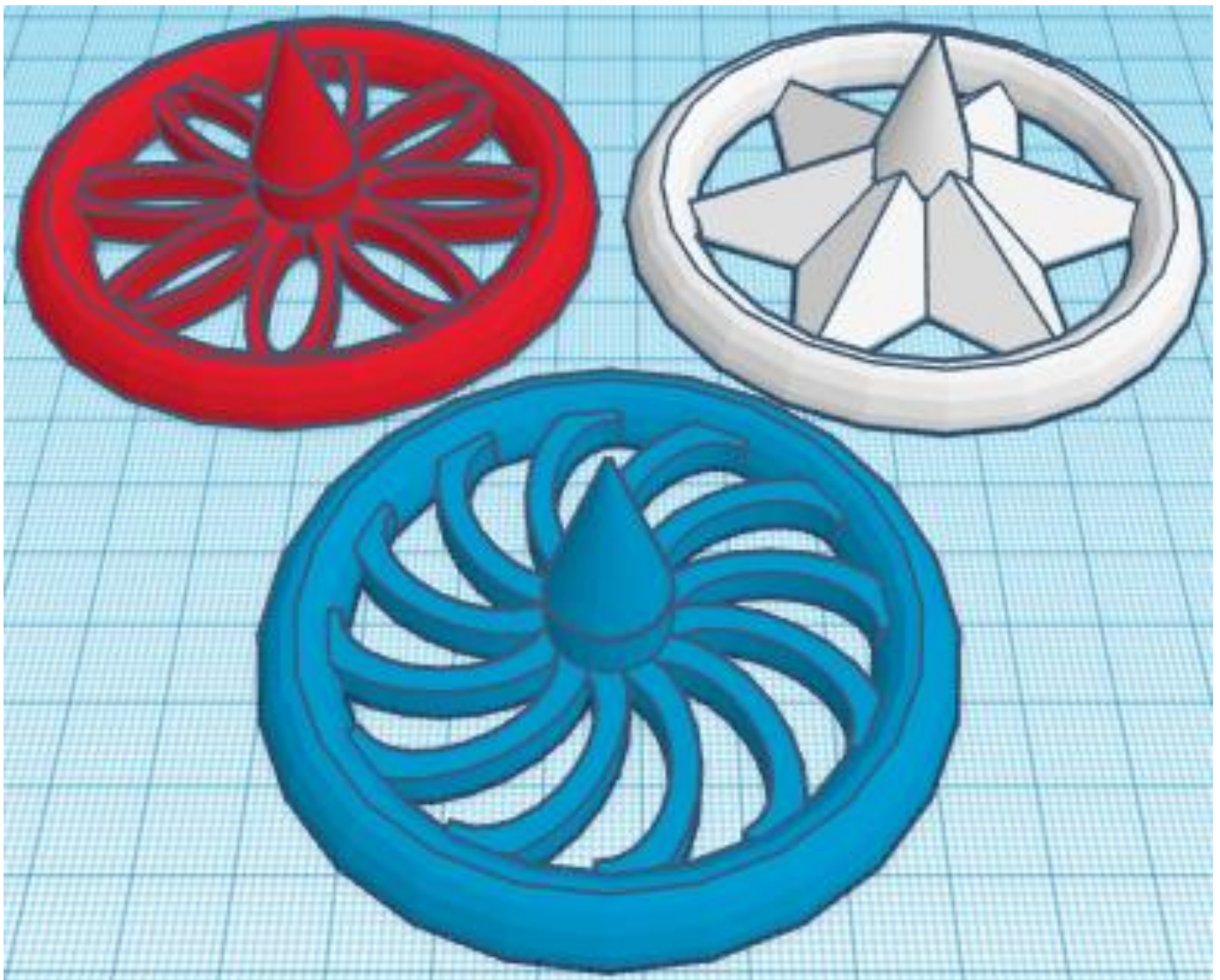




# Spinning Top Project



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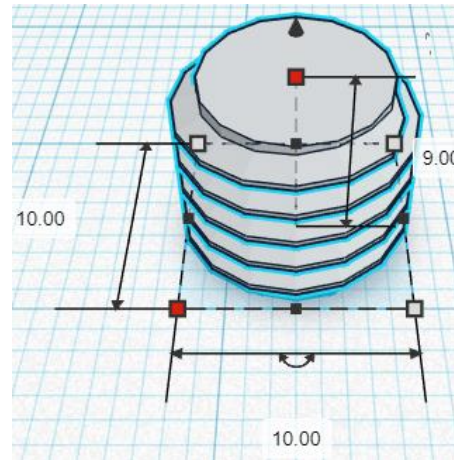
# Spinning Top:

## Base:

Bring in a ISO Metric Thread, located in Featured, (things in Featured move each time that TinkerCad adds items to Featured), this was last seen on page 1, on the right 3 shapes down.

From now on this will be called the **Handle Thread**

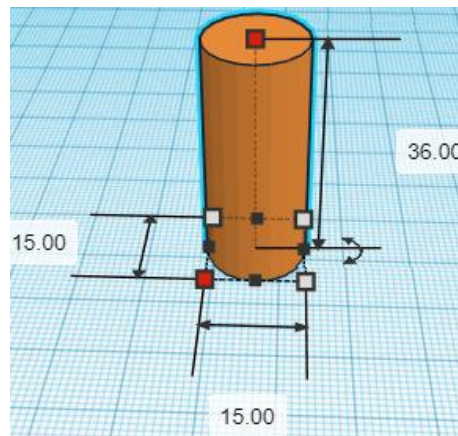
Change the dimensions to  
10mm X direction,  
10mm Y direction, and  
9mm Z direction.



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

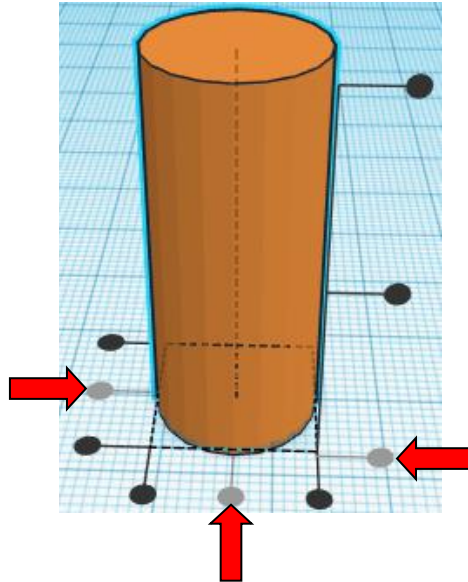
From now on this will be called the **Handle**.

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



**Align Thread Handle and Handle**

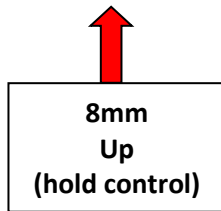
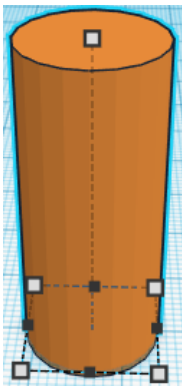
centered in X direction,  
centered in Y direction, and  
bottom in Z direction.



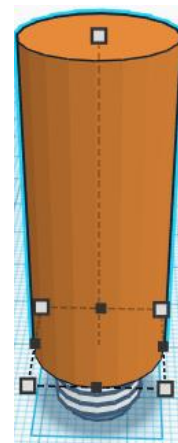
**Move Handle** (Must be in home view for this to work!)  
move up in positive Z direction 8mm

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

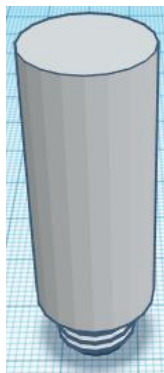
Before



After



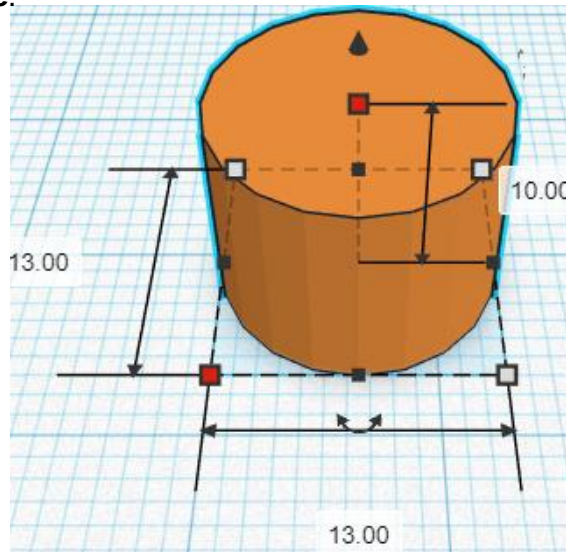
**Group Thread Handle and Handle**  
From now on this will be called the **Handle**



**Tip:**

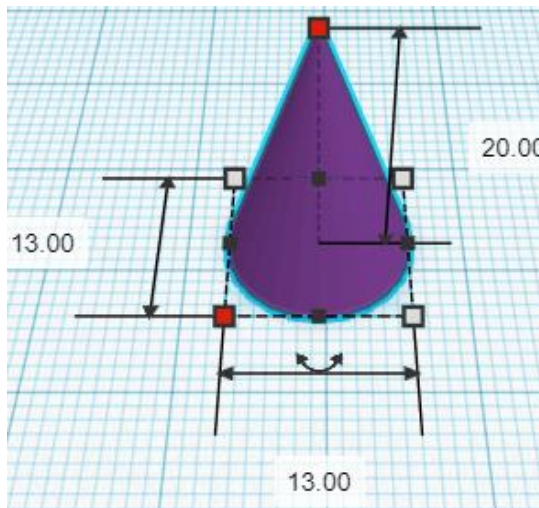
Bring in a Cylinder, located in Basic Shapes on the right 2 shapes down.  
From now on this will be called the **Tip Base**.

Change the dimensions to  
13mm X direction,  
13mm Y direction, and  
10mm Z direction.



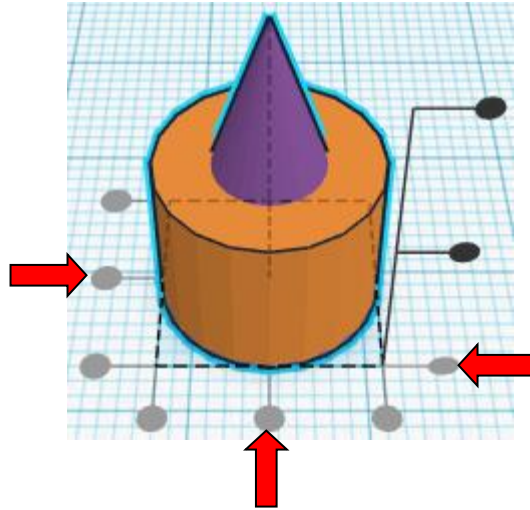
Bring in a Cone, located in Basic Shapes on the right 4 shapes down.  
From now on this will be called the **Tip**.

Change the dimensions to  
13mm X direction,  
13mm Y direction, and  
20mm Z direction.



**Align Tip Base and Tip**

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



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

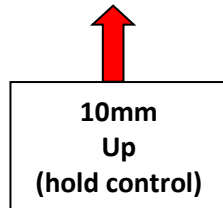
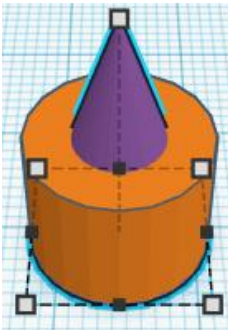
move up in positive Z direction 10mm

**Hint:** Select Tip and hold control and push up arrow key 10 times.

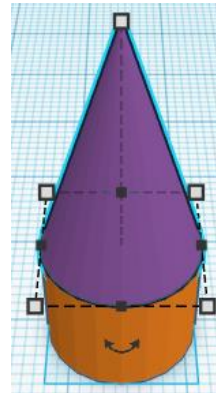
Or

Select Tip and hold control and hold shift and push up arrow key 1 time.

Before

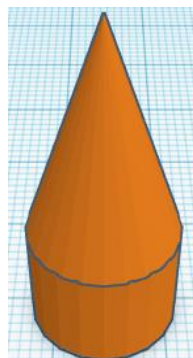


After



**Group Tip Base and Tip**

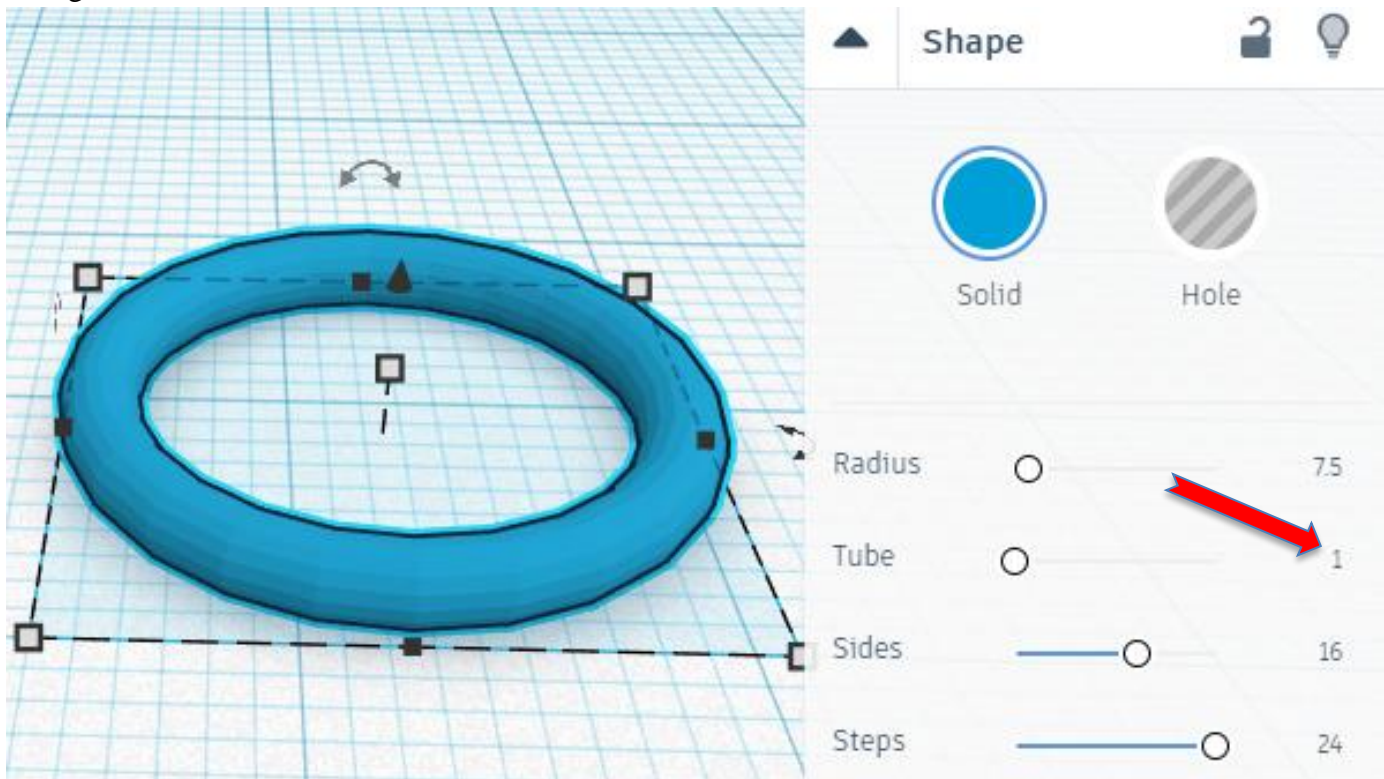
From now on this will be called the **Tip**



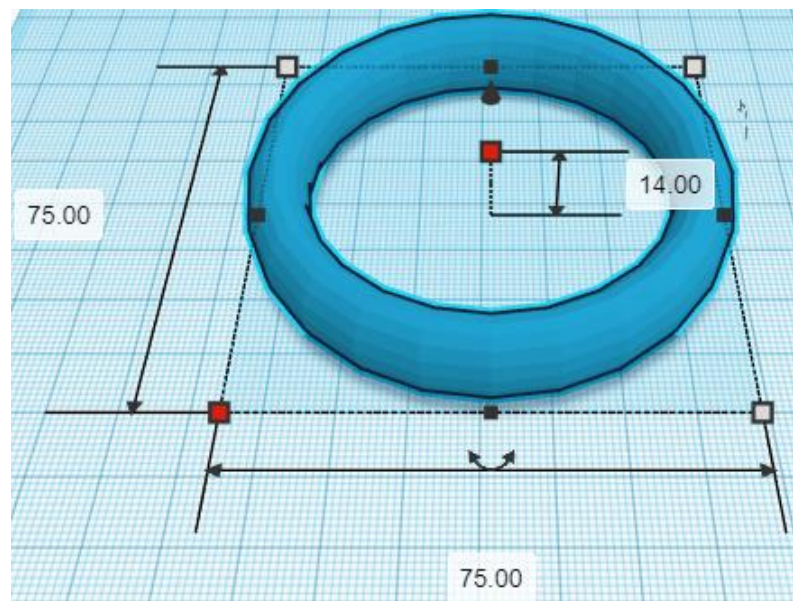
## Ring:

Bring in a Torus, located in Basic Shapes on the right 8 shapes down.  
From now on this will be called the **Ring**.

Change Tube to 1.

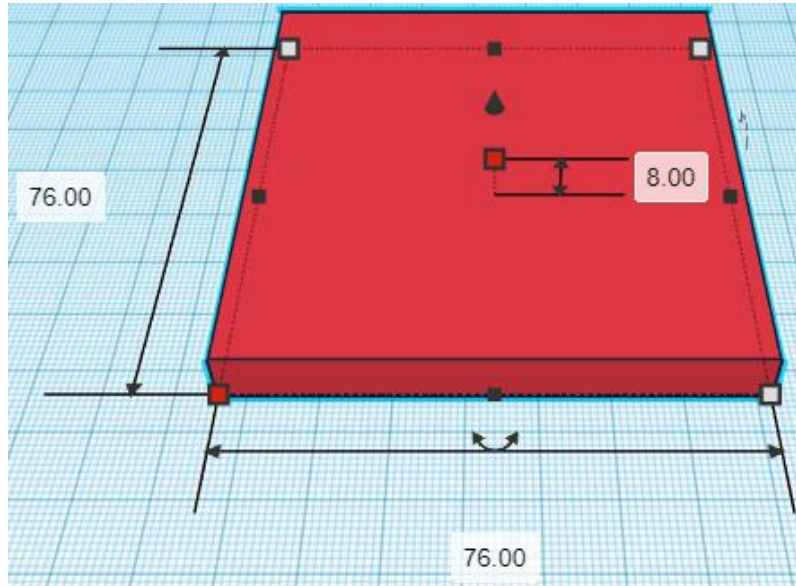


Change the dimensions to  
75mm X direction,  
75mm Y direction, and  
14mm Z direction.

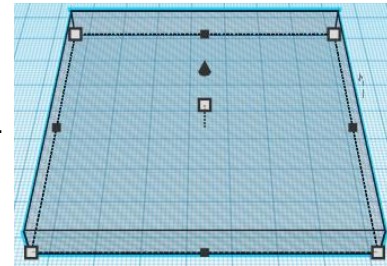


Bring in a Box, located in Basic Shapes on the left 2 shapes down.  
From now on this will be called the **Ring Cutout**.

Change the dimensions to  
76mm X direction,  
76mm Y direction, and  
8mm Z direction.

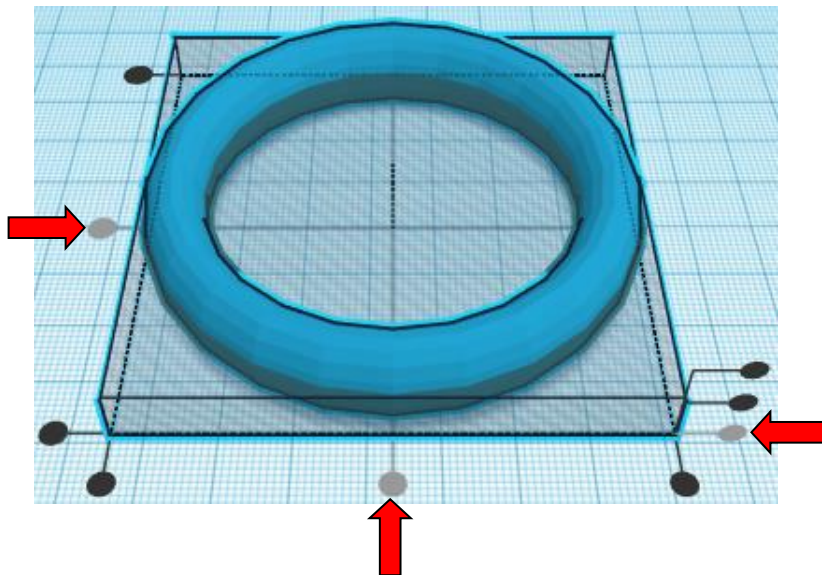


**Change** Ring Cutout to **Hole** by selecting Ring Cutout and typing "h".



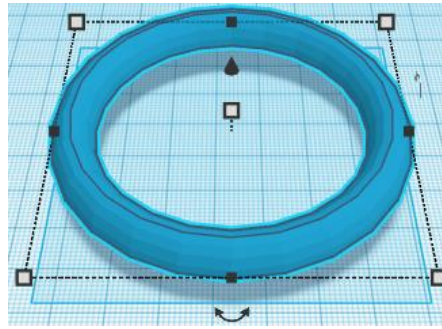
**Align** Ring and Ring Cutout

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





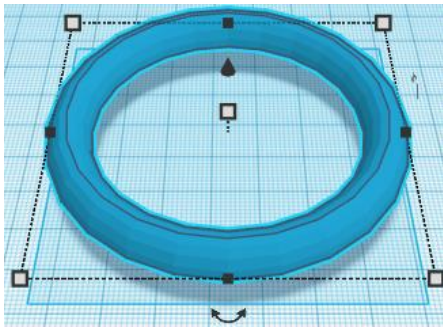
**Group Ring and Ring Cutout**  
From now on this will be called the **Ring**



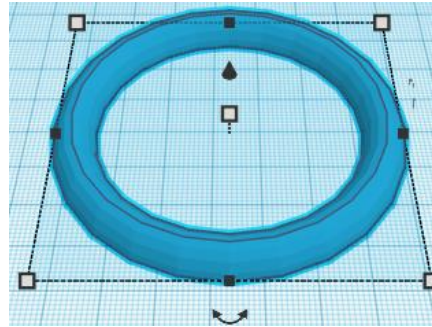
**Set on Workplane:**

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

Before

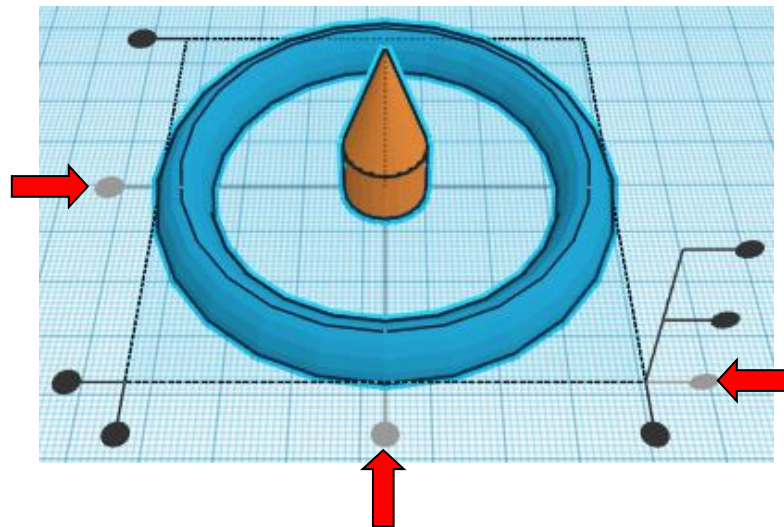


After

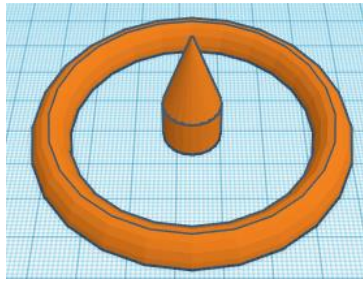


**Align Ring and Tip**

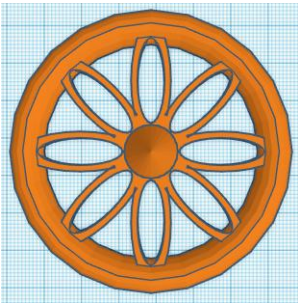
centered in X direction,  
centered of Y direction, and  
bottom of Z direction.



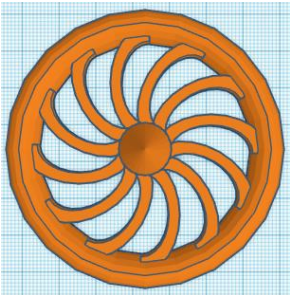
**Group Ring and Tip**  
From now on this will be called the **Ring**



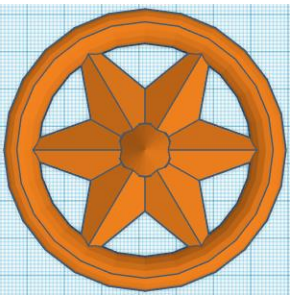
**This is the part where you get to pick your design that you want on your top!**



**Flower:** go to page 11



**Swirl:** go to page 14



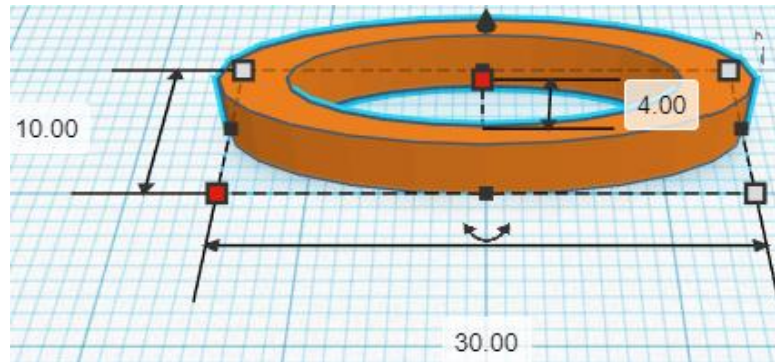
**Star:** go to page 18

**Create your own:** then go to page 20

## Flower:

Bring in a Tube, located in Basic Shapes on the left 9 shapes down.  
From now on this will be called the **Flower**.

Change the dimensions to  
30mm X direction,  
10mm Y direction, and  
4mm Z direction.



**Duplicate** Flower 1 time

From now on this will be called the **Right Flower**

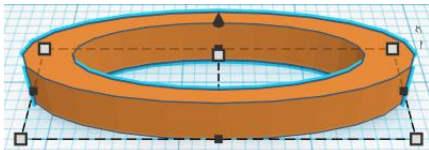
**Move** Right Flower (Must be in home view for this to work!)  
move right in positive X direction 37mm

**Hint:** Select Right Flower and push right arrow key 37 times.

Or

Select Right Flower and hold shift and push right arrow key 3 times. Then release shift and push right arrow 7 more times.

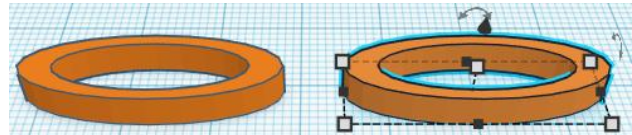
Before



37mm  
Right

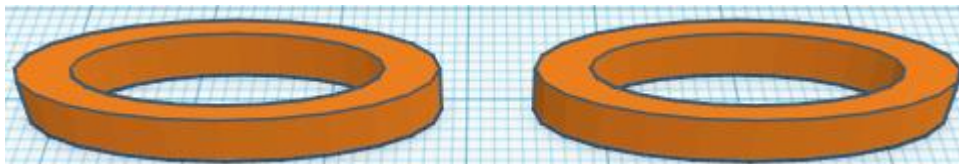


After



**Group** Left Flower and Right Flower

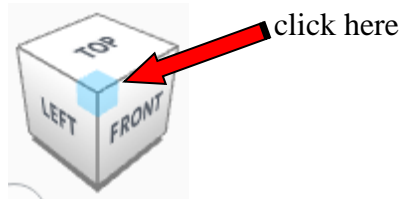
From now on this will be called the **Flower**



**Duplicate** Flower 1 time

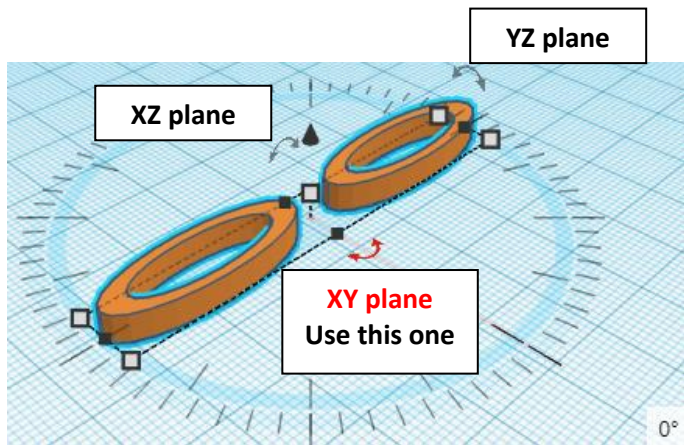
From now on this will be called the **Rotated Flower**

Go to TOP LEFT FRONT view for rotations

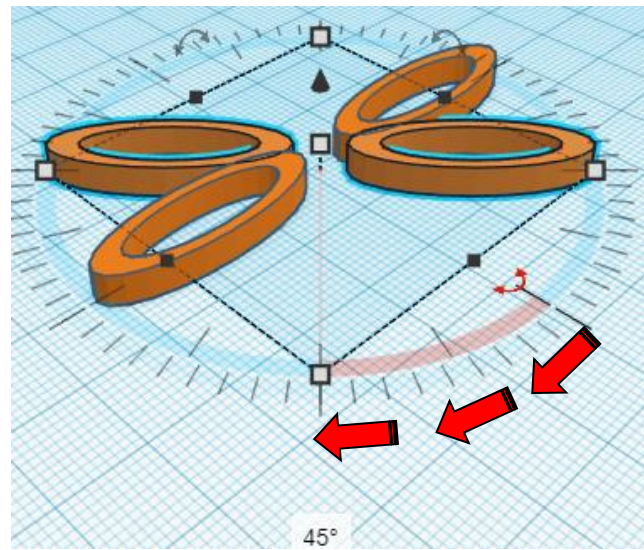


**Rotate** the Rotated Flower clockwise 45 degrees in XY plane.

Before

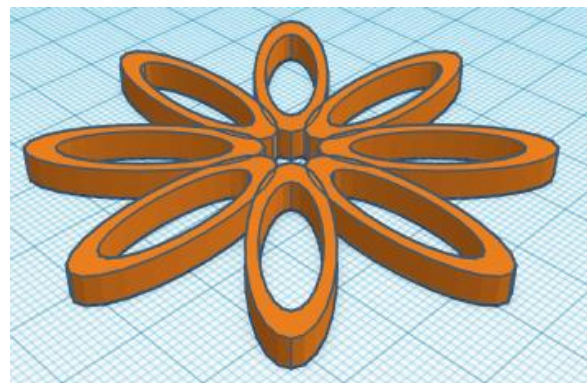


After



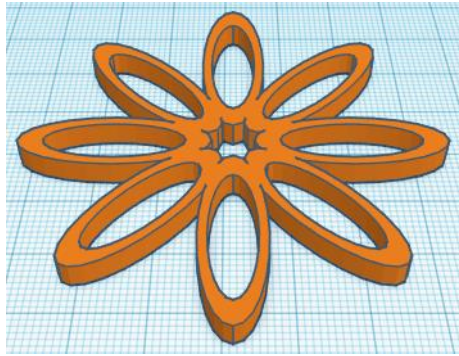
**Immediately push ctrl-d 2 times** to repeat this process twice.

(If you don't immediately push ctrl-d, then do the duplicate and rotate the Rotated Flower again, 2 more times.)



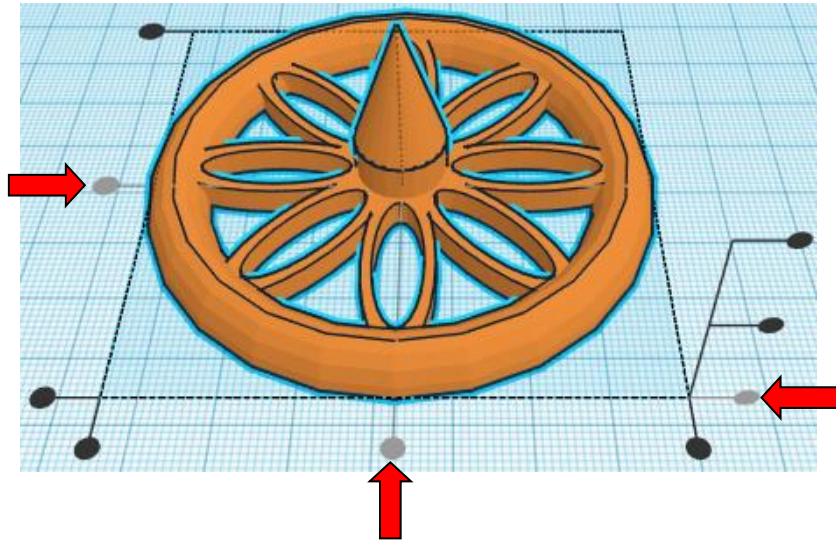
**Group Flower and Rotated Flowers**

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



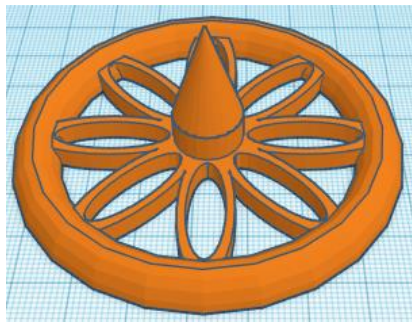
**Align Ring and Flower**

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



**Group Ring and Flower**

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

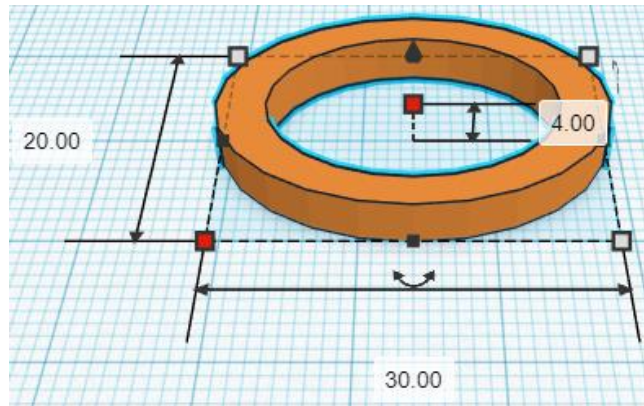


**Go to page 20 to finish.**

## Swirl:

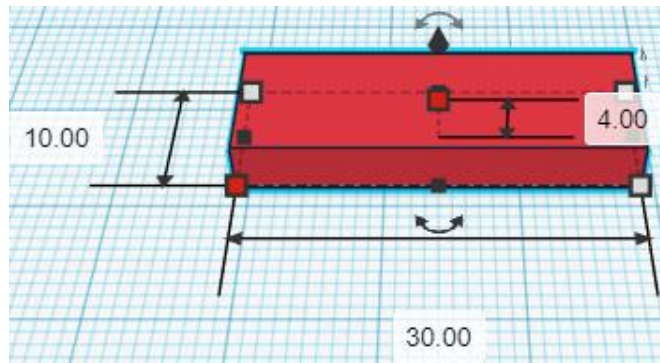
Bring in a Tube, located in Basic Shapes on the left 9 shapes down.  
From now on this will be called the **Swirl**.

Change the dimensions to  
30mm X direction,  
20mm Y direction, and  
4mm Z direction.

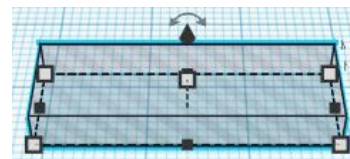


Bring in a Box, located in Basic Shapes on the left 2 shapes down.  
From now on this will be called the **Swirl Cutout**.

Change the dimensions to  
30mm X direction,  
10mm Y direction, and  
4mm Z direction.

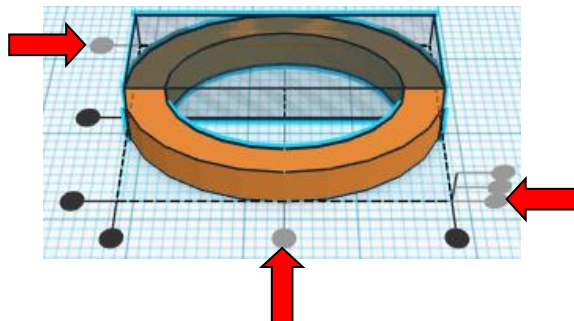


Change Swirl Cutout to **Hole** by selecting Swirl Cutout and typing "h".

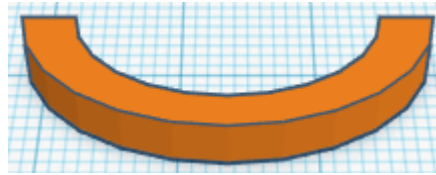


## Align Swirl and Swirl Cutout

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



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

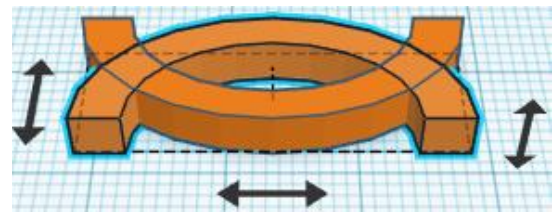
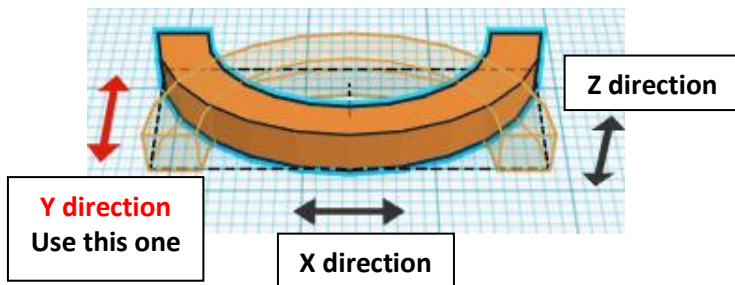


**Duplicate Swirl 1 time**  
From now on this will be called the **Right Swirl**

**Flip Right Swirl** in Y direction.

Before

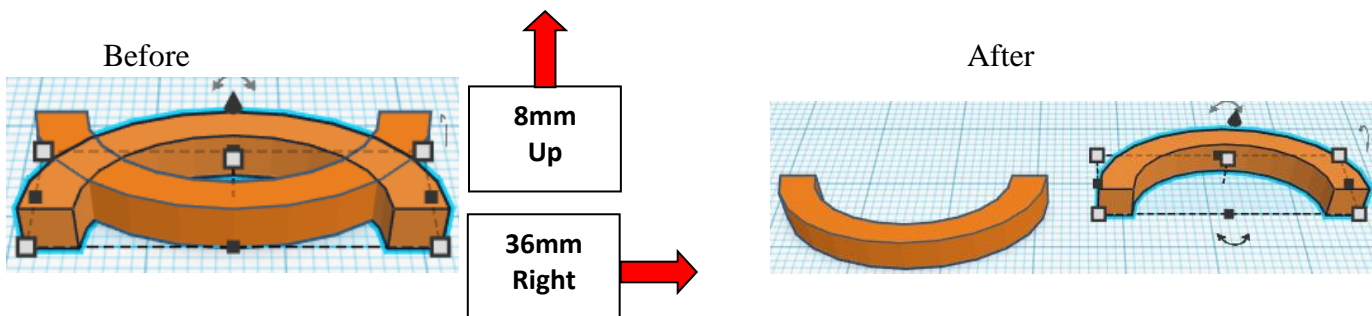
After



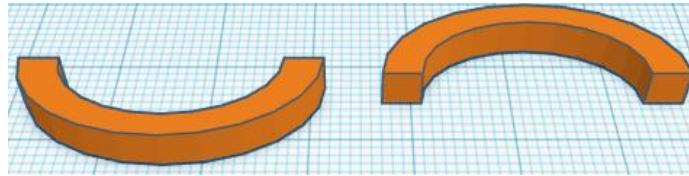
From now on this flipped shape will be called **Right Swirl**

**Move Right Swirl** (Must be in home view for this to work!)  
move back in positive Y direction 8mm  
and  
move right in positive X direction 36mm

**Hint:** Select Right Swirl and push up arrow key 8 times.  
and  
Select Right Swirl and push right arrow key 36 times.  
or  
Select Right Swirl and hold shift and push right arrow key 3 times. Then release shift and push right arrow 6 more times.

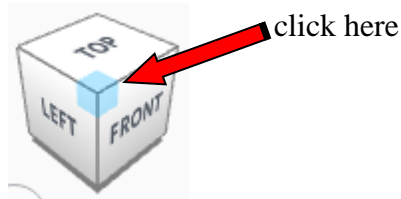


**Group Swirl and Right Swirl**  
From now on this will be called the **Swirl**



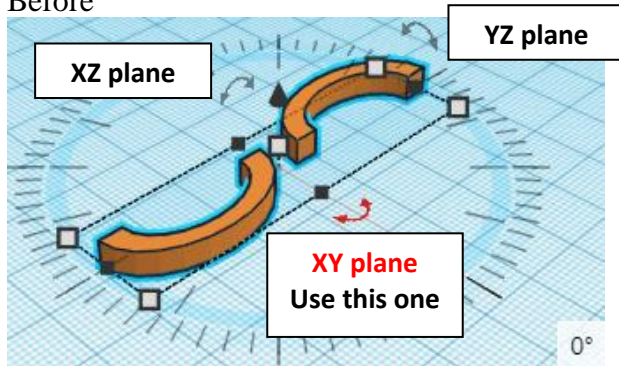
**Duplicate Swirl 1 time**  
From now on this will be called the **Rotated Swirl**

Go to TOP LEFT FRONT view for rotations

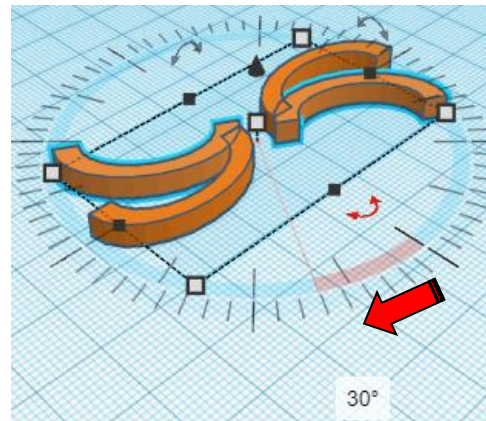


**Rotate the Rotated Swirl** clockwise 30 degrees in XY plane.

Before

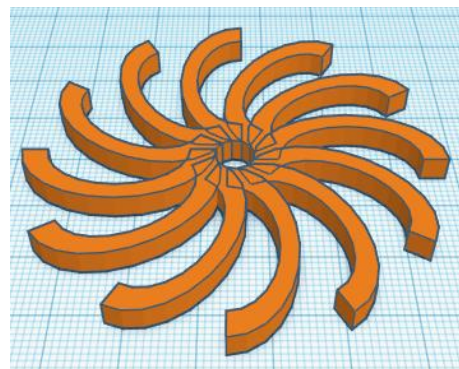


After



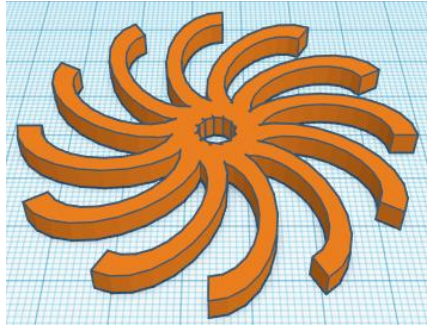
**Immediately push ctrl-d 4 times** to repeat this process twice.

(If you don't immediately push ctrl-d, then do the duplicate and rotate the Rotated Swirl again, 4 more times.)



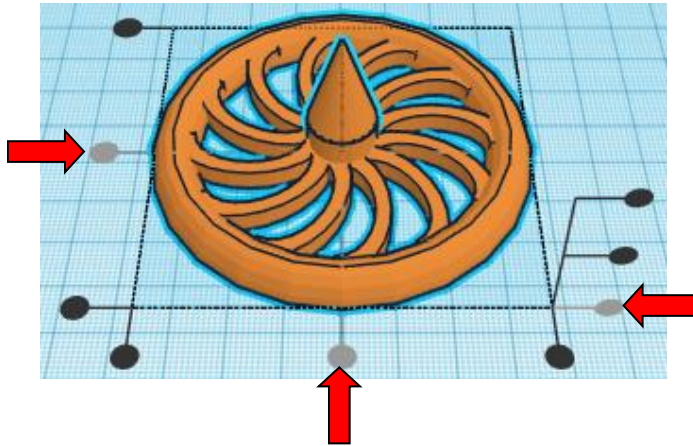


**Group Swirl** and **Rotated Swirls**  
From now on this will be called the **Swirl**

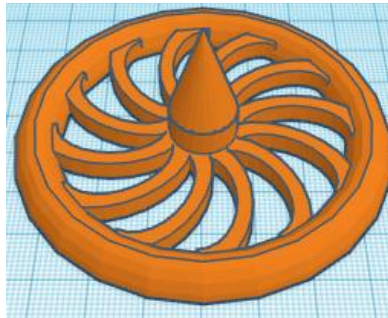


**Align Ring** and **Swirl**

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



**Group Ring** and **Swirl**  
From now on this will be called the **Ring**



**Go to page 20 to finish.**

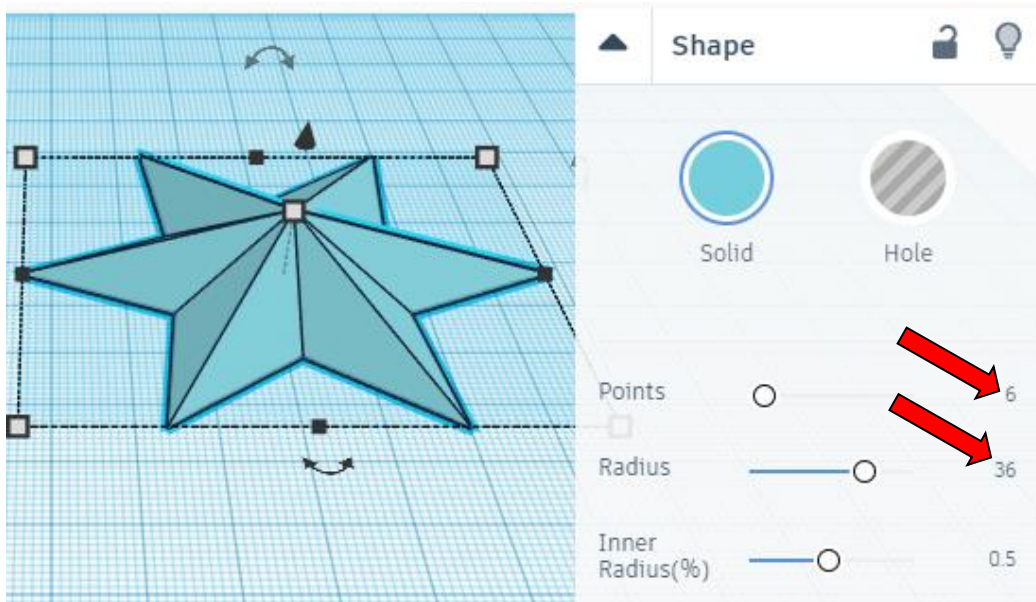
## Star:

Bring in a Star, located in Basic Shapes on the left 10 shapes down.  
(Be aware that there are two stars in Basic Shapes. Pick the light blue one on the left.)  
From now on this will be called the **Star**.

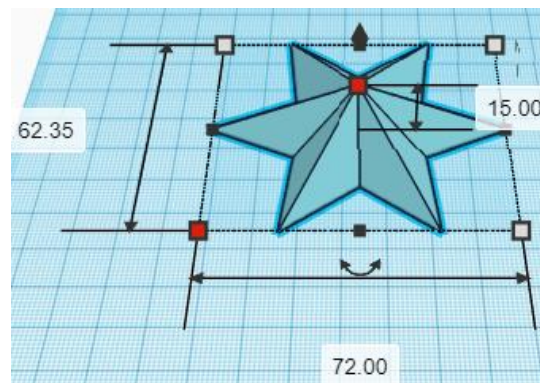
Change Points to 6.

And

Change Radius to 36.

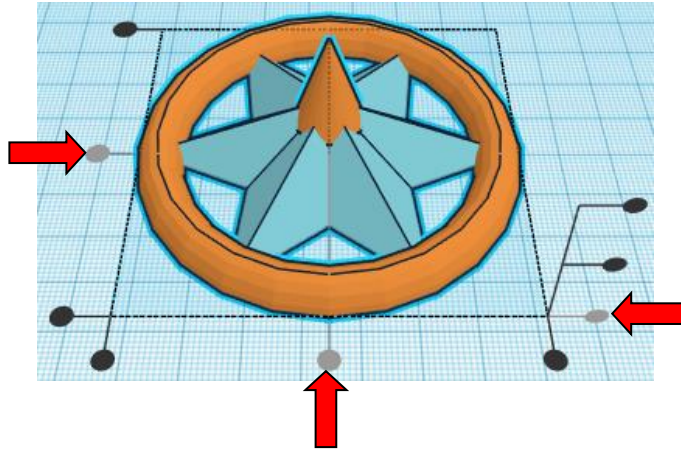


Change the dimensions to  
72mm X direction,  
62.35mm Y direction, and  
15mm Z direction.



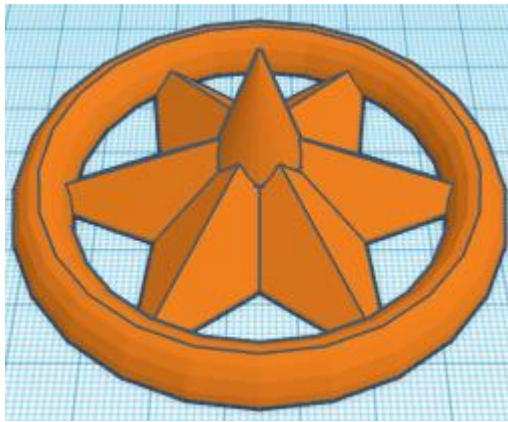
### **Align Star and Ring**

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



### **Group Star and Ring**

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



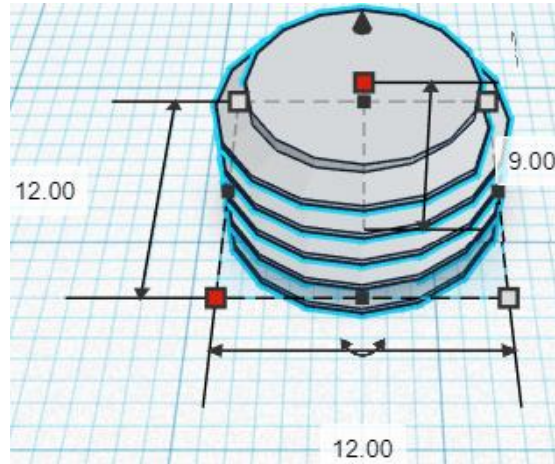
**Go to page 20 to finish.**

## Ring Thread:

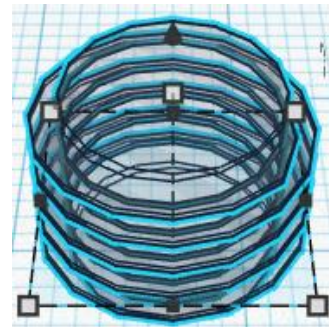
Bring in a ISO Metric Thread, located in Featured, (things in Featured move each time that TinkerCad adds items to Featured), this was last seen on page 1, on the right 3 shapes down.

From now on this will be called the **Ring Thread**

Change the dimensions to  
12mm X direction,  
12mm Y direction, and  
9mm Z direction.



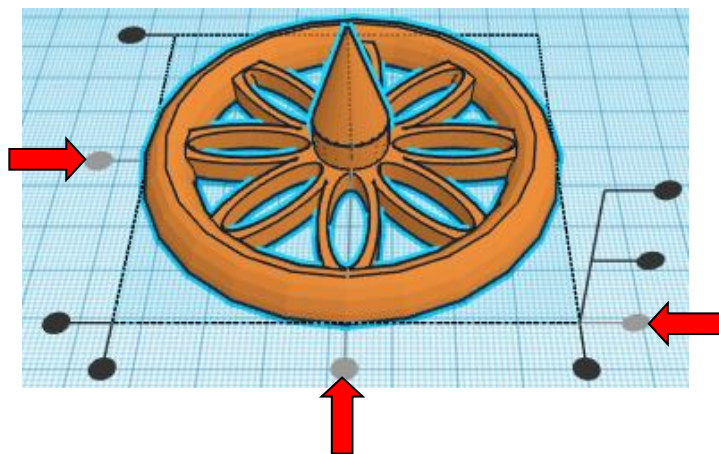
**Change** Ring Thread to **Hole** by selecting Ring Thread and typing “h”.



## **Align** Ring and Ring Thread

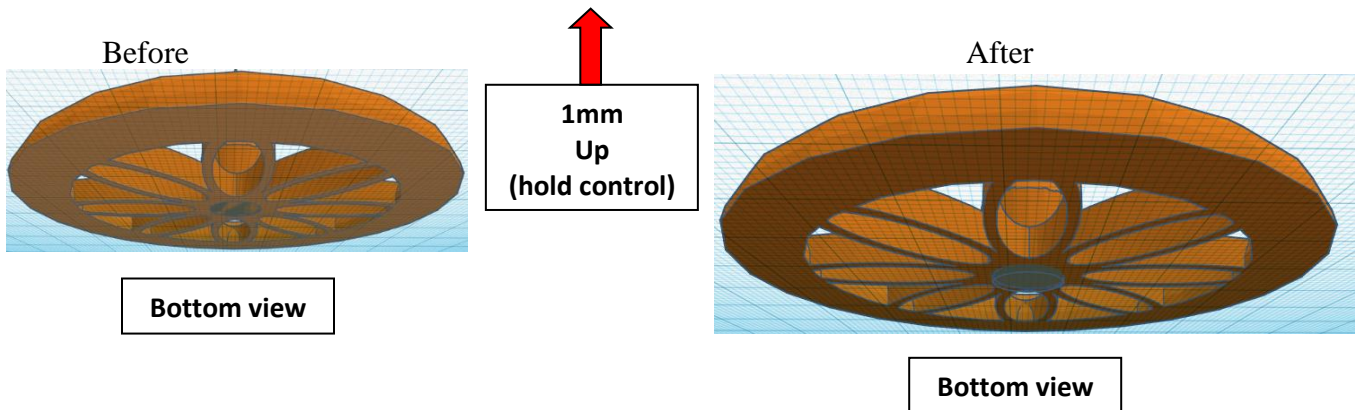
centered in X direction,  
back of Y direction, and  
bottom of Z direction.

(Be aware you ring may look  
different depending on the pattern  
you chose.)

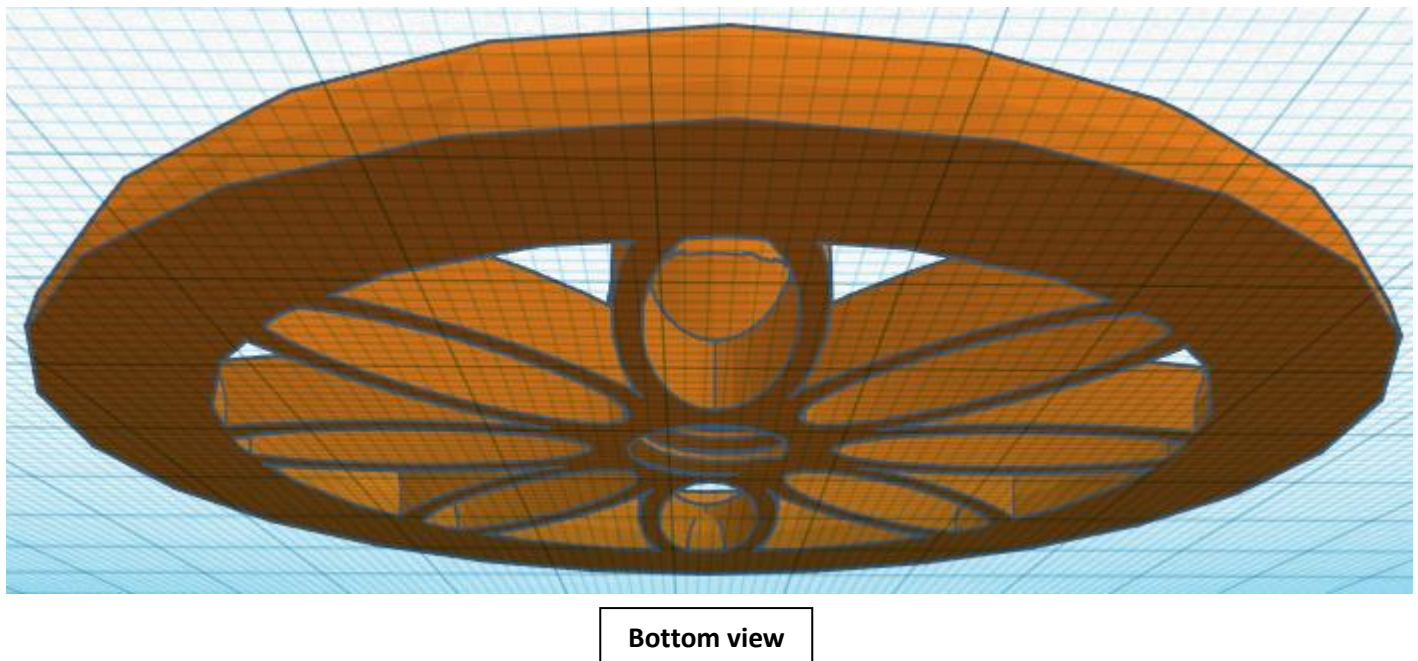


**Move Ring** (Must be in home view for this to work!)  
move up in positive Z direction 1mm

**Hint:** Select Ring and hold control and push up arrow key 1 times.



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



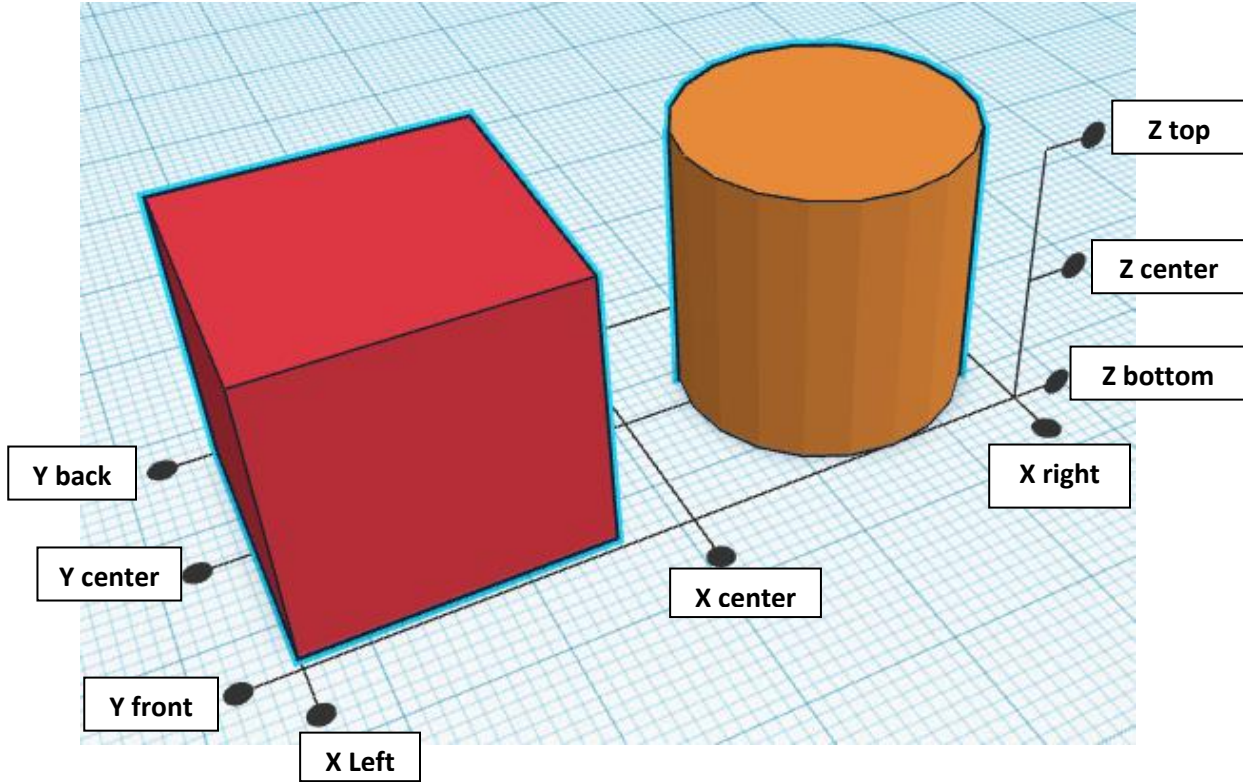
**You're done! Print, screw handle into ring.  
Give it a good spin and have fun!!**

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

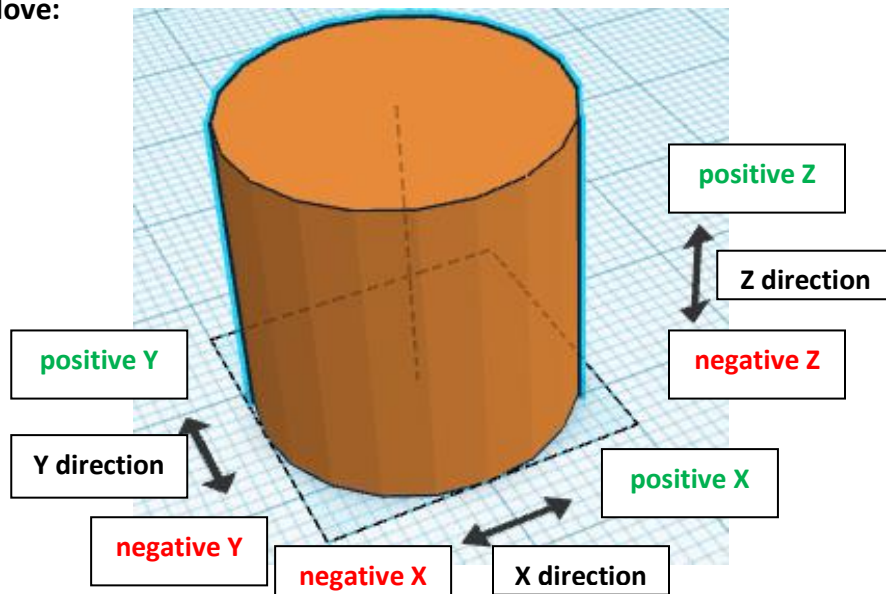
Always be in the "home view" when doing any of these!!!



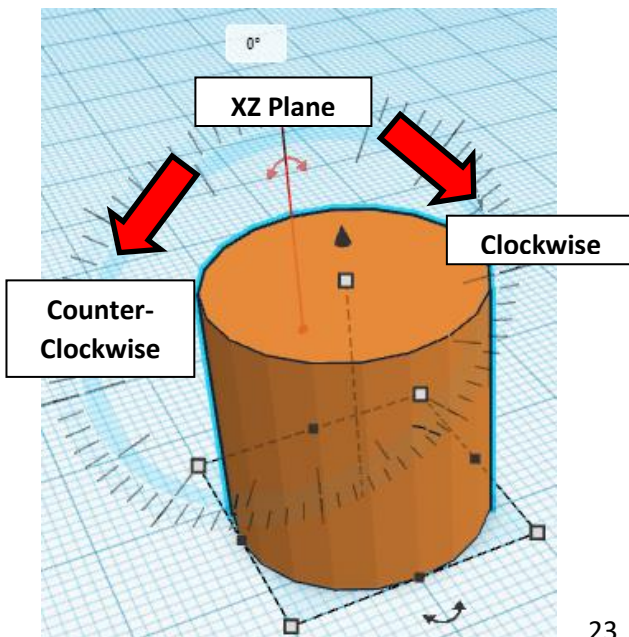
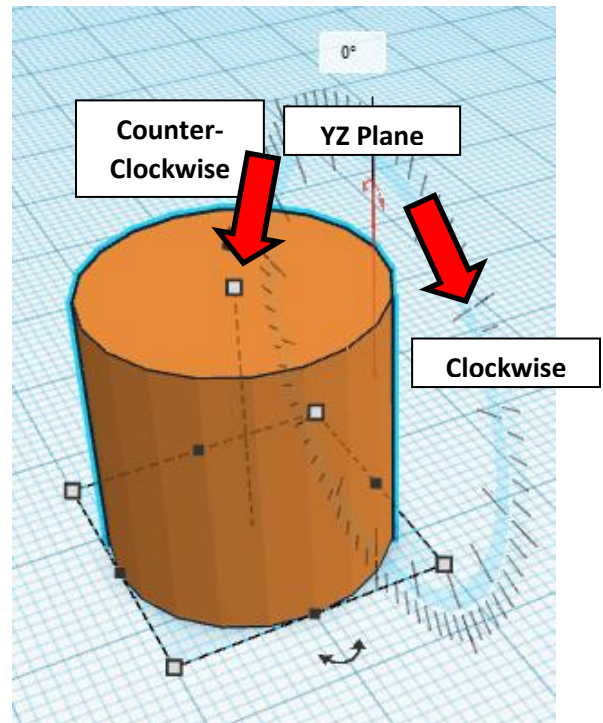
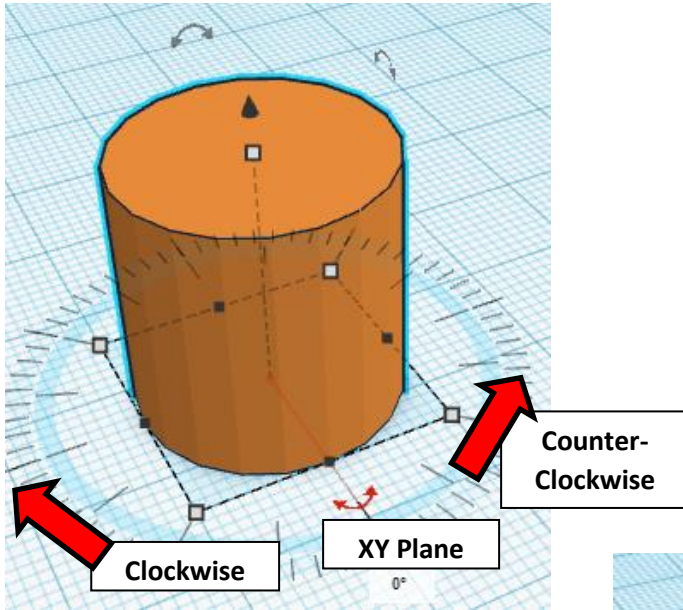
Aligning:



Flip or Mirror and Move:



Rotate:



# Tool Guide

## Most used Keyboard Shortcuts:

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

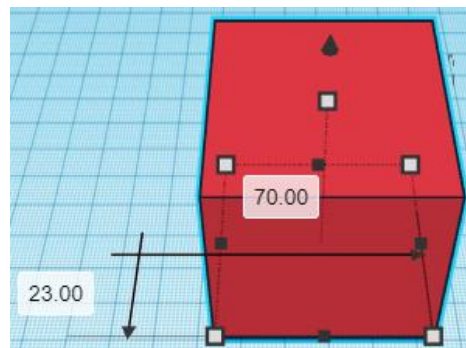
## Moving Object(s):

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.



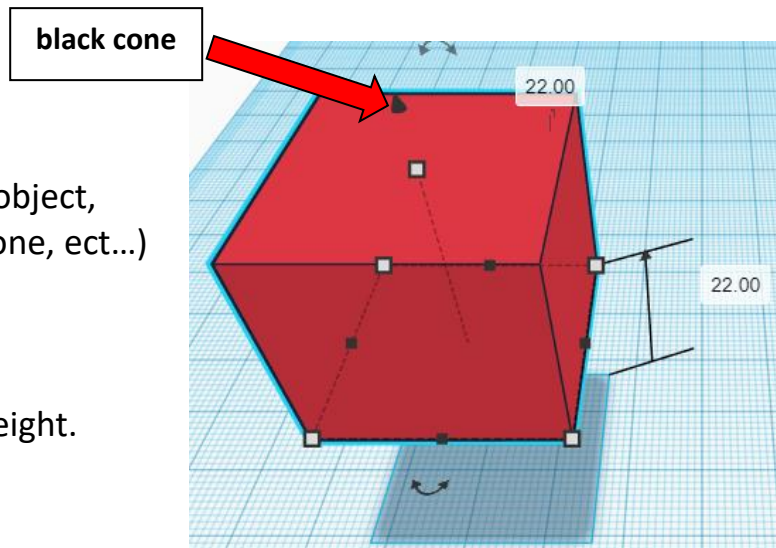


## Moving Object(s) continued:

### 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.

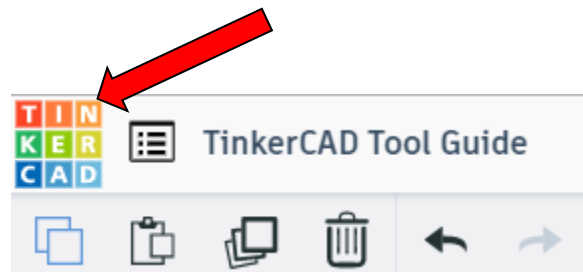


Hold control button and hold shift button  
and use up and down arrow keys to move the object in 10mm increments.

## Using on screen icons:

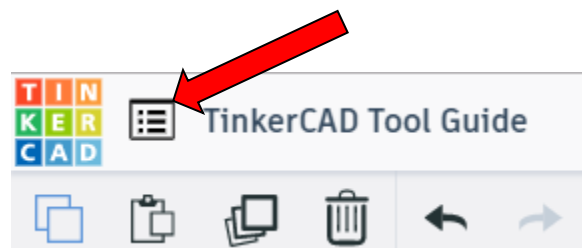
### TinkerCAD main screen:

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



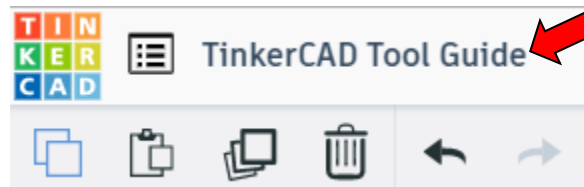
### My designs:

Pulls up menu of your designs.



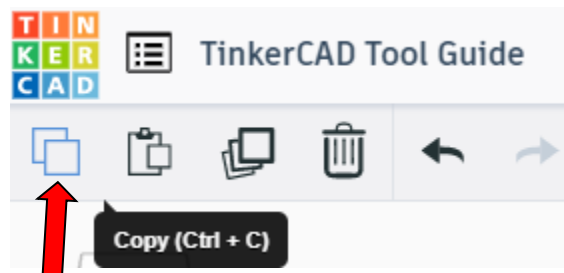
## Design name:

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



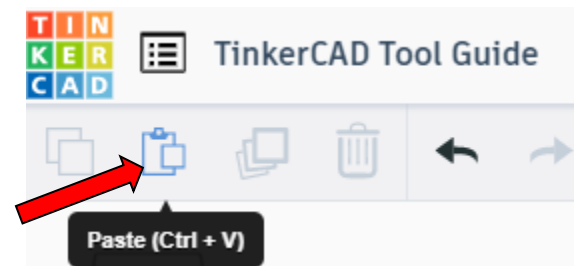
## Copy:

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



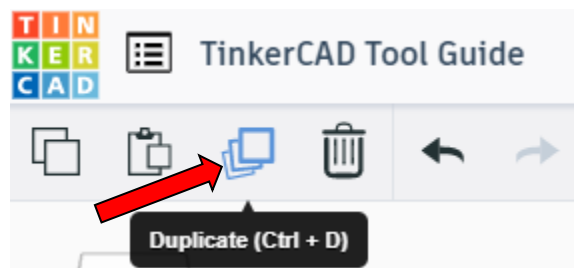
## Paste:

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



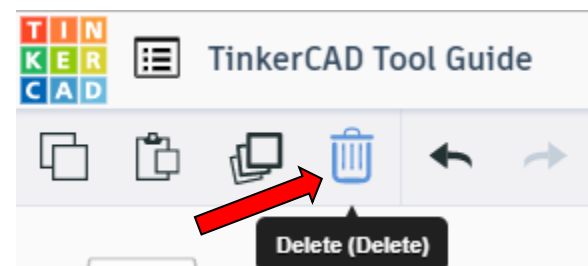
## Duplicate:

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.



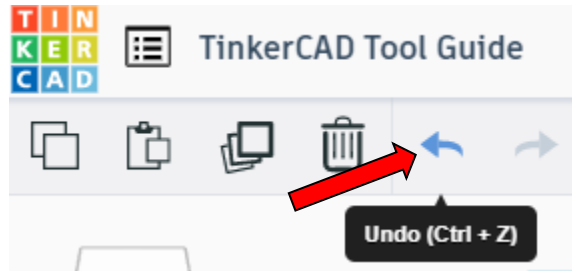
## Delete:

Select shape.  
Click delete or delete key.



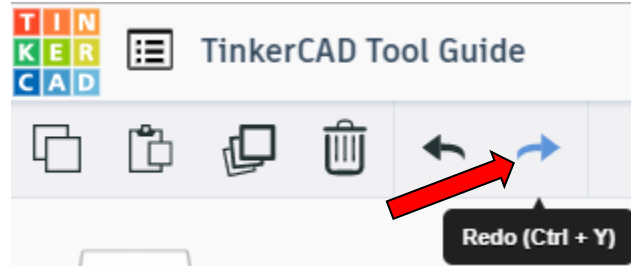
## Undo:

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.



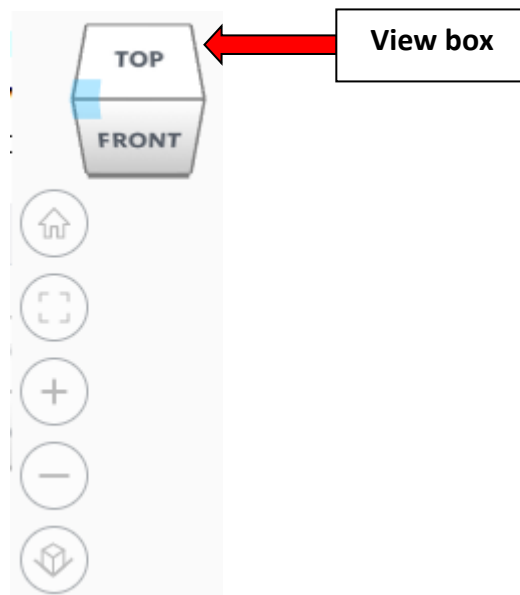
## Change View:

### 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.

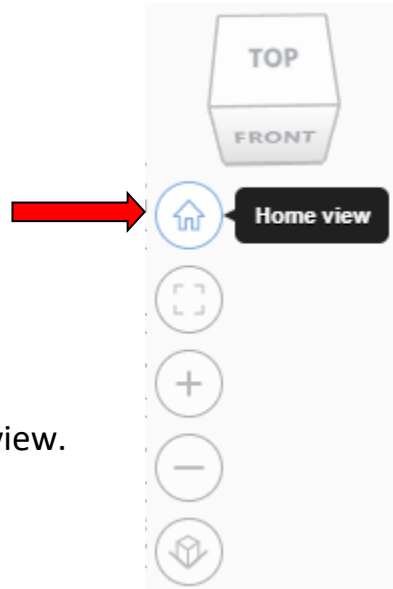


## Change view to home view:

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).



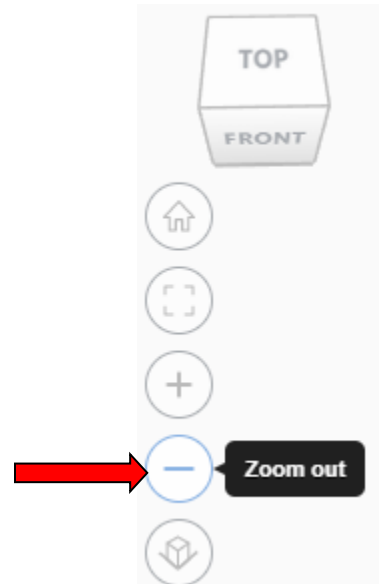
## Zoom in:

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



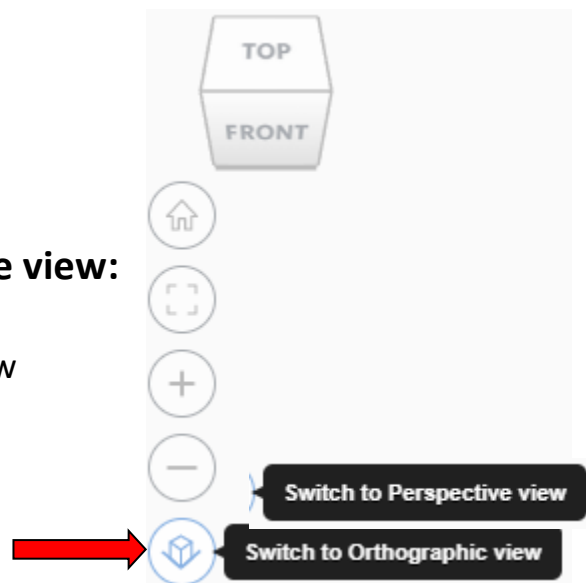
## Zoom out:

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



## Switching to orthographic and perspective view:

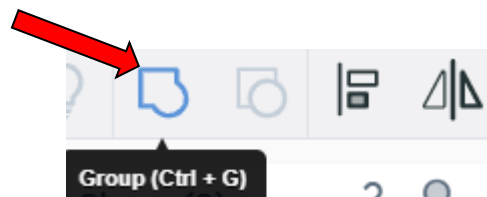
Click the Switch to orthographic/perspective view  
To change to your preferred view.



## 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.

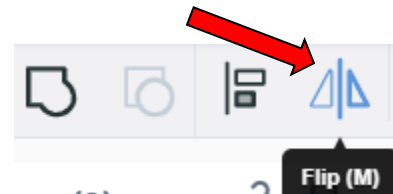
Select the objects to align and click the  
align button or click "L"



## 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)

<b>Duplicate</b> dragged object(s)	Alt + Drag left mouse button
<b>Select</b> 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

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

## TOOLS AND COMMANDS

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