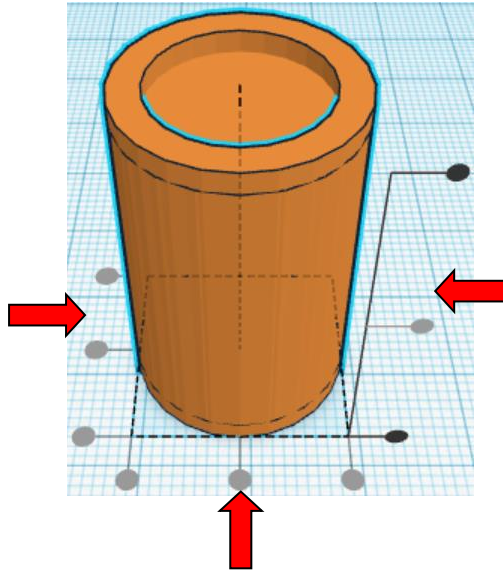
Bring in a Tube, located in Basic Shapes in the center 6 shapes down.
From now on this will be called the **Window Tube**.

Change the dimensions to
20mm X direction,
20mm Y direction, and
32mm Z direction.



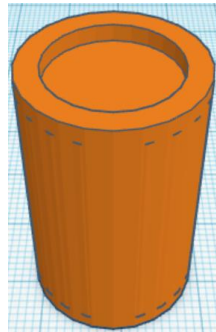
Align Window and Tube

centered in X direction,
centered of Y direction, and
centered of Z direction.



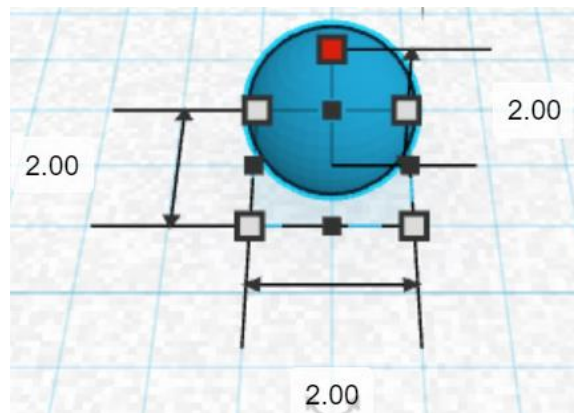
Group Window and Tube

From now on this will be called the **Window**



Bring in a Sphere, located in Basic Shapes in the center 2 shapes down.
From now on this will be called the **Rivet**.

Change the dimensions to
16mm X direction,
16mm Y direction, and
10mm Z direction.



Duplicate Rivet 1 time

From now on this duplicate will be called the **Right Rivet**

Move Right Rivet (Must be in home view for this to work!)

move right in positive X direction 18mm

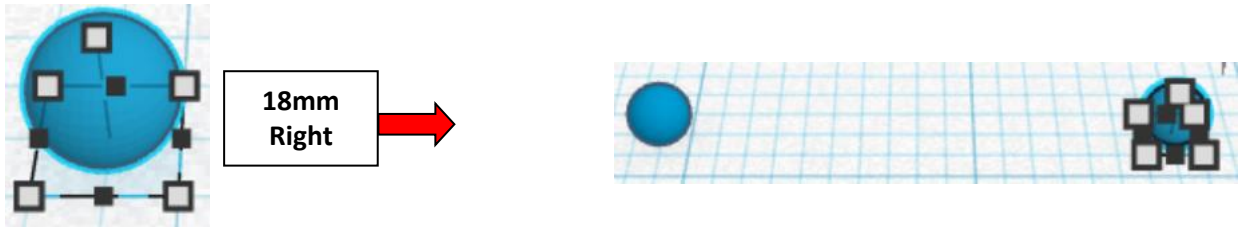
Hint: Select Right Rivet and push right arrow key 18 times.

Or

Select Right Rivet and hold shift and push right arrow key 1 time,
then release shift and push right arrow key 8 time,

Before

After



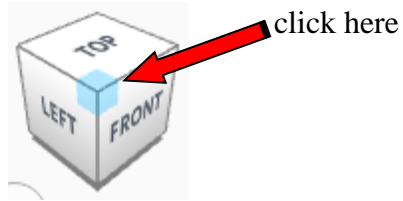
Group Rivet and Right Rivet

From now on this will be called the **Rivets**



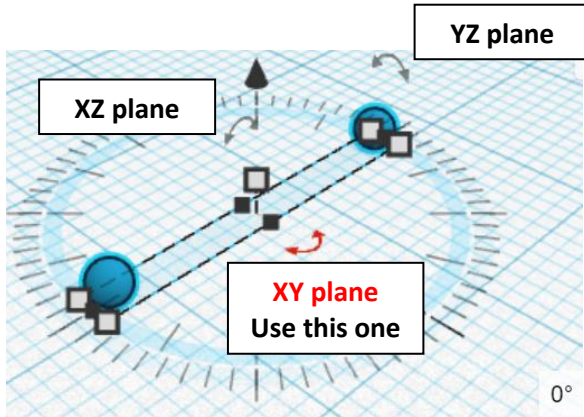
Duplicate Rivets 1 time

Go to TOP LEFT FRONT view for rotations

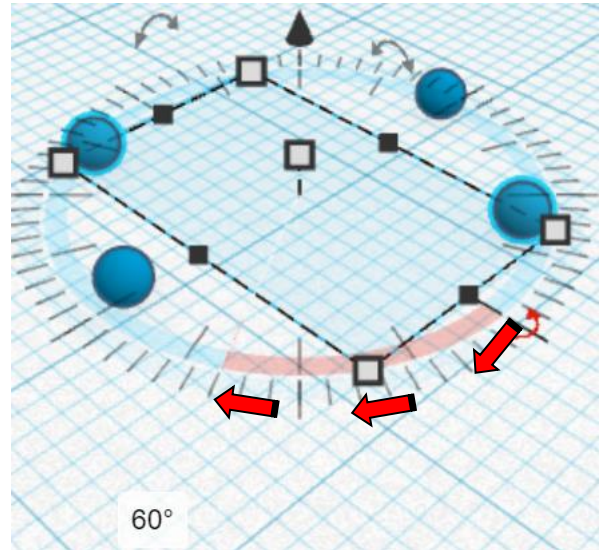


Rotate the Rivets clockwise 60 degrees in XZ plane.

Before



After

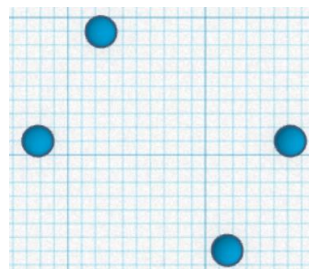


Immediately Duplicate Rivets 1 time

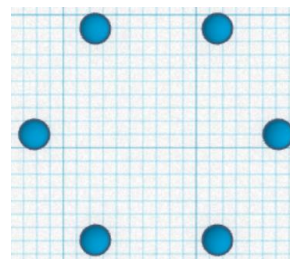
(This will **Duplicate** and repeat the **Rotate** 60 degrees as long as you don't do any other action.)



Original
Duplicate



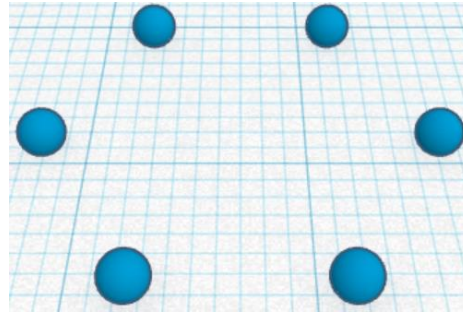
After first Duplicate
and Rotate 60 degrees



After second Duplicate
and 2nd Rotate 60 degrees

Group all Rivets

From now on this will be called the **Rivets**



Duplicate Rivets 1 time

Move Rivets (Must be in home view for this to work!)

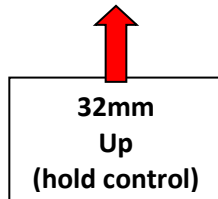
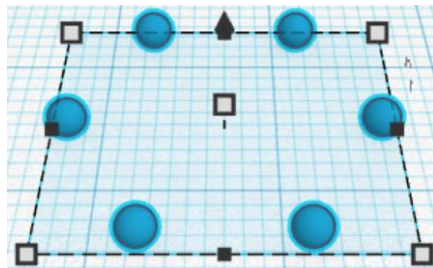
move up in positive Z direction 32mm

Hint: Select Rivets and hold control and push up arrow key 32 times.

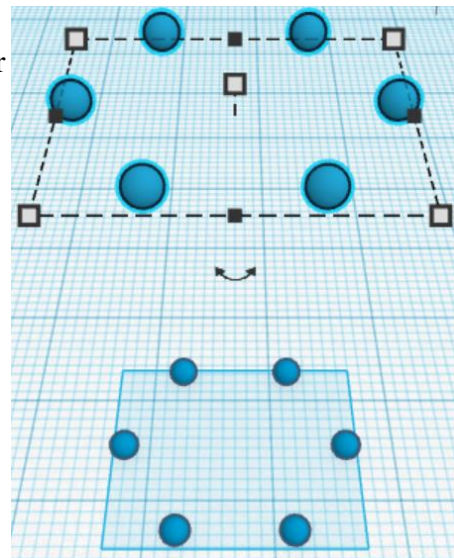
Or

Select Rivets and hold control and hold shift and push up arrow key 3 times, then release shift and push up arrow key 2 more times.

Before

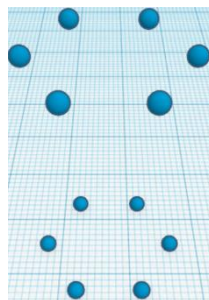


After



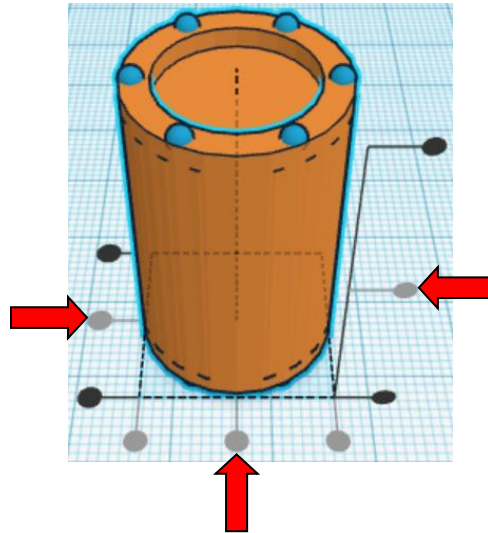
Group Rivets

From now on this will be called the **Rivets**



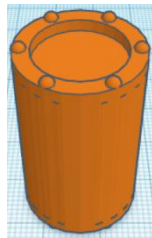
Align Window and Rivets

centered in X direction,
centered of Y direction, and
centered of Z direction.

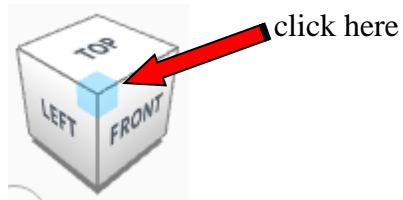


Group Window and Rivets

From now on this will be called the **Window**

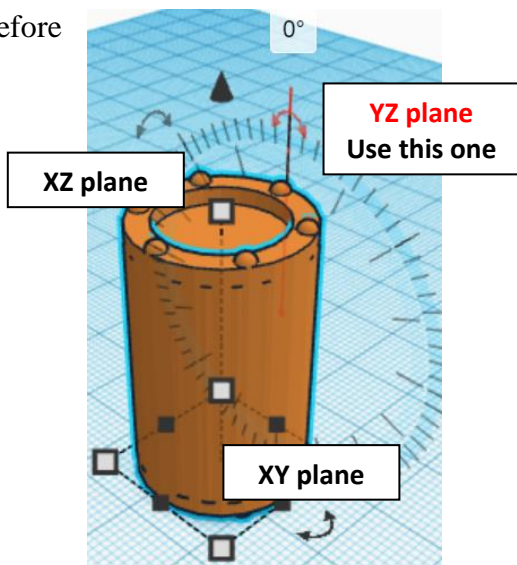


Go to TOP LEFT FRONT view for rotations

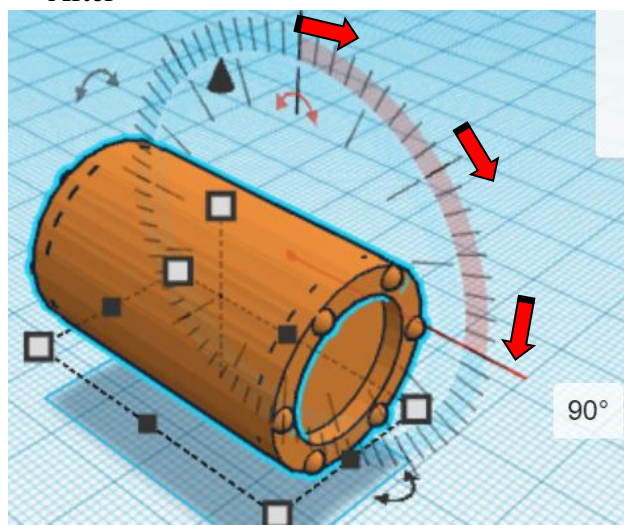


Rotate the Window clockwise 90 degrees in YZ plane.

Before



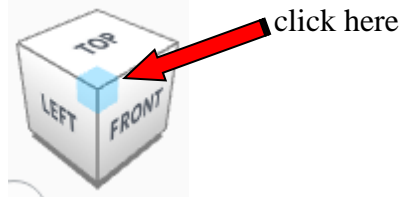
After



Duplicate Window 1 time

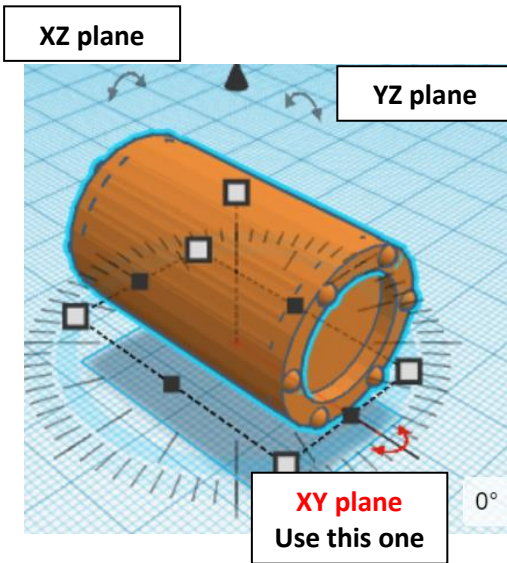
From now on this duplicate will be called the **Rotated Window**

Go to TOP LEFT FRONT view for rotations

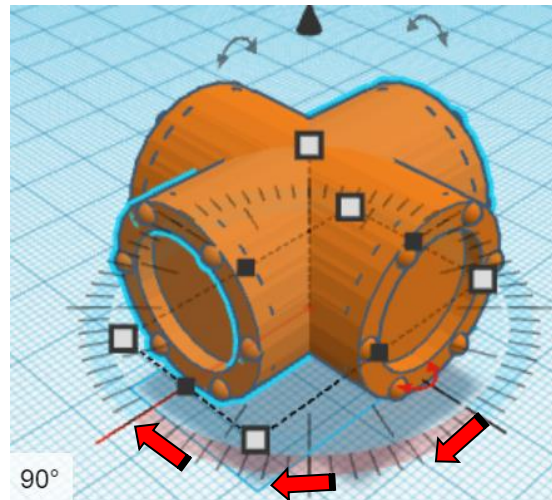


Rotate the Rotated Window clockwise 90 degrees in XY plane.

Before



After



Move Rotated Window (Must be in home view for this to work!)

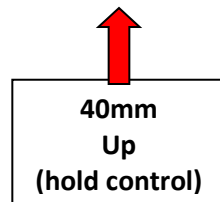
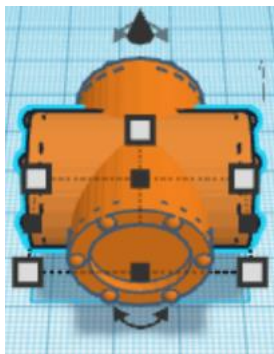
move up in positive Z direction 40mm

Hint: Select Rivets and hold control and push up arrow key 40 times.

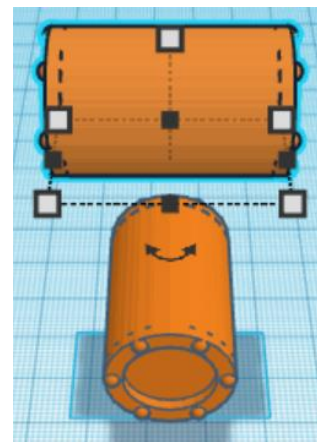
Or

Select Rivets and hold control and hold shift and push up arrow key 4 times.

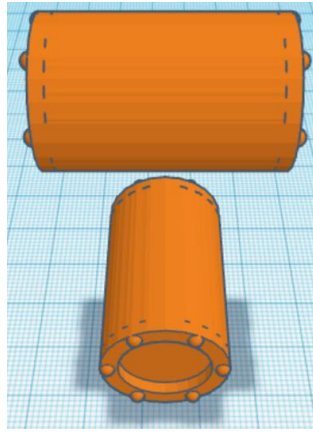
Before



After

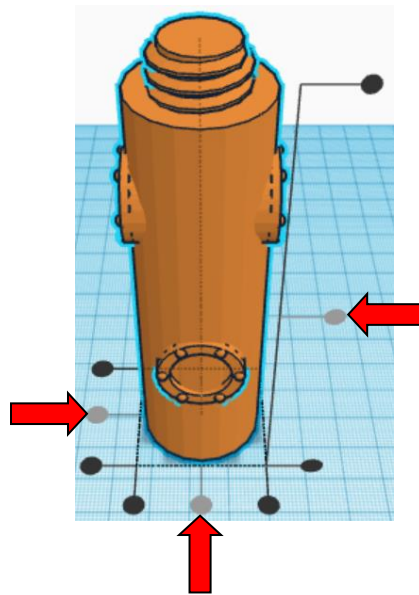


Group Window and **Rotated Window**
From now on this will be called the **Windows**

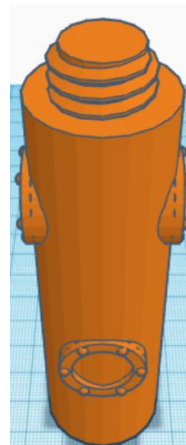


Align Windows and **Middle**

centered in X direction,
centered of Y direction, and
centered of Z direction.



Group Window and **Middle**
From now on this will be called the **Window Middle**



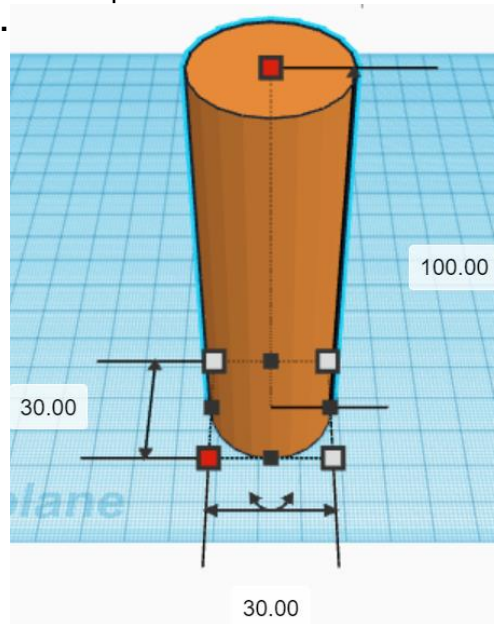
You are done with your Middle!

Go back to page 3 to choose your top.

Modern Middle:

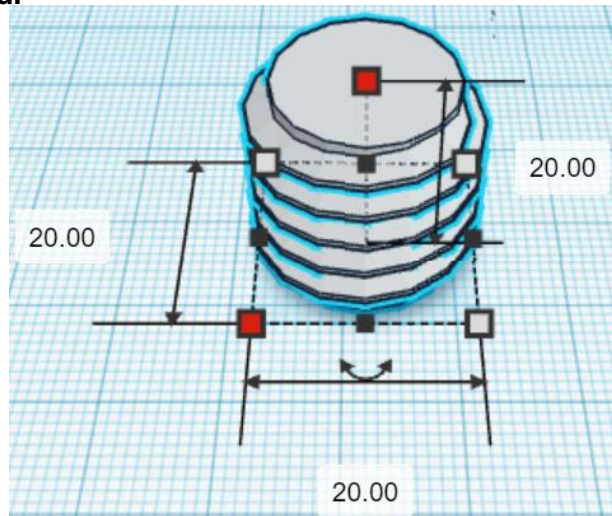
Bring in a Cylinder, located in Basic Shapes on the left 2 shapes down.
From now on this will be called the **Middle Cylinder**.

Change the dimensions to
30mm X direction,
30mm Y direction, and
100mm Z direction.



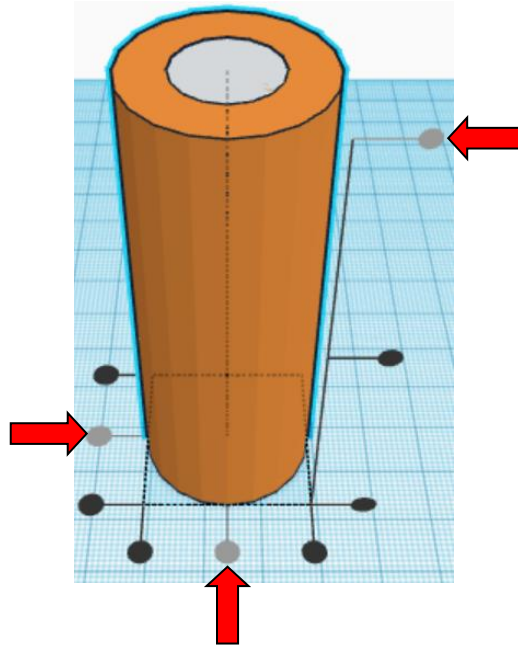
Bring in a ISO Metric Thread, located in Shape Generators, under Featured, (things in Featured move each time that TinkerCad adds items to Featured), this was last seen on the left, 3 shapes down.
From now on this will be called the **Middle Thread**.

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



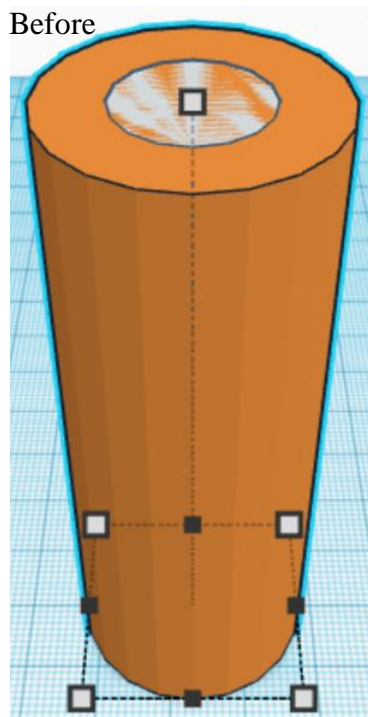
Align Middle Cylinder and Middle Thread

centered in X direction,
centered of Y direction, and
top of Z direction.

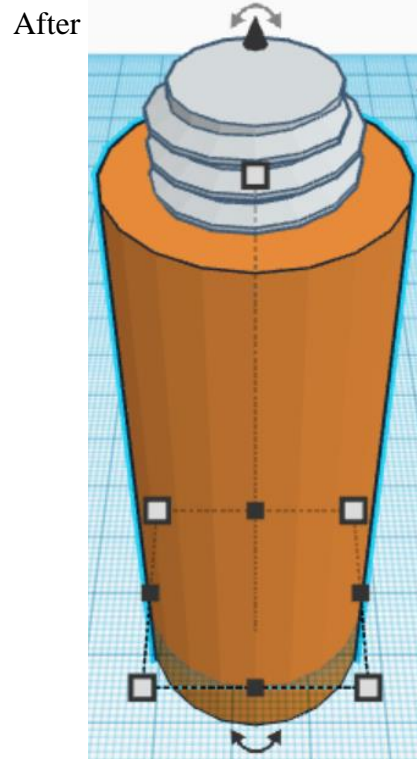


Move Middle Cylinder (Must be in home view for this to work!)
move down in negative Z direction 10mm

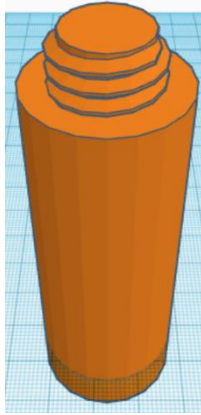
Hint: Select Middle Cylinder and hold control and push down arrow key 10 times.
Or
Select Middle Cylinder and hold control and hold shift and push down arrow key 1 time.



10mm
Down
(Hold Control)

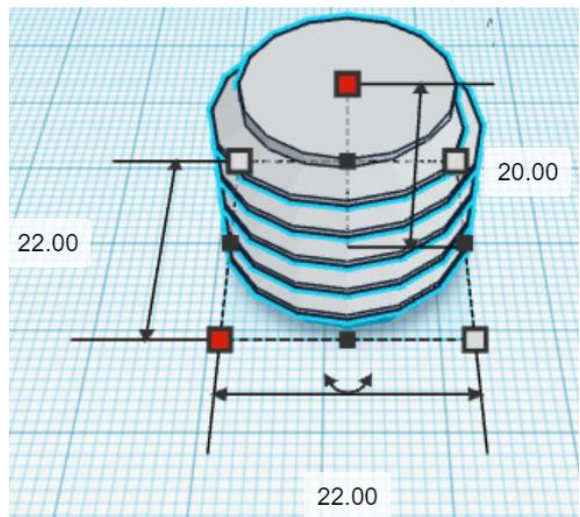


Group Middle Cylinder and Middle Thread
From now on this will be called the **Middle**



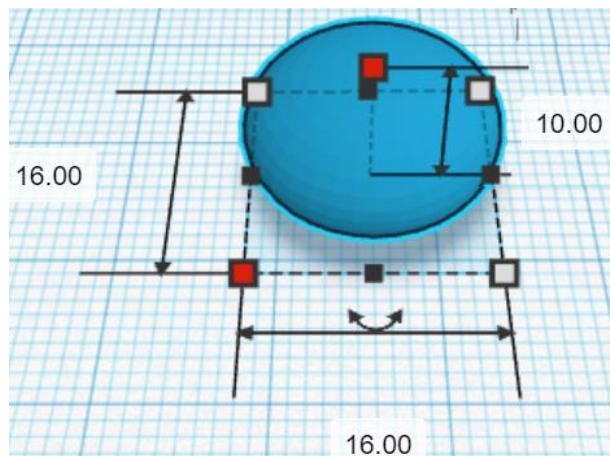
Bring in a ISO Metric Thread, located in Shape Generators, under Featured, (things in Featured move each time that TinkerCad adds items to Featured), this was last seen on the left, 3 shapes down.
From now on this will be called the **Middle Thread Cutout**.

Change the dimensions to
22mm X direction,
22mm Y direction, and
20mm Z direction.



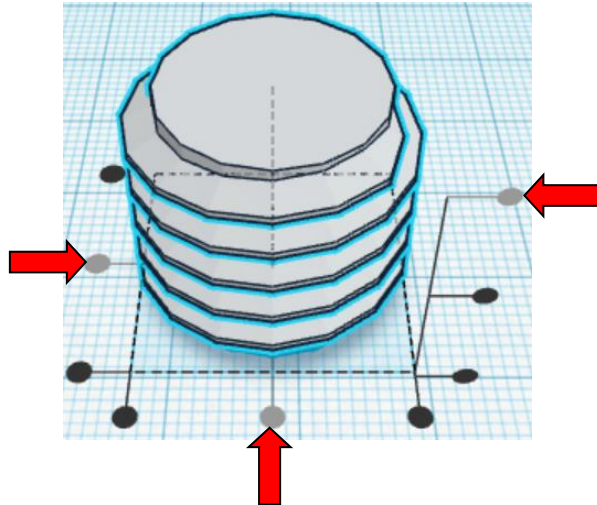
Bring in a Sphere, located in Basic Shapes in the center 2 shapes down.
From now on this will be called the **Middle Thread Cutout Top**.

Change the dimensions to
16mm X direction,
16mm Y direction, and
10mm Z direction.



Align Middle Thread Cutout and Middle Thread Cutout Top

centered in X direction,
centered of Y direction, and
top of Z direction.

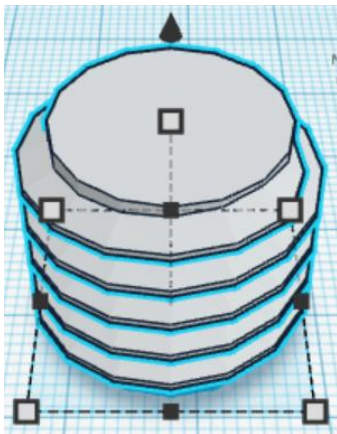


Move Middle Thread Cutout (Must be in home view for this to work!)

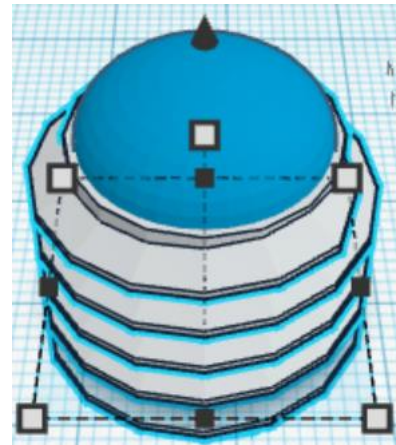
move down in negative Z direction 5mm

Hint: Select Middle Thread Cutout and hold control and push down arrow key 5 times.

Before



After

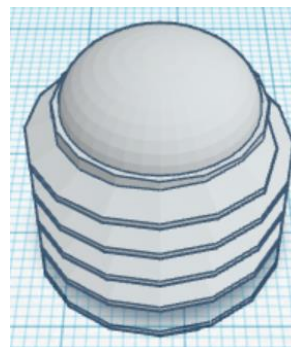


5mm
Down
(Hold Control)

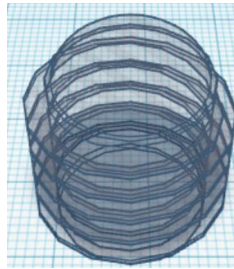


Group Middle Thread Cutout and Middle Thread Cutout Top

From now on this will be called the **Middle Thread Cutout**

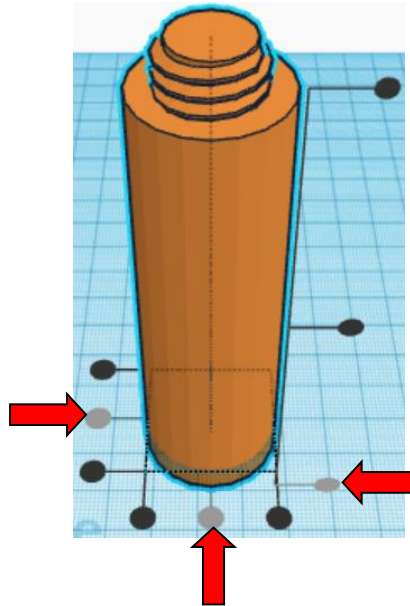


Change Middle Thread Cutout to Hole
by selecting Middle Thread Cutout and typing "h".



Align Middle Thread Cutout and Middle

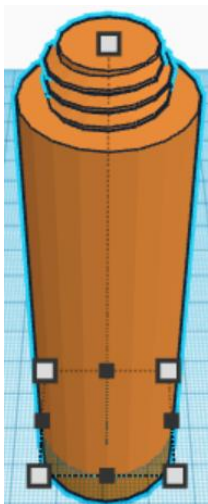
centered in X direction,
centered of Y direction, and
bottom of Z direction.



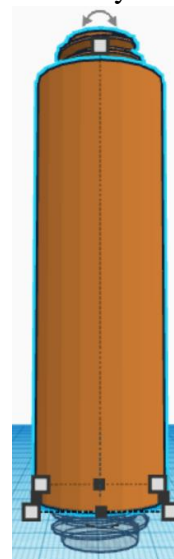
Move Middle (Must be in home view for this to work!)
move up in positive Z direction 10mm

Hint: Select Middle and hold control and push up arrow key 10 times.
Or
Select Middle and hold control and hold shift and push up arrow key 1 time.

Before

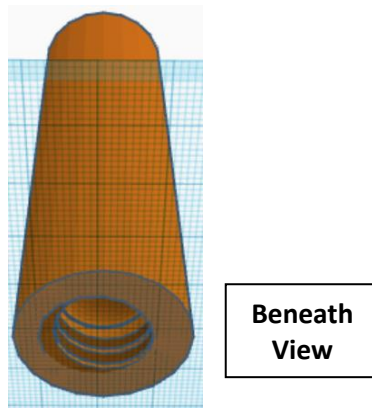


After

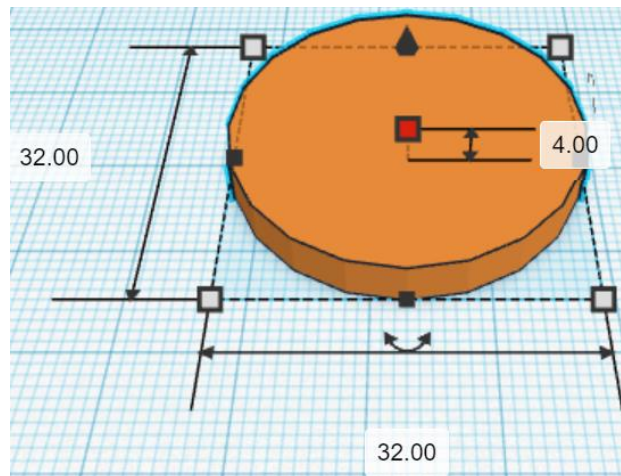


↑
10mm
Up
(Hold Control)

Group Middle Thread Cutout and Middle
From now on this will be called the **Middle**

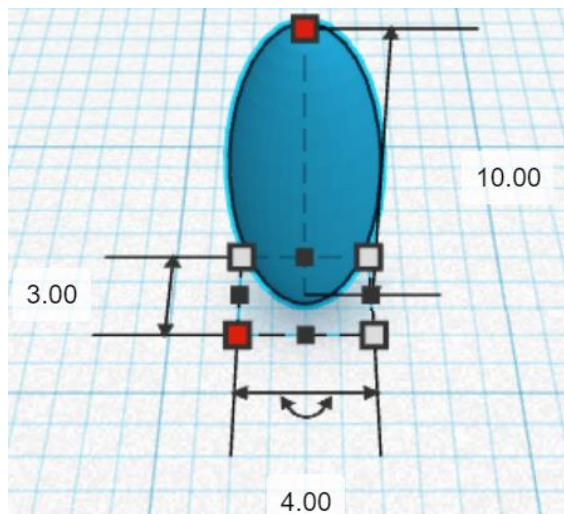


Bring in a Cylinder, located in Basic Shapes on the left 2 shapes down.
From now on this will be called the **Disk**.



Change the dimensions to
32mm X direction,
32mm Y direction, and
4mm Z direction.

Bring in a Sphere, located in Basic Shapes in the center 2 shapes down.
From now on this will be called the **Link**.



Change the dimensions to
4mm X direction,
3mm Y direction, and
10mm Z direction.

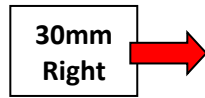
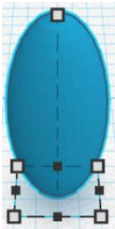
Duplicate Link 1 time

From now on this duplicate will be called the **Right Link**

Move Right Link (Must be in home view for this to work!)
move right in positive X direction 30mm

Hint: Select Right Link and push right arrow key 30 times.
Or
Select Right Link and hold shift and push right arrow key 3 times.

Before



After



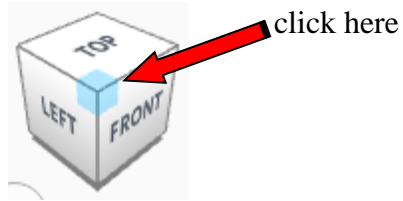
Group Link and Right Link

From now on this will be called the **Links**

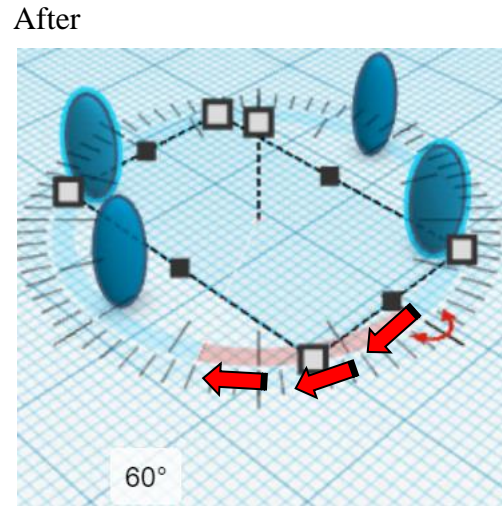
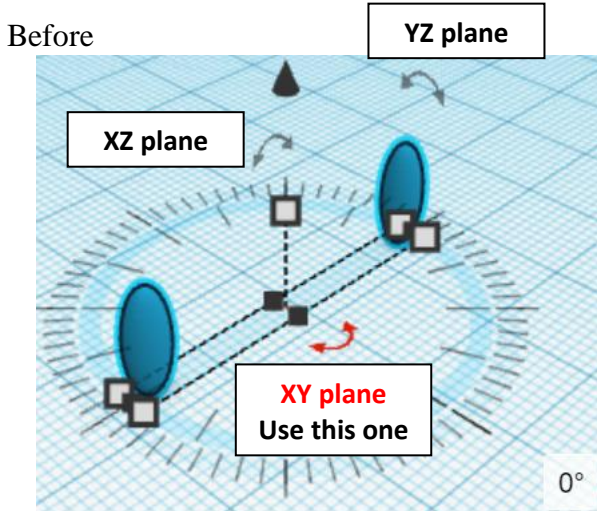


Duplicate Links 1 time

Go to TOP LEFT FRONT view for rotations



Rotate the Links clockwise 60 degrees in XY plane.

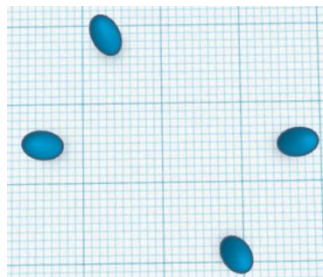


Immediately Duplicate Links 1 time

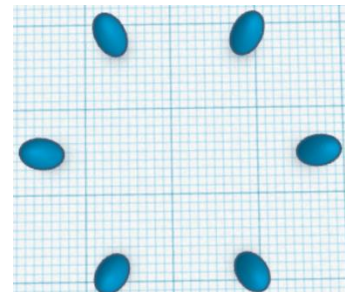
(This will **Duplicate** and repeat the **Rotate** 60 degrees as long as you don't do any other action.)



Original Duplicate



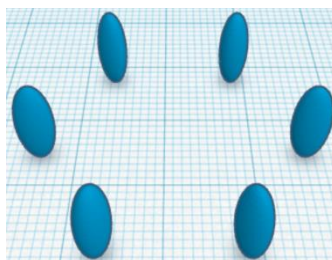
After first Duplicate and Rotate 60 degrees



After second Duplicate and 2nd Rotate 60 degrees

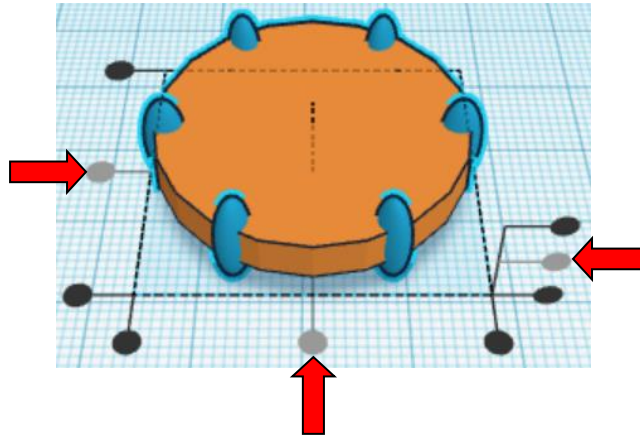
Group Links

From now on this will be called the **Links**



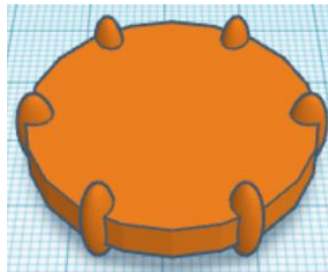
Align Disk and Links

centered in X direction,
centered of Y direction, and
centered of Z direction.



Group Disk and Links

From now on this will be called the **Disk**



Duplicate Disk 1 time

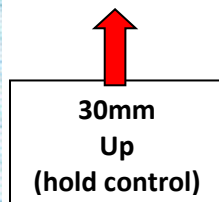
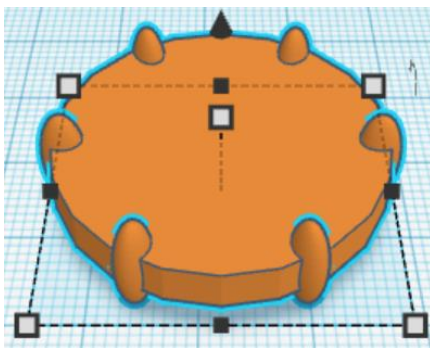
Move Disk (Must be in home view for this to work!)
move up in positive Z direction 30mm

Hint: Select Disk and hold control and push up arrow key 30 times.

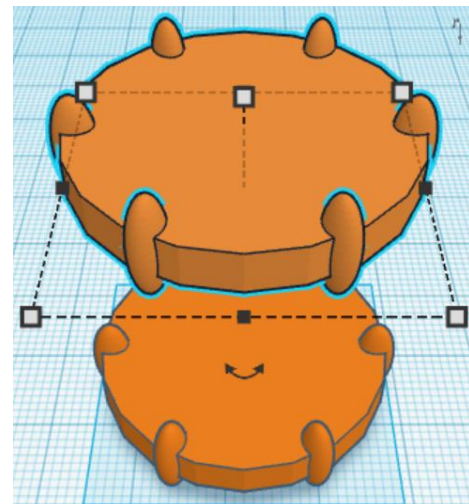
Or

Select Disk and hold control and hold shift and push up arrow key 3 times.

Before

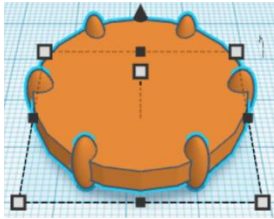


After

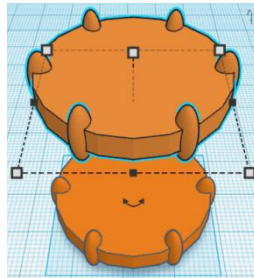


Immediately Duplicate Disk 1 time

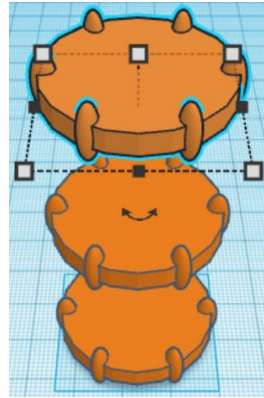
(This will **Duplicate** and repeat the **Move** 30mm up as long as you don't do any other action.)



Original
Duplicate



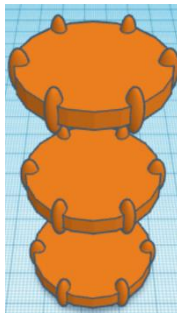
After first Duplicate
and Move up 30mm



After second Duplicate
and 2nd Move up 30mm

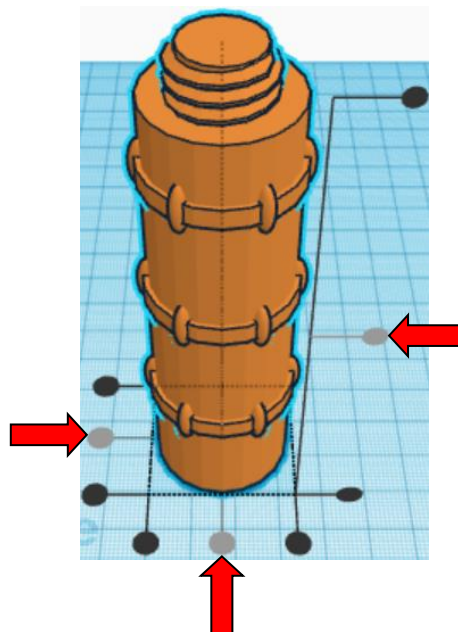
Group Disk

From now on this will be called the **Disk**



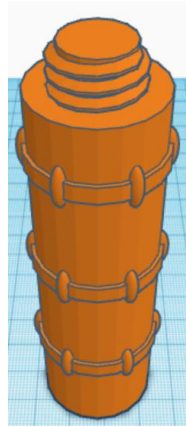
Align Disk and Middle

centered in X direction,
centered of Y direction, and
centered of Z direction.



Group Disk and Middle

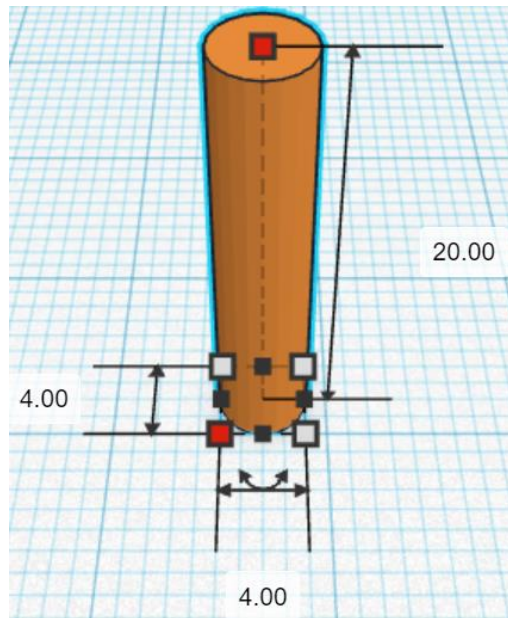
From now on this will be called the **Middle**



Bring in a Cylinder, located in Basic Shapes on the left 2 shapes down.

From now on this will be called the **Middle Cutout**.

Change the dimensions to
4mm X direction,
4mm Y direction, and
20mm Z direction.

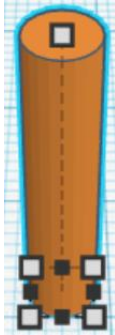


Duplicate Middle Cutout 1 time

Move Middle Cutout (Must be in home view for this to work!)
move right in positive X direction 30mm

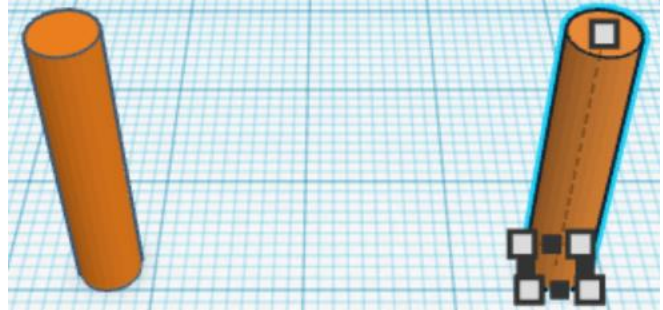
Hint: Select Middle Cutout and push right arrow key 30 times.
Or
Select Middle Cutout and hold shift and push right arrow key 3 times.

Before

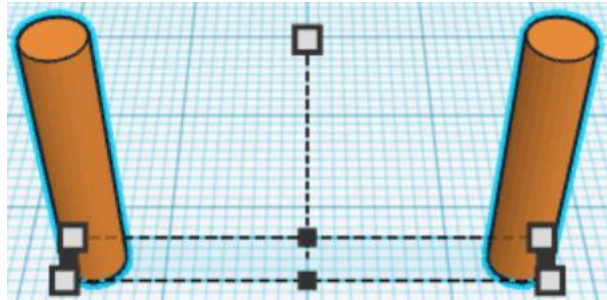


30mm
Right →

After

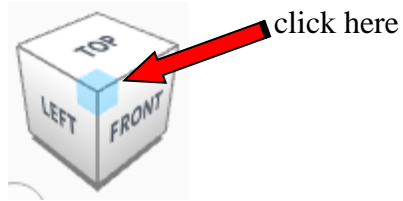


Group Middle Cutout
From now on this will be called the **Middle Cutouts**



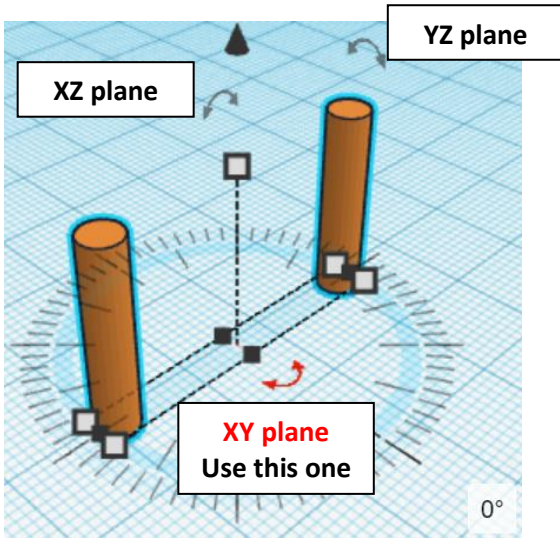
Duplicate Middle Cutouts 1 time

Go to TOP LEFT FRONT view for rotations

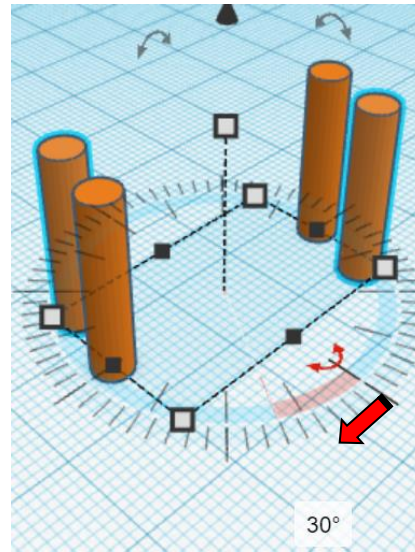


Rotate the Middle Cutouts clockwise 30 degrees in XY plane.

Before

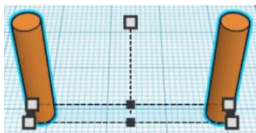


After

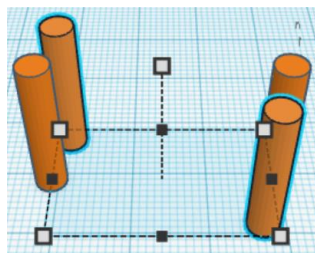


Immediately Duplicate Middle Cutouts 2 times

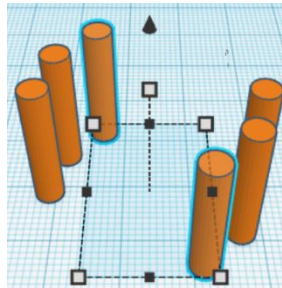
(This will **Duplicate** and repeat the **Rotate** 30 degrees as long as you don't do any other action.)



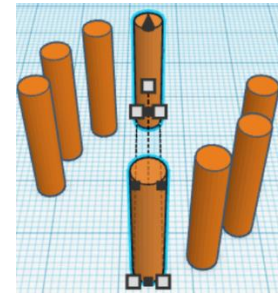
Original Duplicate



After first Duplicate and Rotate 30 degrees



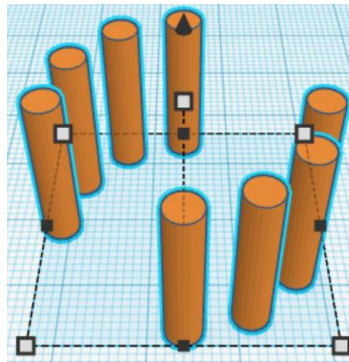
After second Duplicate and 2nd Rotate 30 degrees



After second Duplicate and 3rd Rotate 30 degrees

Group Middle Cutouts

From now on this will be called the **Middle Cutouts**



Duplicate Middle Cutouts 1 time

From now on this will be called the **Middle Cutouts Top**

Move Middle Cutouts Top

(Must be in home view for this to work!)

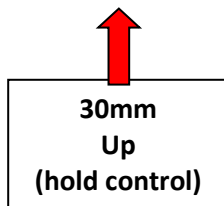
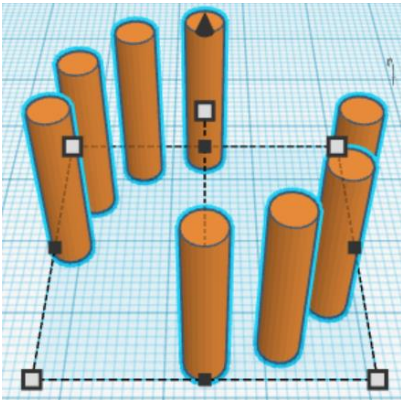
move up in positive Z direction 30mm

Hint: Select Middle Cutout Top and hold control and push up arrow key 30 times.

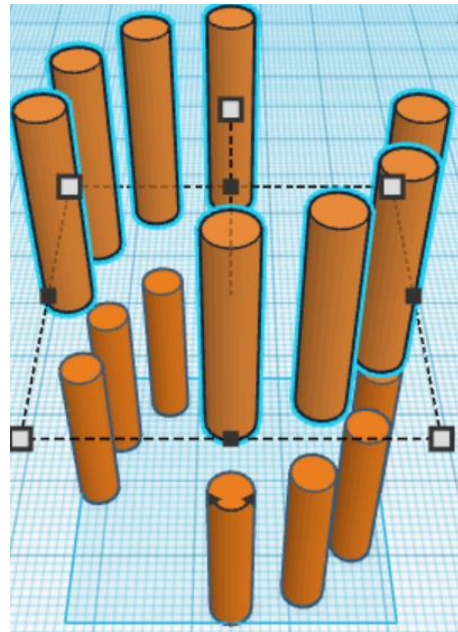
Or

Select Middle Cutout Top and hold control and hold shift and push up arrow key 3 times.

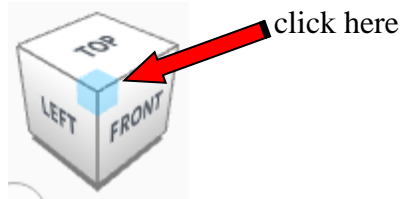
Before



After

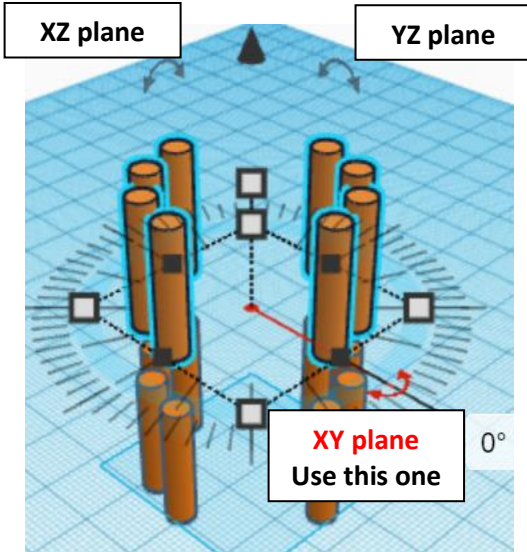


Go to TOP LEFT FRONT view for rotations

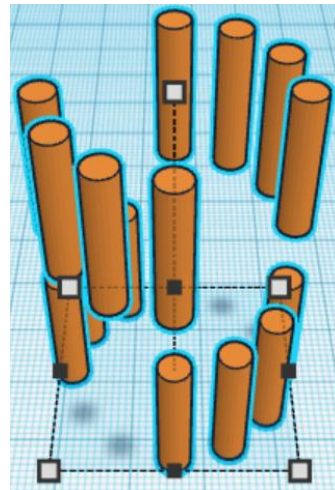
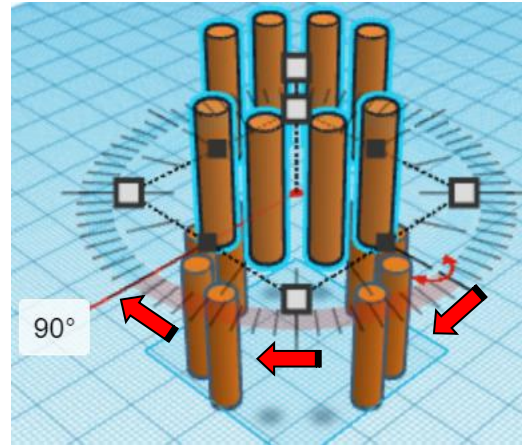


Rotate the Middle Cutouts Top clockwise 90 degrees in XY plane.

Before

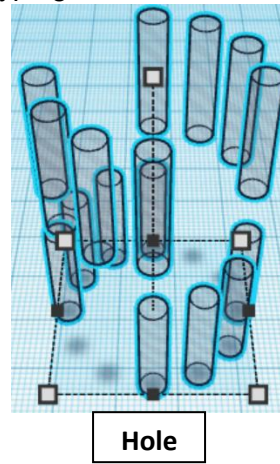
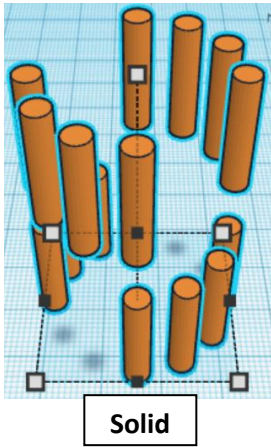


After



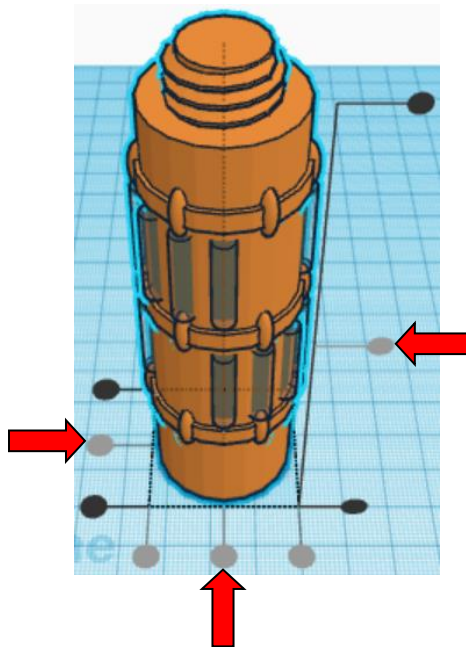
Group Middle Cutouts and Middle Cutouts Top
From now on this will be called the **Middle Cutouts**

Change Middle Cutouts to **Hole** by selecting Middle Cutouts and typing "h".

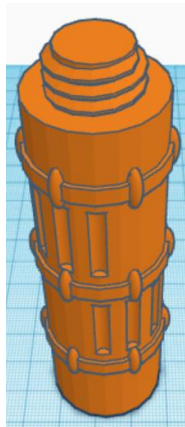


Align Middle Cutouts and Middle

centered in X direction,
centered of Y direction, and
centered of Z direction.



Group Middle Cutouts and Middle
From now on this will be called the **Middle**



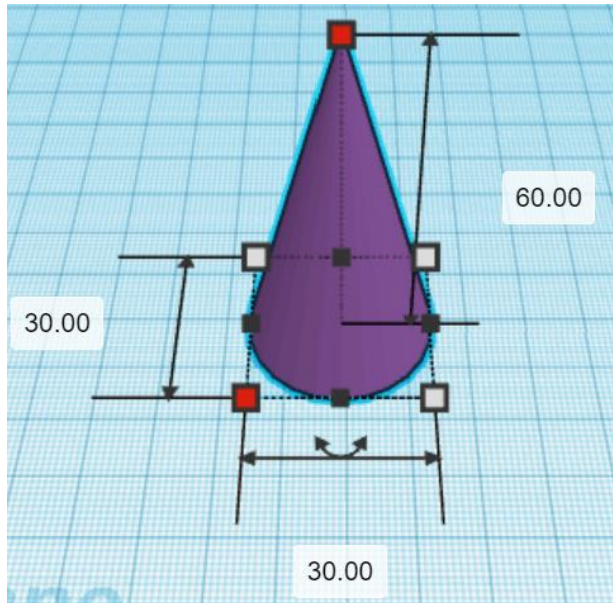
You are done with your Middle!

Go back to page 3 to choose your top.

Retro Top:

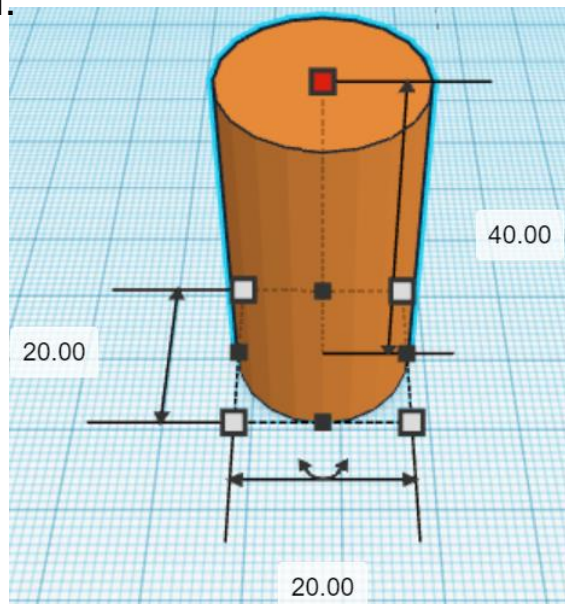
Bring in a Cone, located in Basic Shapes in the center 3 shapes down.
From now on this will be called the **Top Cone 1**.

Change the dimensions to
30mm X direction,
30mm Y direction, and
60mm Z direction.



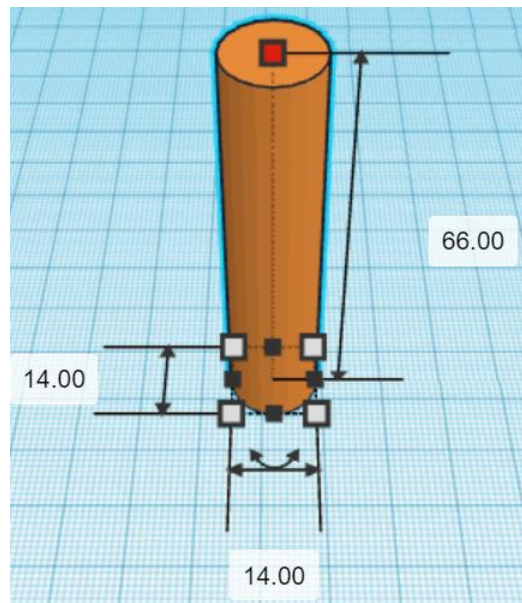
Bring in a Cylinder, located in Basic Shapes on the left 2 shapes down.
From now on this will be called the **Top Cylinder 1**.

Change the dimensions to
20mm X direction,
20mm Y direction, and
40mm Z direction.



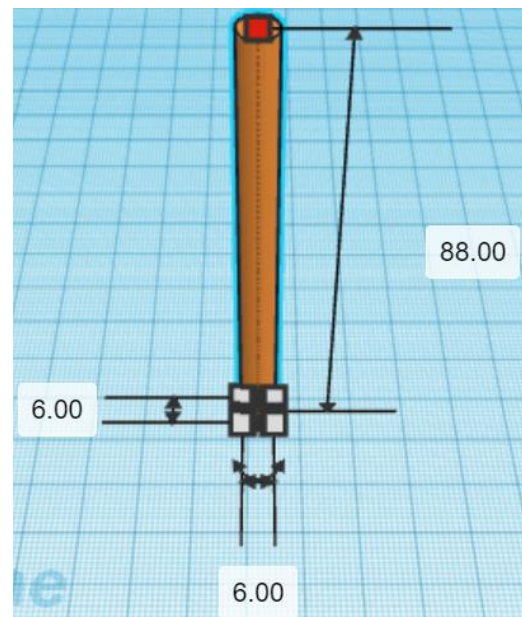
Bring in a Cylinder, located in Basic Shapes on the left 2 shapes down.
From now on this will be called the **Top Cylinder 2**.

Change the dimensions to
14mm X direction,
14mm Y direction, and
66mm Z direction.



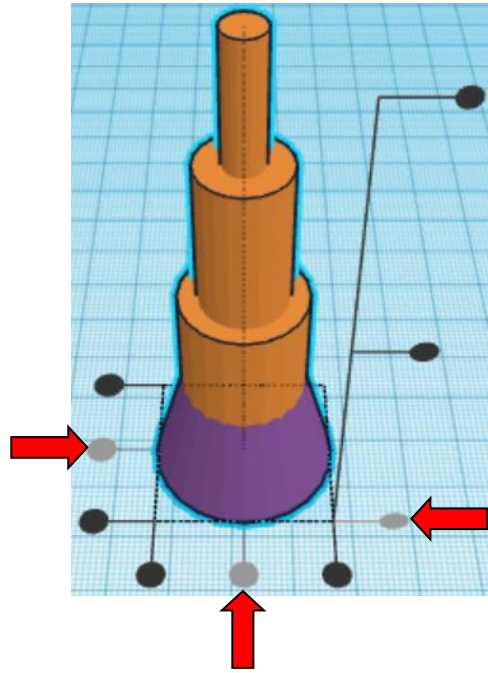
Bring in a Cylinder, located in Basic Shapes on the left 2 shapes down.
From now on this will be called the **Top Cylinder 3**.

Change the dimensions to
6mm X direction,
6mm Y direction, and
88mm Z direction.

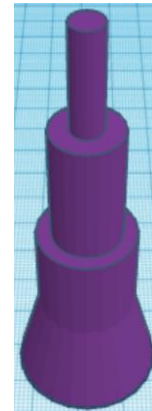


Align Top Cone 2 and Top Cylinder 1 and Top Cylinder 2 and Top Cylinder 3

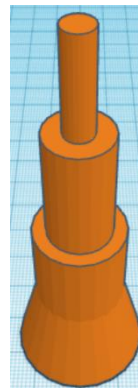
centered in X direction,
centered of Y direction, and
bottom of Z direction.



Group Top Cone 2 and Top Cylinder 1 and Top Cylinder 2 and Top Cylinder 3
From now on this will be called the **Top**

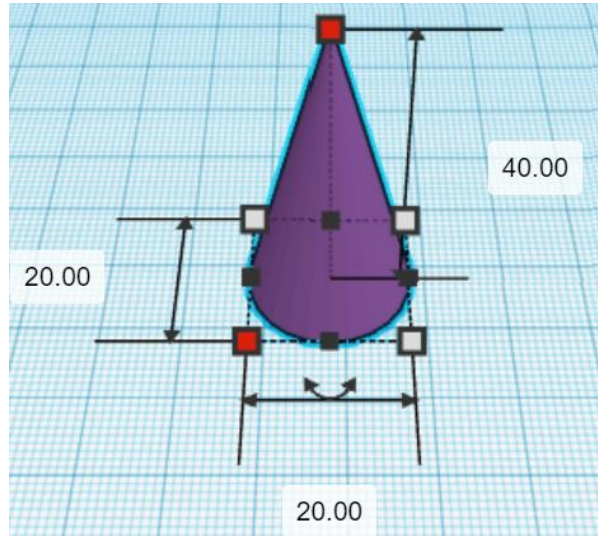


Change Color of Top to better see which objects to move.



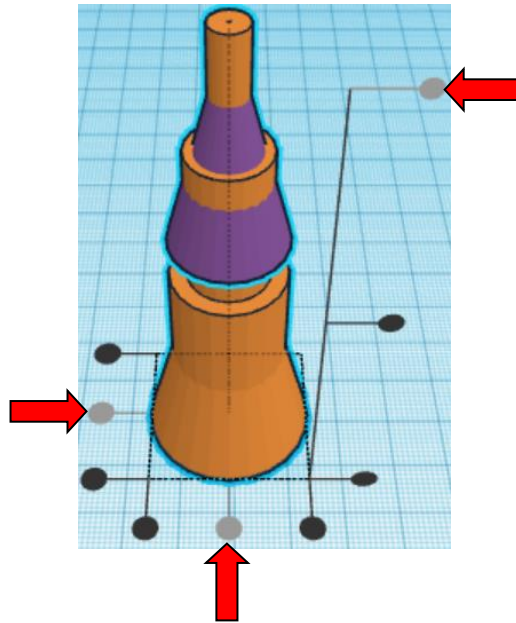
Bring in a Cone, located in Basic Shapes in the center 3 shapes down.
From now on this will be called the **Top Cone 2**.

Change the dimensions to
20mm X direction,
20mm Y direction, and
40mm Z direction.



Align Top and Top Cone 2

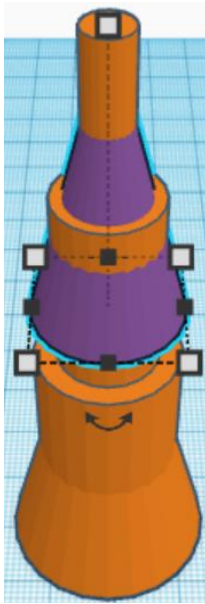
centered in X direction,
centered of Y direction, and
top of Z direction.



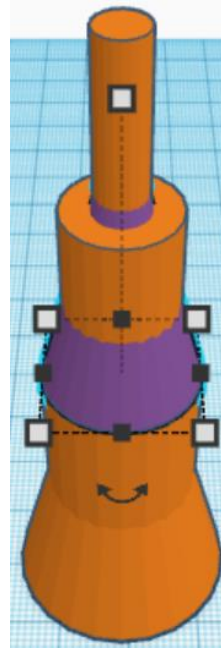
Move Top Cone 2 (Must be in home view for this to work!)
move down in negative Z direction 8mm

Hint: Select Top Cone 2 and hold control and push down arrow key 8 times.

Before



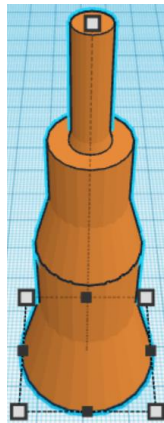
After



8mm
Down
(hold control)

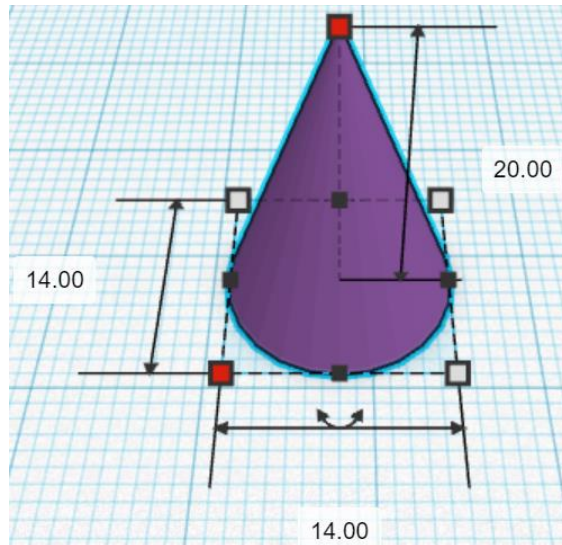


Group Top and Top Cone 2
From now on this will be called the **Top**



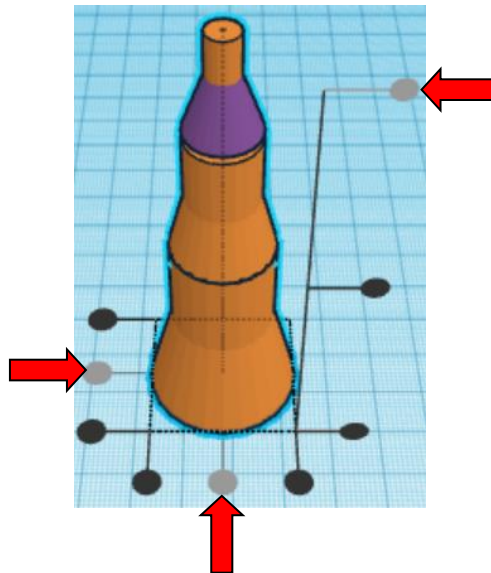
Bring in a Cone, located in Basic Shapes in the center 3 shapes down.
From now on this will be called the **Top Cone 3**.

Change the dimensions to
14mm X direction,
14mm Y direction, and
20mm Z direction.



Align Top and Top Cone 3

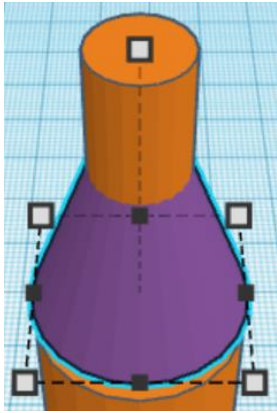
centered in X direction,
centered of Y direction, and
top of Z direction.



Move Top Cone 3 (Must be in home view for this to work!)
move down in negative Z direction 2mm

Hint: Select Top Cone 3 and hold control and push down arrow key 2 times.

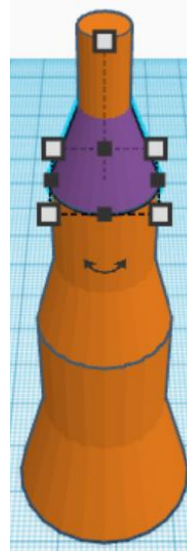
Before



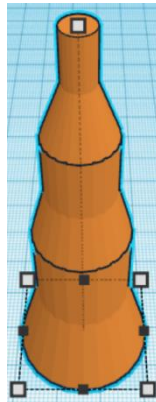
2mm
Down
(hold control)



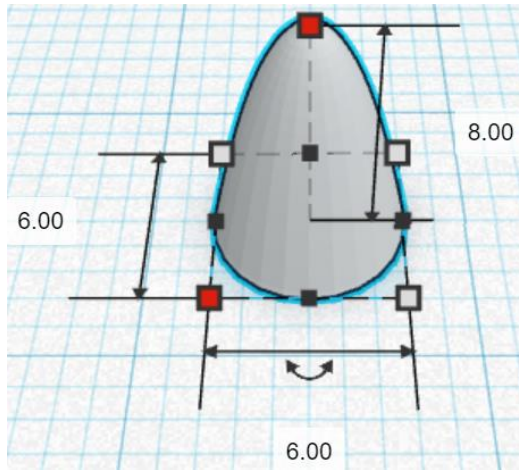
After



Group Top and Top Cone 3
From now on this will be called the **Top**



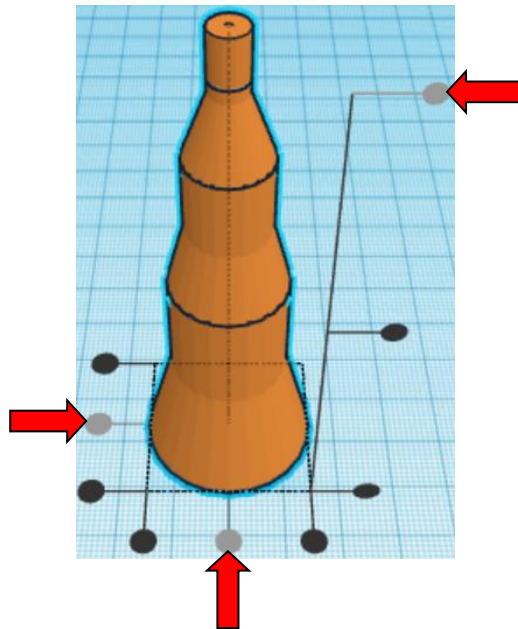
Bring in a Paraboloid, located in Basic Shapes on the right 5 shapes down.
From now on this will be called the **Top Cone 4**.



Change the dimensions to
6mm X direction,
6mm Y direction, and
8mm Z direction.

Align Top and Top Cone 4

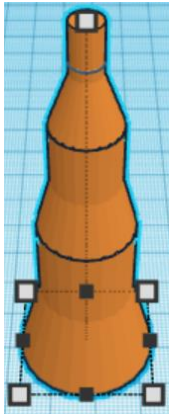
centered in X direction,
centered of Y direction, and
top of Z direction.



Move Top (Must be in home view for this to work!)
move down in negative Z direction 8mm

Hint: Select Top and hold control and push down arrow key 8 times.

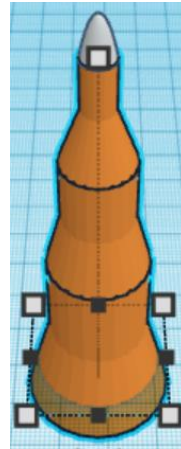
Before



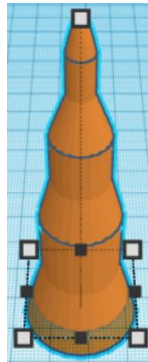
8mm
Down
(hold control)



After

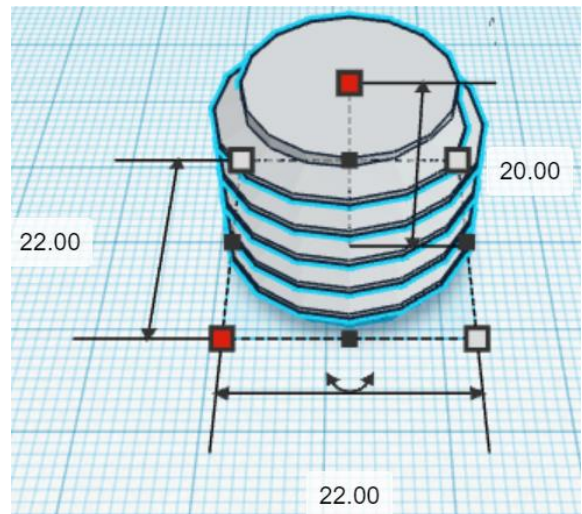


Group Top and Top Cone 4
From now on this will be called the **Top**



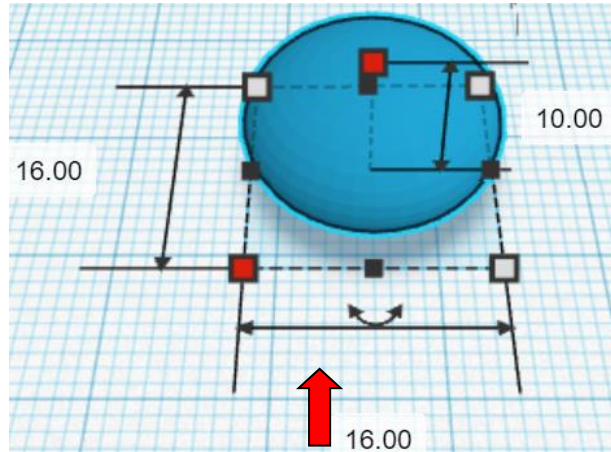
Bring in a ISO Metric Thread, located in Shape Generators, under Featured, (things in Featured move each time that TinkerCad adds items to Featured), this was last seen on the left, 3 shapes down.
From now on this will be called the **Top Thread Cutout**.

Change the dimensions to
22mm X direction,
22mm Y direction, and
20mm Z direction.



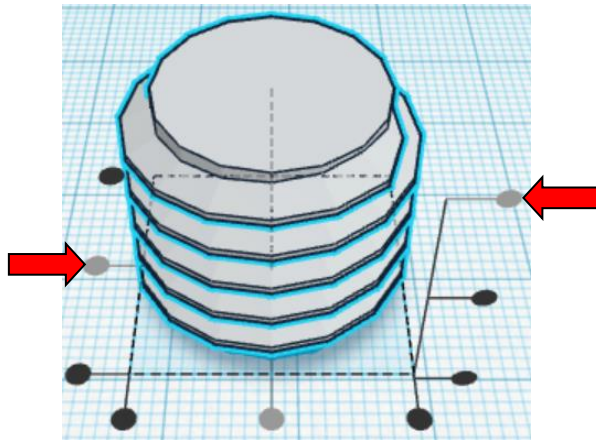
Bring in a Sphere, located in Basic Shapes in the center 2 shapes down.
From now on this will be called the **Top Thread Cutout Top**.

Change the dimensions to
16mm X direction,
16mm Y direction, and
10mm Z direction.



Align Top Thread Cutout and Top Thread Cutout Top

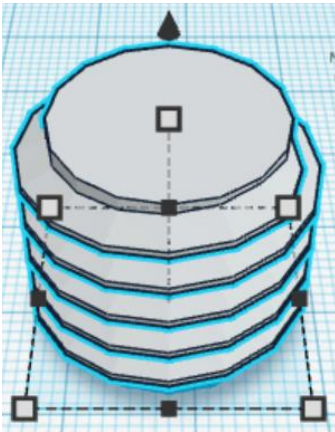
centered in X direction,
centered of Y direction, and
top of Z direction.



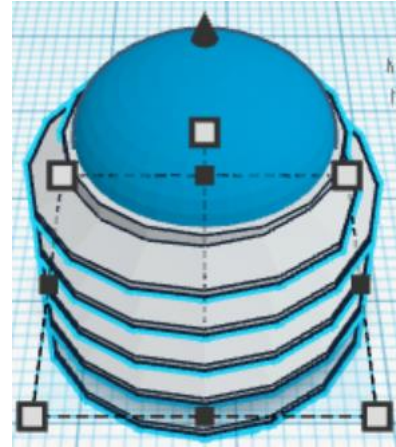
Move Top Thread Cutout (Must be in home view for this to work!)
move down in negative Z direction 5mm

Hint: Select Top Thread Cutout and hold control and push down arrow key 5 times.

Before



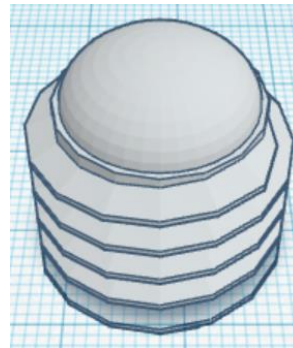
After



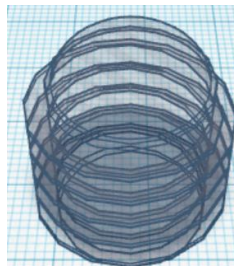
5mm
Down
(Hold Control)



Group Top Thread Cutout and Top Thread Cutout Top
From now on this will be called the **Top Thread Cutout**

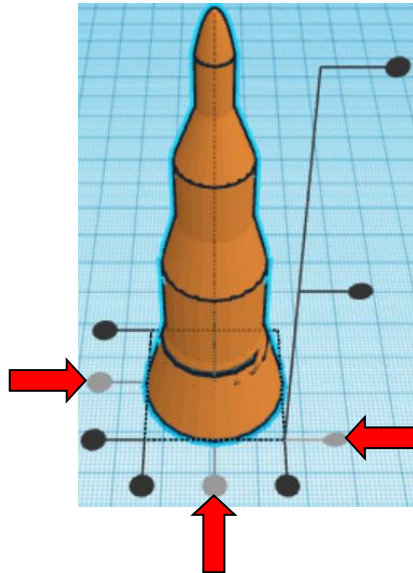


Change Top Thread Cutout to Hole
by selecting Top Thread Cutout and typing "h".



Align Top Thread Cutout and Top

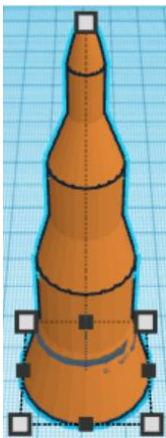
centered in X direction,
centered of Y direction, and
bottom of Z direction.



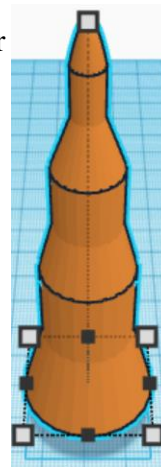
Move Top (Must be in home view for this to work!)
move up in positive Z direction 10mm

Hint: Select Top and hold control and push up arrow key 10 times.
Or
Select Top and hold control and hold shift and push up arrow key 1 time.

Before



After



↑
**10mm
Up
(Hold Control)**

Group Top Thread Cutout and Top
From now on this will be called the **Top**



**Beneath
View**

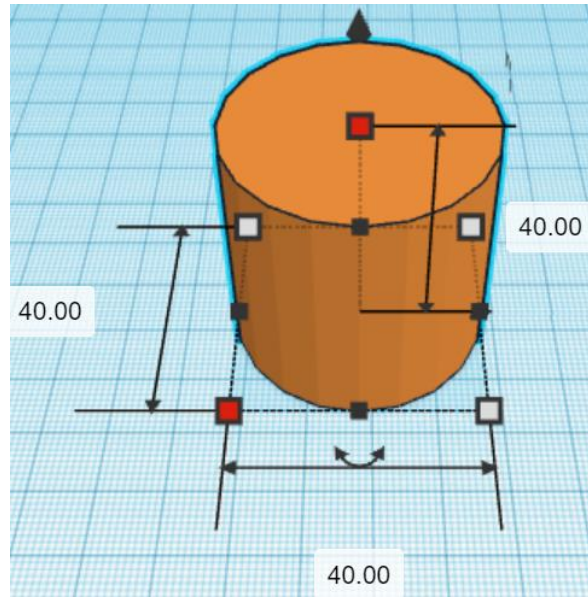
You are done with your Top!

Print all 3 parts!

Modern Top:

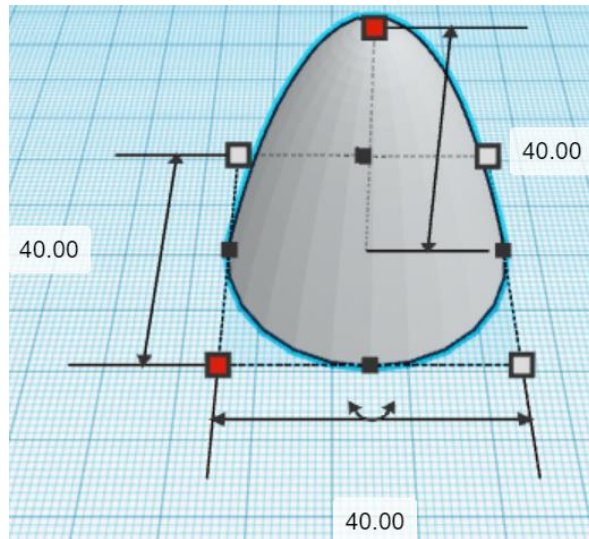
Bring in a Cylinder, located in Basic Shapes on the left 2 shapes down.
From now on this will be called the **Capsule Cylinder**.

Change the dimensions to
40mm X direction,
40mm Y direction, and
40mm Z direction.



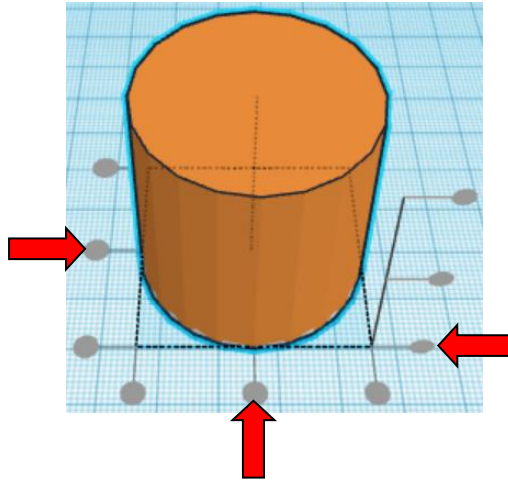
Bring in a Paraboloid, located in Basic Shapes on the right 5 shapes down.
From now on this will be called the **Capsule Top**.

Change the dimensions to
40mm X direction,
40mm Y direction, and
40mm Z direction.



Align Capsule Cylinder and Capsule Top

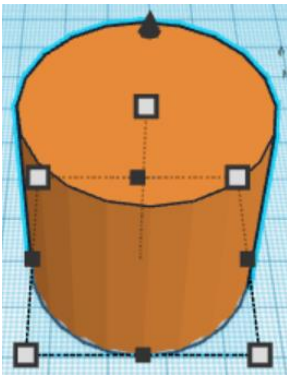
centered in X direction,
centered of Y direction, and
bottom of Z direction.



Move Capsule Cylinder (Must be in home view for this to work!)
move down in negative Z direction 40mm

Hint: Select Capsule Cylinder and hold control and push down arrow key 40 times.
Or
Select Capsule Cylinder and hold control and hold shift and push down arrow key 4 times.

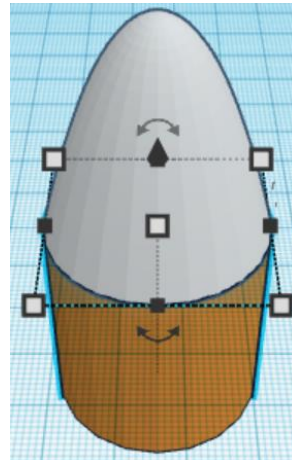
Before



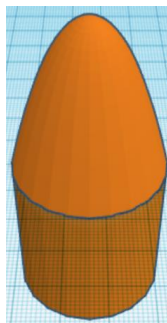
40mm
Down
(Hold Control)



After

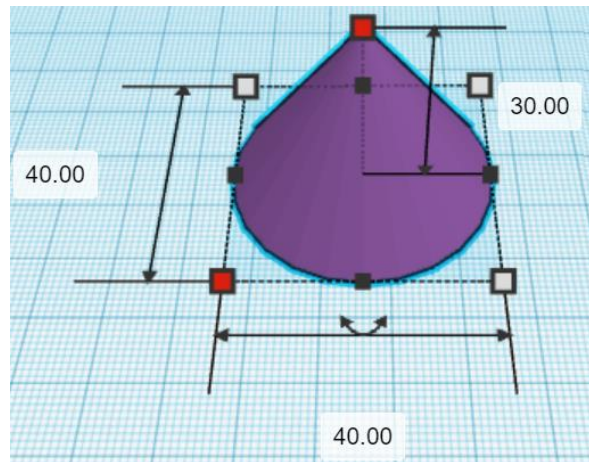


Group Capsule Cylinder and Capsule Top
From now on this will be called the **Capsule**



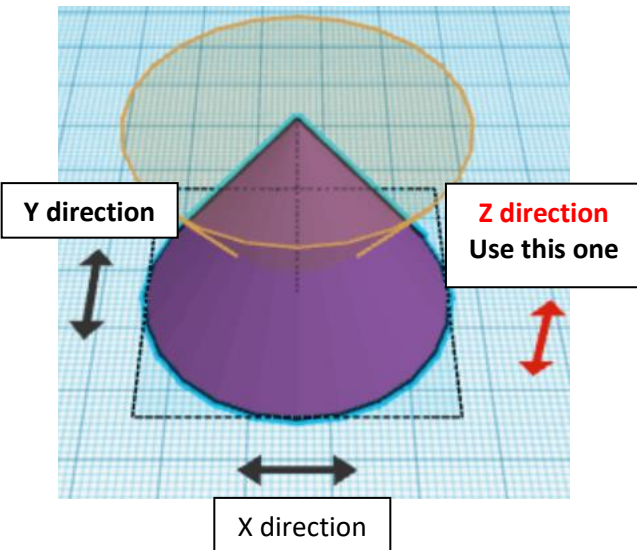
Bring in a Cone, located in Basic Shapes in the center 3 shapes down.
From now on this will be called the **Capsule Cone**.

Change the dimensions to
40mm X direction,
40mm Y direction, and
30mm Z direction.

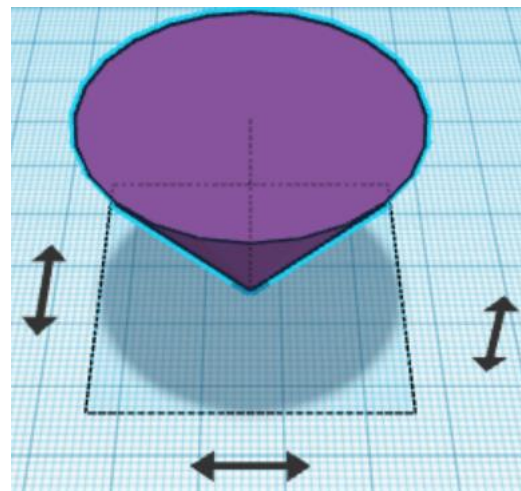


Flip Capsule Cone in Z direction.

Before

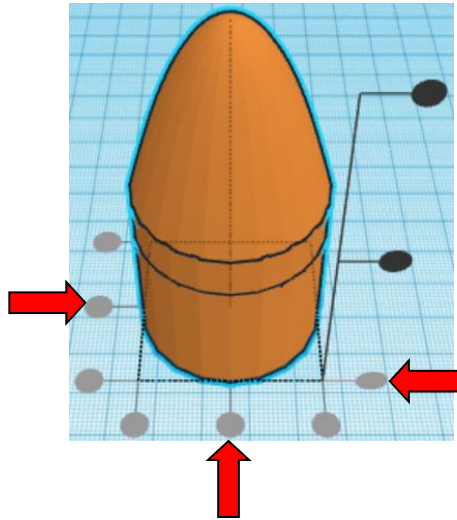


After



Align Capsule and Capsule Cone

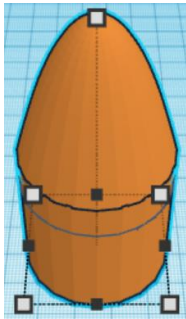
centered in X direction,
centered of Y direction, and
bottom of Z direction.



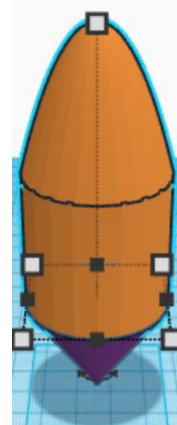
Move Capsule (Must be in home view for this to work!)
move up in positive Z direction 30mm

Hint: Select Capsule and hold control and push up arrow key 30 times.
Or
Select Capsule and hold control and hold shift and push up arrow key 3 times.

Before

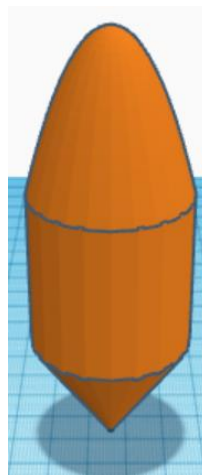


After



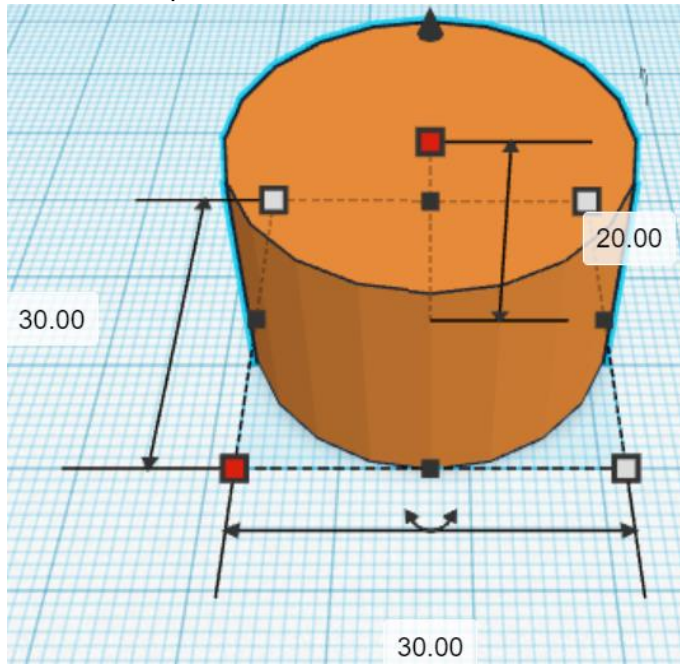
30mm
Up
(hold control)

Group Capsule and Capsule Cone
From now on this will be called the **Capsule**



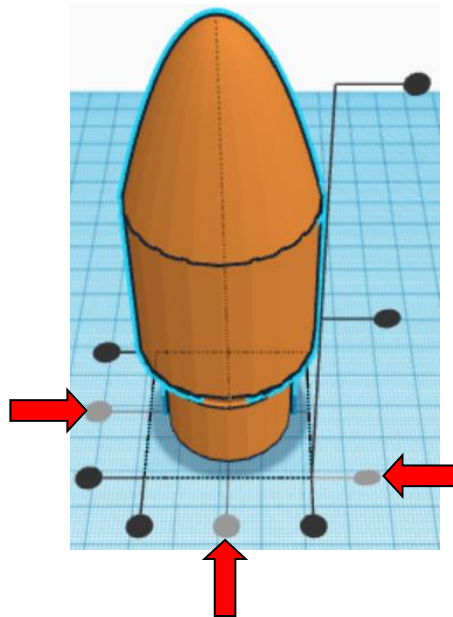
Bring in a Cylinder, located in Basic Shapes on the left 2 shapes down.
From now on this will be called the **Cylinder**.

Change the dimensions to
30mm X direction,
30mm Y direction, and
20mm Z direction.



Align Capsule and Cylinder

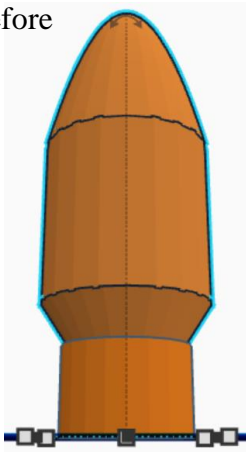
centered in X direction,
centered of Y direction, and
bottom of Z direction.



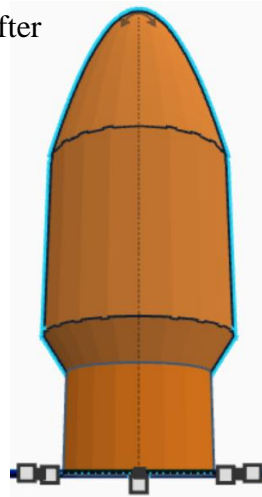
Move Capsule (Must be in home view for this to work!)
move down in negative Z direction 2mm

Hint: Select Capsule and hold control and push down arrow key 2 times.

Before



After



2mm
Down
(hold control)

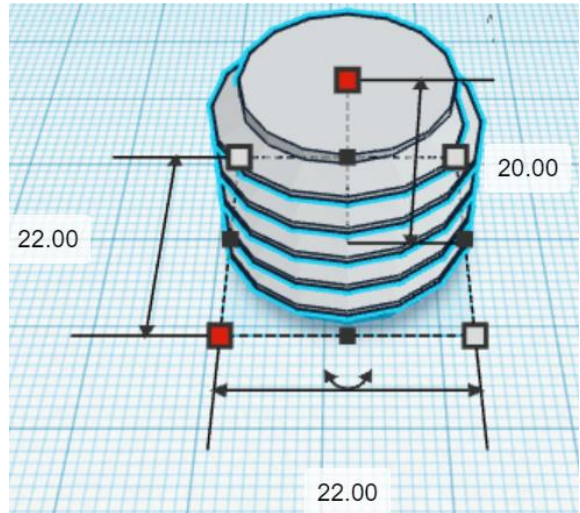


Group Capsule and Cylinder
From now on this will be called the **Capsule**



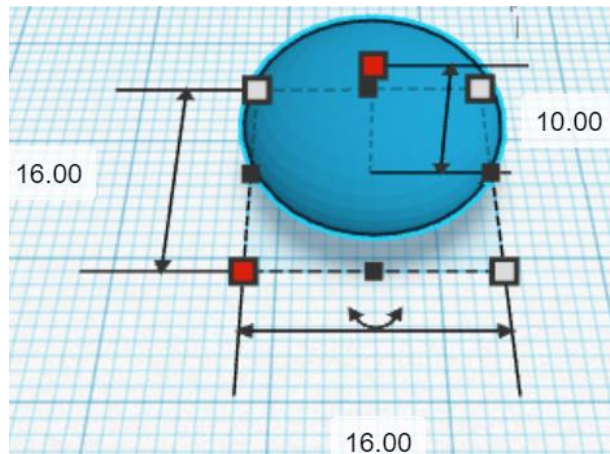
Bring in a ISO Metric Thread, located in Shape Generators, under Featured, (things in Featured move each time that TinkerCad adds items to Featured), this was last seen on the left, 3 shapes down.
 From now on this will be called the **Top Thread Cutout**.

Change the dimensions to
 22mm X direction,
 22mm Y direction, and
 20mm Z direction.



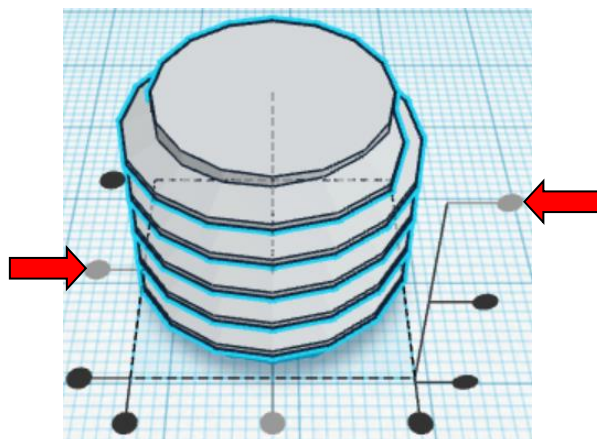
Bring in a Sphere, located in Basic Shapes in the center 2 shapes down.
 From now on this will be called the **Top Thread Cutout Top**.

Change the dimensions to
 16mm X direction,
 16mm Y direction, and
 10mm Z direction.



Align Top Thread Cutout and Top Thread Cutout Top

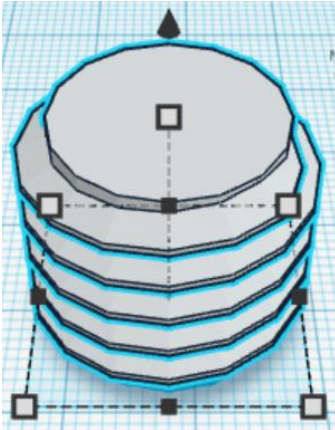
centered in X direction,
 centered of Y direction, and
 top of Z direction.



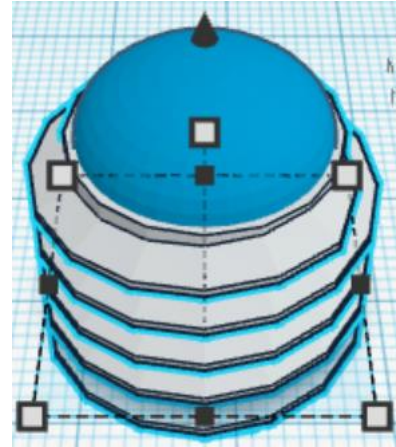
Move Top Thread Cutout (Must be in home view for this to work!)
move down in negative Z direction 5mm

Hint: Select Top Thread Cutout and hold control and push down arrow key 5 times.


Before



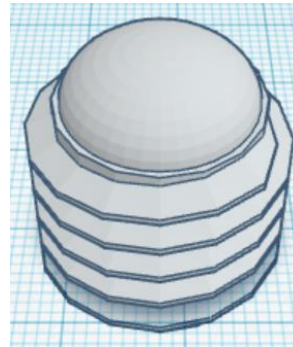
After



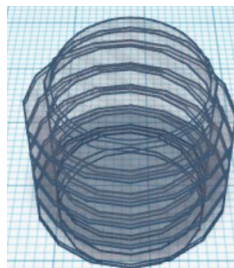
5mm
Down
(Hold Control)



Group Top Thread Cutout and Top Thread Cutout Top
From now on this will be called the **Top Thread Cutout**

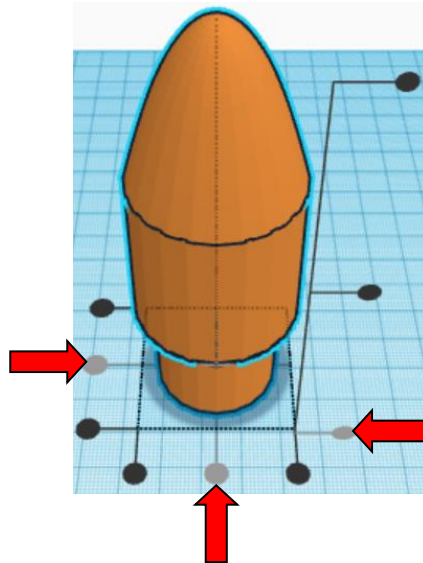


Change Top Thread Cutout to **Hole**
by selecting Top Thread Cutout and typing "h".



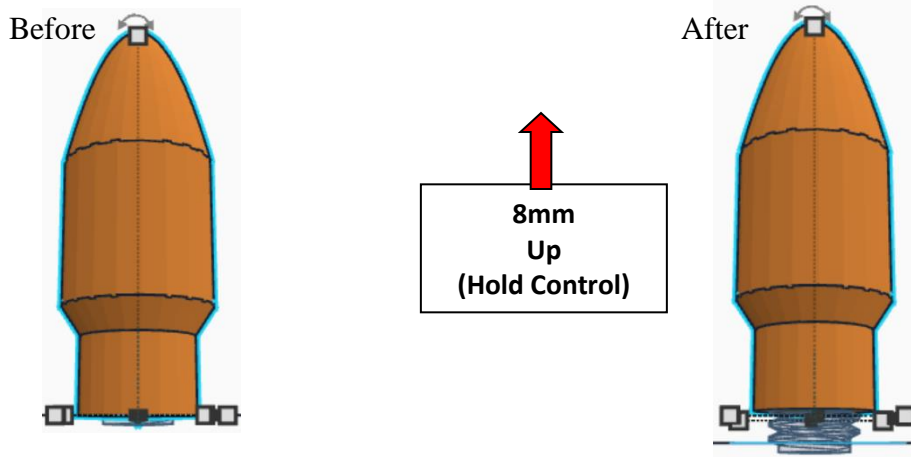
Align Top Thread Cutout and Capsule

centered in X direction,
centered of Y direction, and
bottom of Z direction.

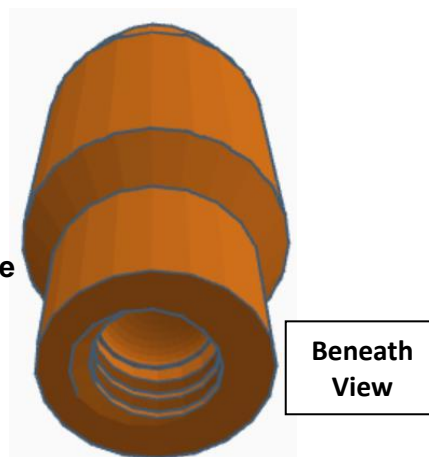


Move Capsule (Must be in home view for this to work!)
move up in positive Z direction 8mm

Hint: Select Capsule and hold control and push up arrow key 8 times.



Group Top Thread Cutout and Capsule
From now on this will be called the **Capsule**



You are done with your Top!

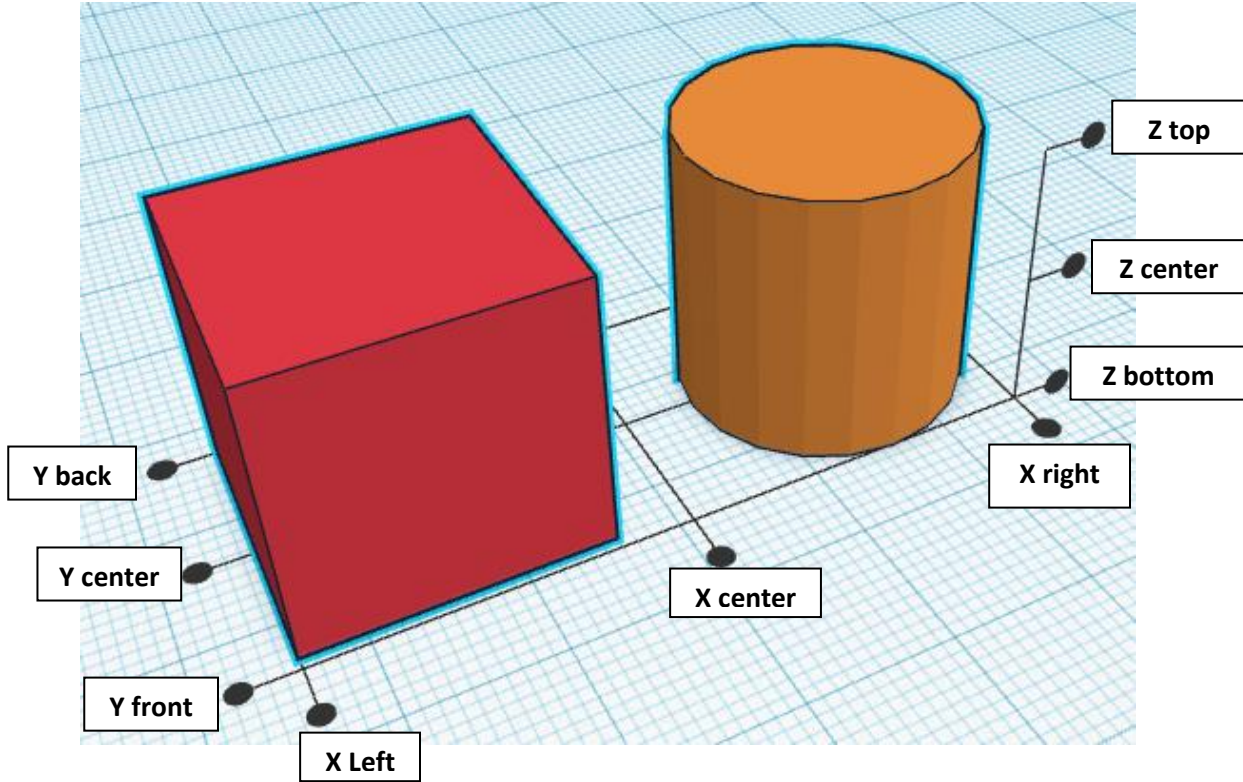
Print all 3 parts!

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

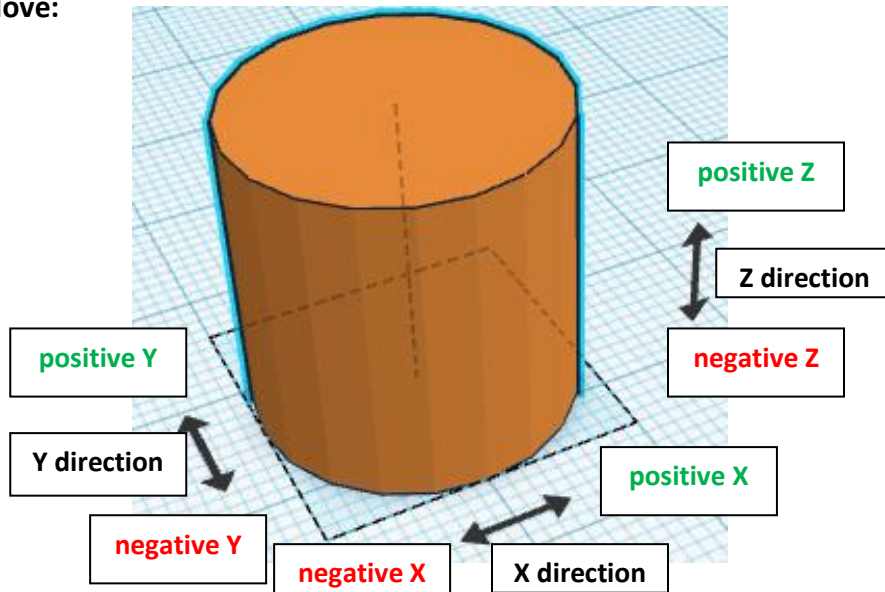
Always be in the "home view" when doing any of these!!!



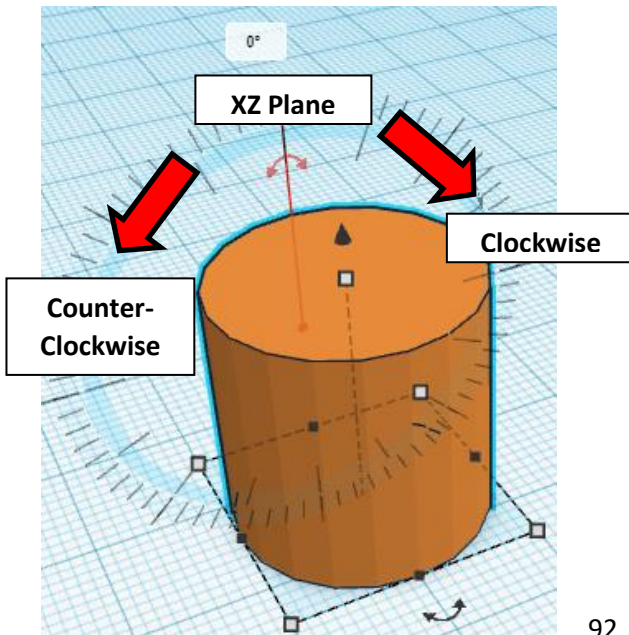
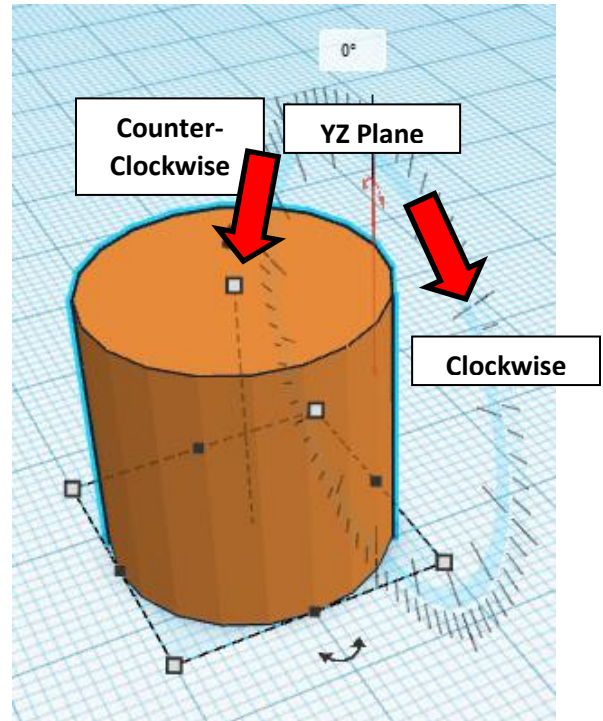
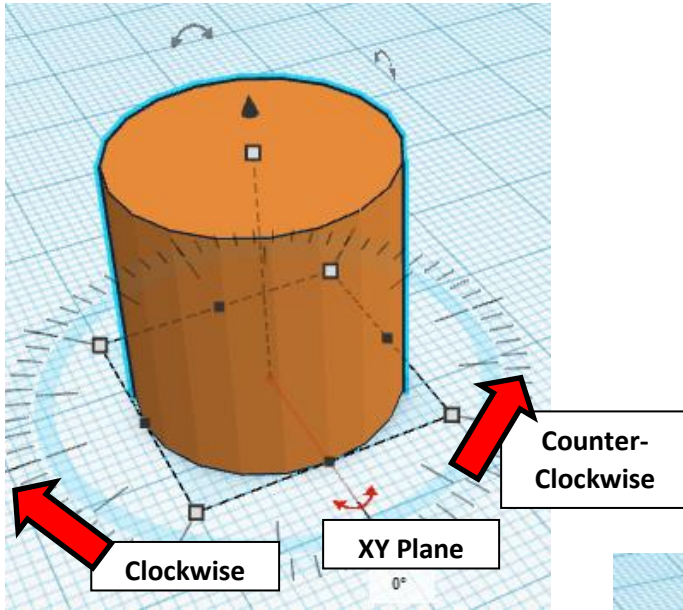
Aligning:



Flip or Mirror and Move:



Rotate:



Tool Guide

Most used Keyboard Shortcuts:

| | | | |
|------------------------------------|----------|----------------------------------|------------------------|
| Transparency toggle | T | Duplicate object(s) in place. | Ctrl + D |
| Turn object(s) into Holes | H | Delete object(s) | Del |
| Turn object(s) into Solids | S | Undo action(s) | Ctrl + Z |
| Align object(s) | L | Zoom the view in or out | Mouse scroll wheel |
| Flip/Mirror object(s) | M | Zoom-in | + |
| Drop object(s) to workplane | D | Zoom-out | - |
| | | Fit selected object(s) into view | F |

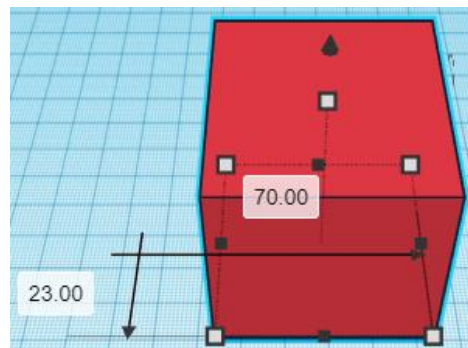
Moving Object(s):

To move object(s) with mouse:

In XY Plane
(left/right and forward/ backward)

Click and hold left mouse button on object.

Move mouse to desired location.

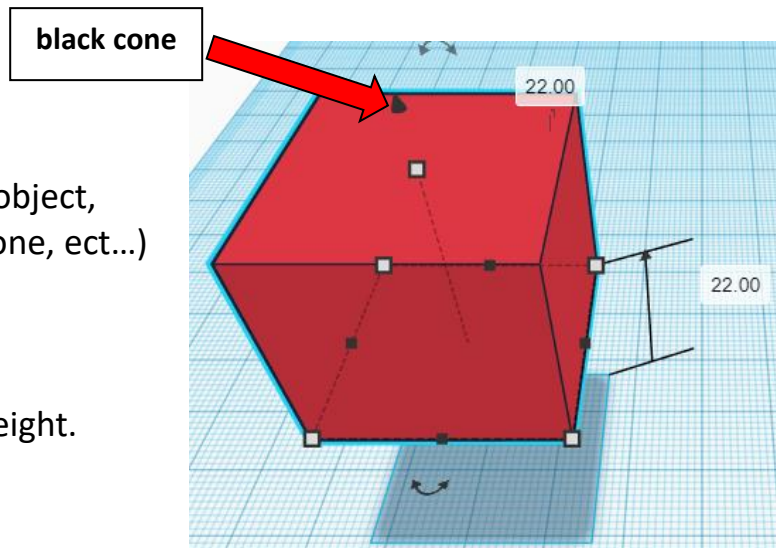


Moving Object(s) continued:

In Z direction (up/down)

Select object with left mouse button.
Notice that several shapes appear on object,
(white squares, black squares, black cone, ect...)

Click and hold left mouse button
on the black cone at top of object.
Move mouse up or down to desired height.



To move object(s) with keyboard:

In XY Plane (left/right and forward/ backward)

Select object with left mouse button.

Use arrow keys to move the object in 1mm increments.



In XY Plane (fast) (left/right and forward/ backward)

Select object with left mouse button.

Hold shift key
and use arrow keys to move the object in 10mm increments.



Moving Object(s) continued:

In Z direction (up/down)

Select object with left mouse button.



Hold control button and use up and down arrow keys to move the object in 1mm increments.

In Z direction (fast) (up/down)

Select object with left mouse button.

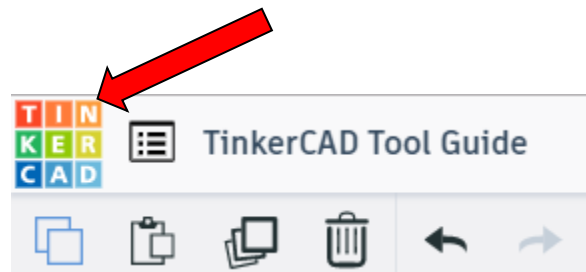


Hold control button and hold shift button and use up and down arrow keys to move the object in 10mm increments.

Using on screen icons:

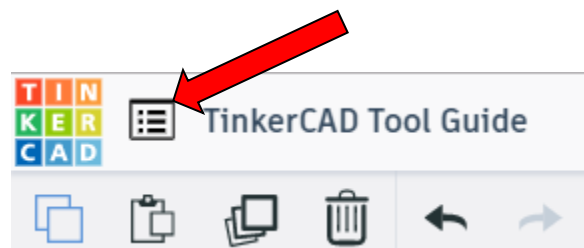
TinkerCAD main screen:

(I know this doesn't look like an icon button, but it is)



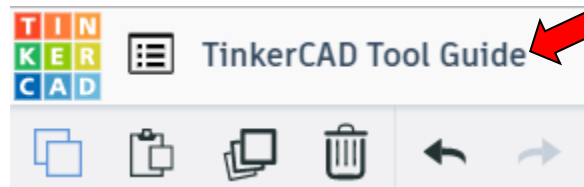
My designs:

Pulls up menu of your designs.



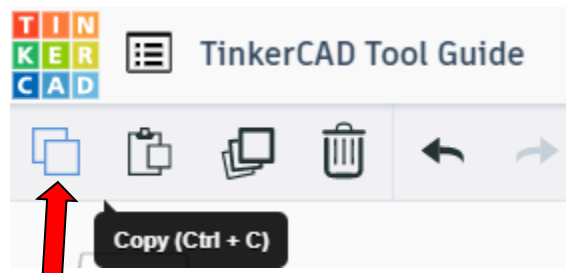
Design name:

TinkerCAD automatically names your design a random name.
Click here to change your design name.



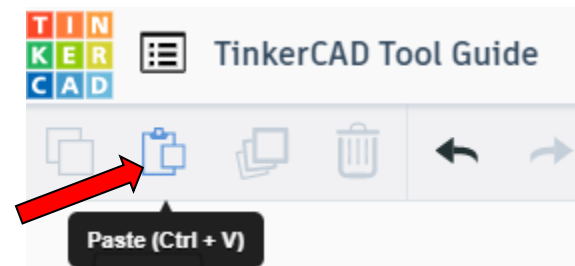
Copy:

Select shape.
Click copy or use ctrl + c
Paste to copy or go into new design and paste to copy.



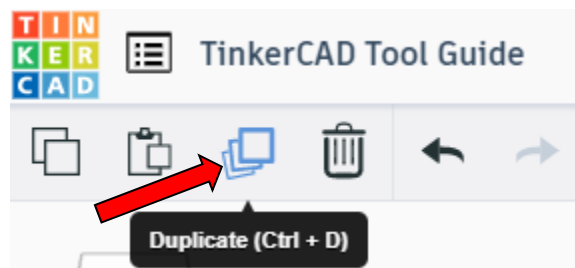
Paste:

After using copy,
click paste or use ctrl + v to paste.



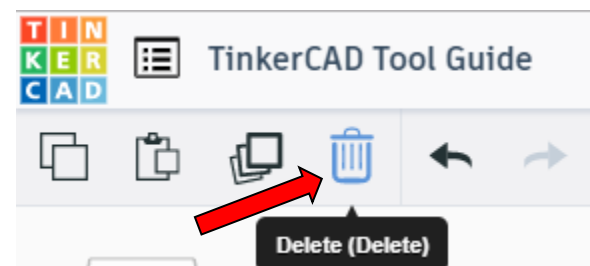
Duplicate:

Similar to copy, but can't copy to other designs.
Select shape.
Click duplicate or use ctrl + d
It will appear as if nothing happened, but if you move the shape you will see then duplicate underneath.



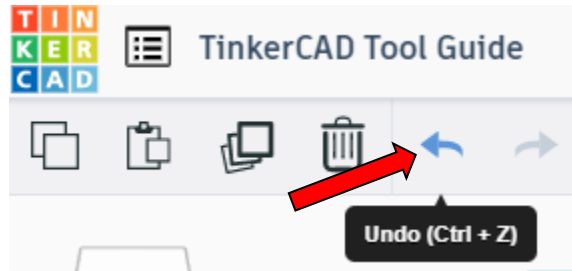
Delete:

Select shape.
Click delete or delete key.



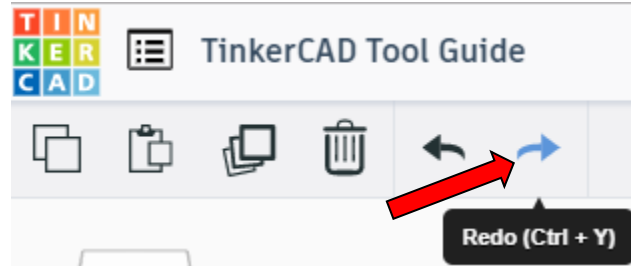
Undo:

Click undo or use ctrl + z
This will undo your last command.
This can be repeated.



Redo:

Click redo or use ctrl + y
This will redo your last undo command,
can only be used after using the
undo command.



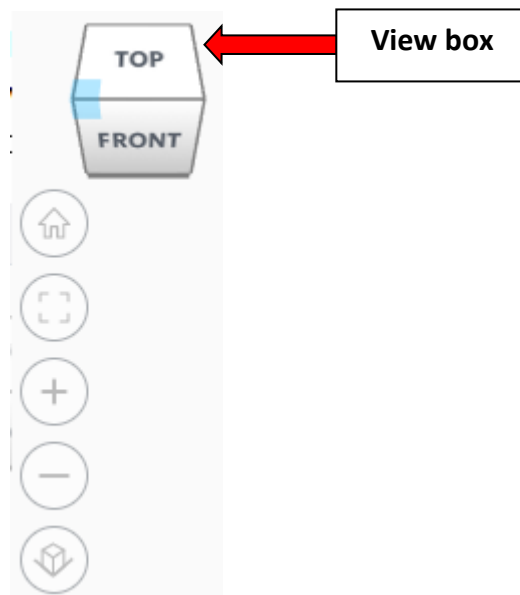
Change View:

To change view with mouse:

Right click and hold anywhere in work area. While holding right mouse button move mouse.
This will change the view of the work area.

To change view with icons:

Left click on view box.
Where you click determines
the view shown.

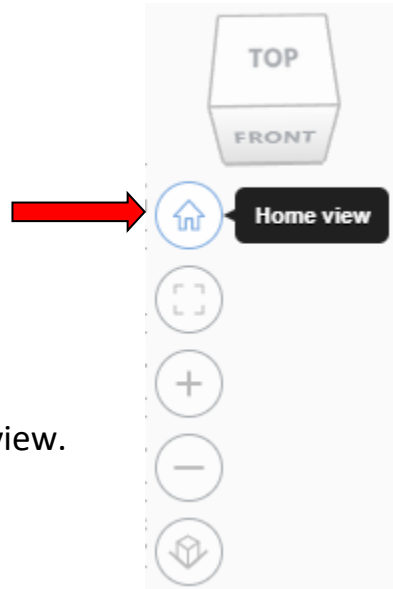


Change view to home view:

Most TinkerCAD Tutorials only work while in home view.

Click on home view icon to go to the home view.

You can also use the view box between the top and front view to change to the home view.



Fit all in view:

If you lose an object off the screen, you can click on Fit all in view to un-zoom to see all objects.

Fit one or more object(s) in view:

If you want to only see one or more object(s) in the view then select the object(s) and click Fit all in view or click the "f" key. This will zoom in on the object(s).



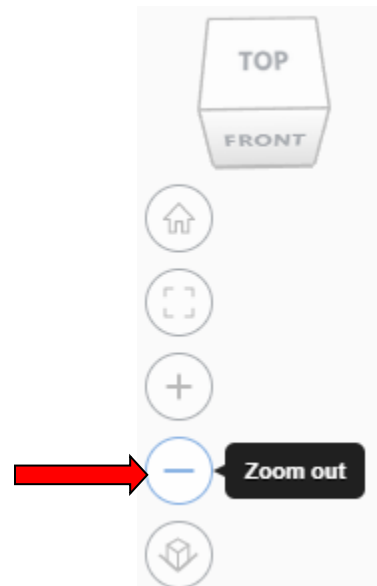
Zoom in:

Click the Zoom in icon or click the "+" key to zoom in.



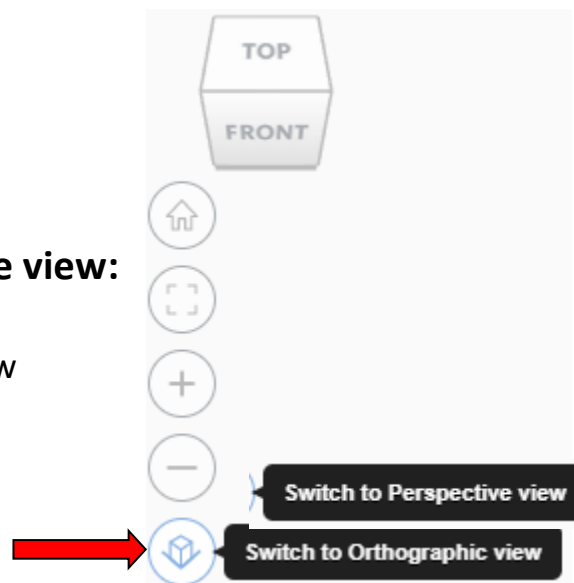
Zoom out:

Click the Zoom out icon or click the “-” key to zoom out.



Switching to orthographic and perspective view:

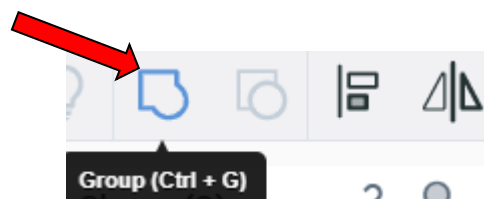
Click the Switch to orthographic/perspective view
To change to your preferred view.



Group:

To combine two or more objects into one object.

Select the objects to combine and click the
Group button or click ctrl + G



Ungroup:

After group objects, this will ungroup the object
back to separate objects.

Select the objects to ungroup and click the
ungroup button or click ctrl + shift + G



Align:

To perfectly center objects to each other or
To line up objects along their edges then use align.

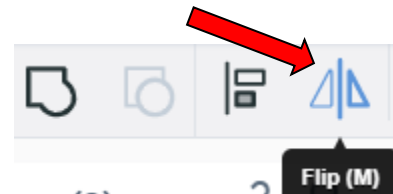
Select the objects to align and click the
align button or click "L"



Flip (Mirror):

This is mainly used for symmetric builds,
you create one half, duplicate it, then flip it
and move it in place and group it.

Select the objects to flip and click the
flip button or click "M"



Full list of Keyboard Shortcuts

MOVING OBJECT(S)

(Using keyboard)

| | |
|--------------------------|-----------------------|
| Move along X/Y axis | ← / ↑ / ↓ / → |
| Move along Z axis | Ctrl + ↓ / ↑ |
| ×10 Nudge along X/Y axis | Shift + ← / ↑ / ↓ / → |
| ×10 Nudge along Z axis | Ctrl + Shift + ↓ / ↑ |

KEYBOARD + MOUSE SHORTCUTS

(Press and hold the keys, then click and drag the mouse)

| | |
|------------------------------------|------------------------------|
| Duplicate dragged object(s) | Alt + Drag left mouse button |
| Select multiple object(s) | Shift + Left mouse button |
| 45° rotation | Shift (Hold while rotating) |
| Scale in one direction | Alt + Hold side handle |
| Scale in two directions | Alt + Hold corner handle |
| Uniform scale | Shift + Hold corner handle |
| Uniform scale in all directions | Alt + Shift + Corner handle |
| Uniform scale in all directions | Alt + Shift + Top handle |

VIEWING DESIGNS

(With the help of a mouse or a mouse pad)

| | |
|----------------------------------|----------------------------|
| Orbit the view | Right mouse button |
| Orbit the view | Ctrl + Left mouse button |
| Pan the view | Shift + Right mouse button |
| Pan the view | Ctrl + Shift + left button |
| Zoom the view in or out | Mouse scroll wheel |
| Zoom-in | + |
| Zoom-out | - |
| Fit selected object(s) into view | F |

OBJECT SETTINGS

| | |
|--|------------------|
| Transparency toggle | T |
| Turn object(s) into Holes | H |
| Turn object(s) into Solids | S |
| Lock or Unlock object(s) | Ctrl + L |
| Hide object(s) | Ctrl + H |
| Show all hidden object(s) | Ctrl + Shift + H |

TOOLS AND COMMANDS

| | |
|--------------------------------------|-------------------------------------|
| Copy object(s) | Ctrl + C |
| Paste object(s) | Ctrl + V |
| Duplicate object(s) in place. | Ctrl + D |
| Delete object(s) | Del |
| Undo action(s) | Ctrl + Z |
| Redo action(s) | Ctrl + Y |
| Redo action(s) | Ctrl + Shift + Z |
| Group object(s) | Ctrl + G |
| Un-group object(s) | Ctrl + Shift + G |
| Align object(s) | L |
| Flip/Mirror object(s) | M |
| Select all object(s) | Ctrl + A |
| Place a Ruler | R (Shift toggle midpoint/center) |
| Place a Workplane | W (press Shift to flip direction) |
| Drop object(s) to workplane | D |