TINKERCAD

Steam Punk Desk Pencil Holder
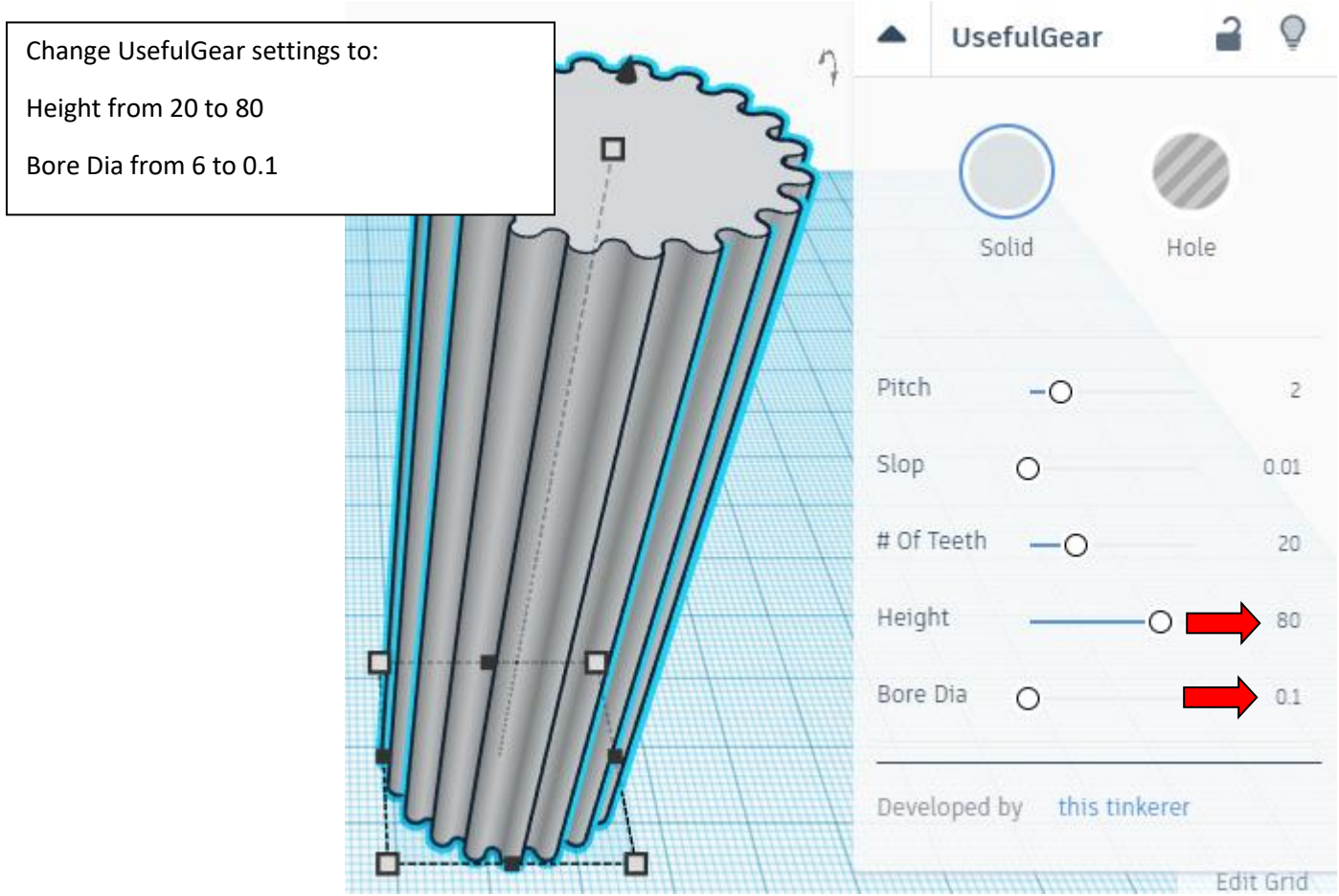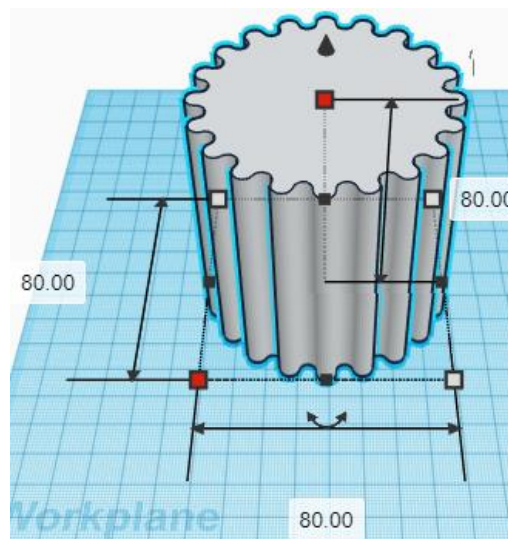
Contents:

Large Main Gears:

Large Gear:

Bring in a Useful gear, located in All, (things in All move each time that TinkerCad adds items to All), this was last seen on page 3, on the right second from bottom.
From now on this will be called the **Large Gear**

Change UsefulGear settings to:

Height from 20 to 80

Bore Dia from 6 to 0.1

	UsefulGear	
	Solid	Hole
Pitch	—O	2
Slop	O	0.01
# Of Teeth	—O	20
Height	————O ⟹	80
Bore Dia	O ⟹	0.1

Developed by   this tinkerer

Edit Grid

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

3

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

Change the dimensions to
16mm X direction,
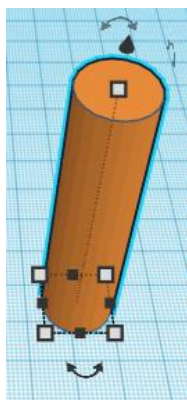16mm Y direction, and
70mm Z direction.
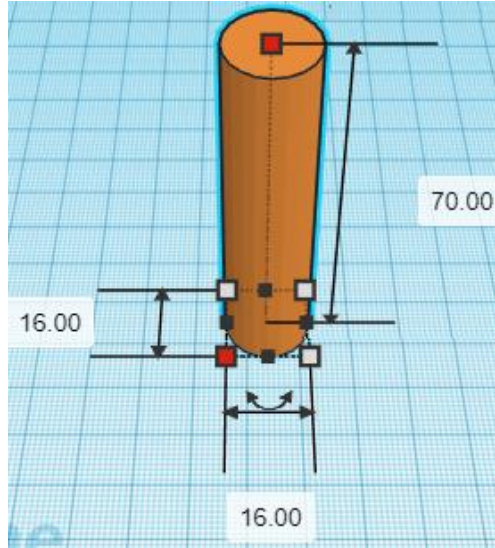
Duplicate Pencil Hole 1 time

Move Pencil Hole   (Must be in home view for this to work!)
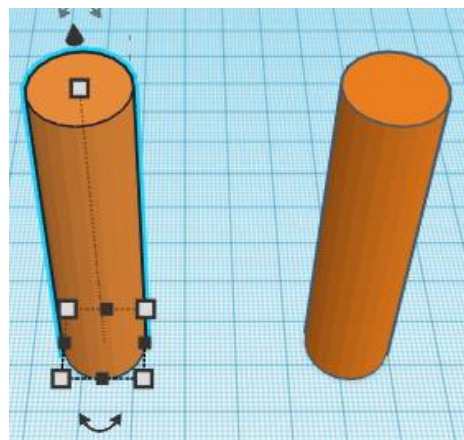move left in negative X direction 48mm

Hint: Select Pencil Hole and push left arrow key 48 times.
        or
        Select Pencil Hole and hold down shift and push left arrow key 4 times. Then release shift and push
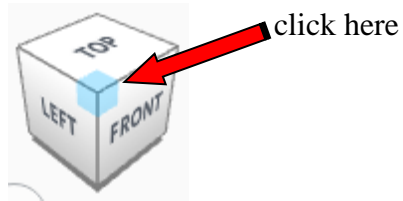   left arrow key 8 more times.

Before   After
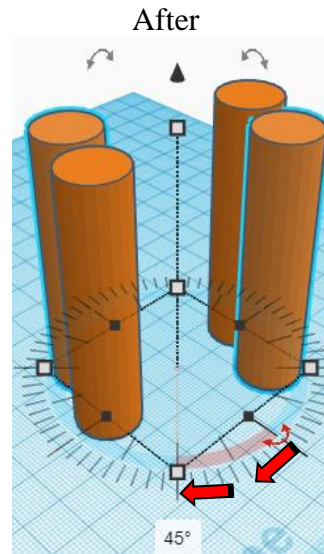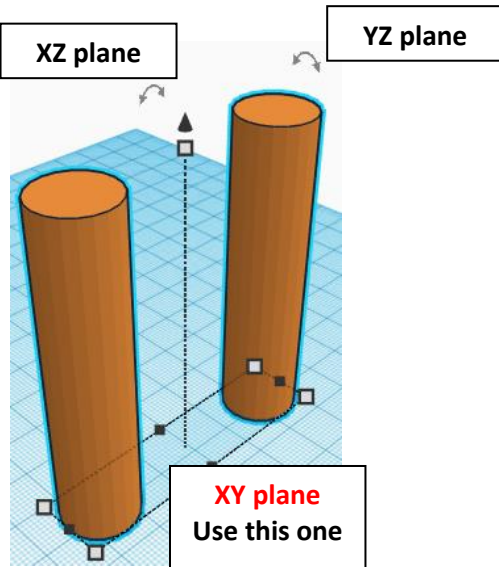

48mm

left

Group Left Pencil Hole and Right Pencil Hole
From now on this will be called the **Pencil Hole Set**

Duplicate Pencil Hole Set 1 time

Go to TOP LEFT FRONT view for rotations click here

Rotate the Pencil Hole Set clockwise 45 degrees in XY plane.

Before   After

XZ plane   YZ plane

XY plane
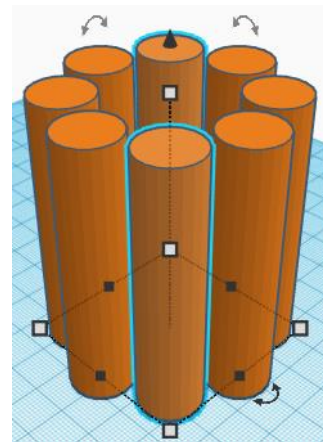**Use this one**

45°

Remember the Cool Trick Time:

immediately

Duplicate Pencil Hole Set 2 more times

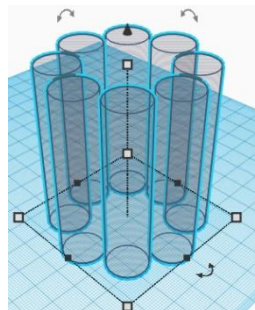This will duplicate and rotate the holes all at the same time.

Group all Pencil Hole Sets
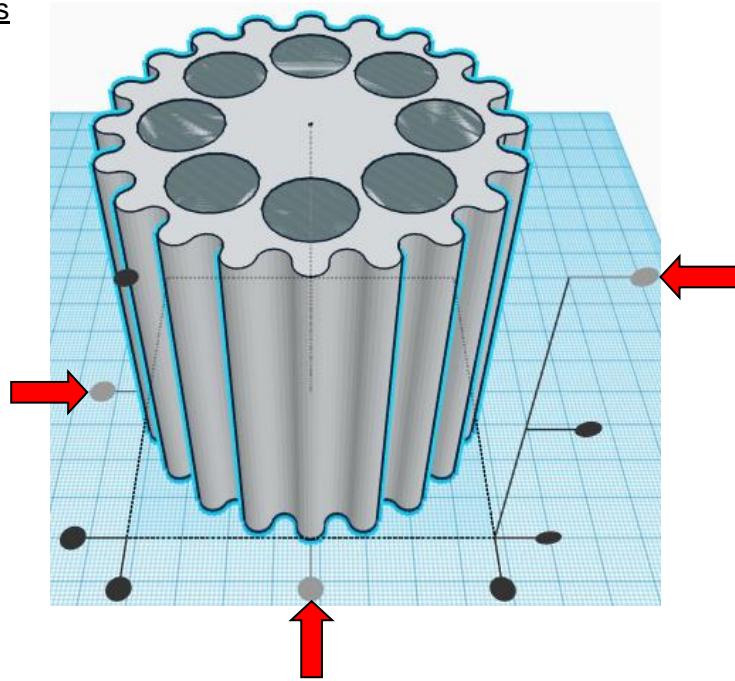From now on this will be called the **Full Pencil Hole Set**

Change Full Pencil Hole Sets to **Hole**
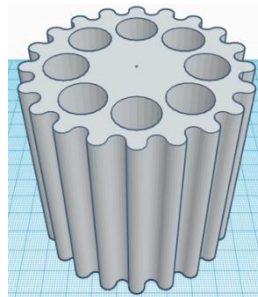by selecting Full Pencil Hole Sets and typing "h".

Align Large Gear and Full Pencil Hole Sets

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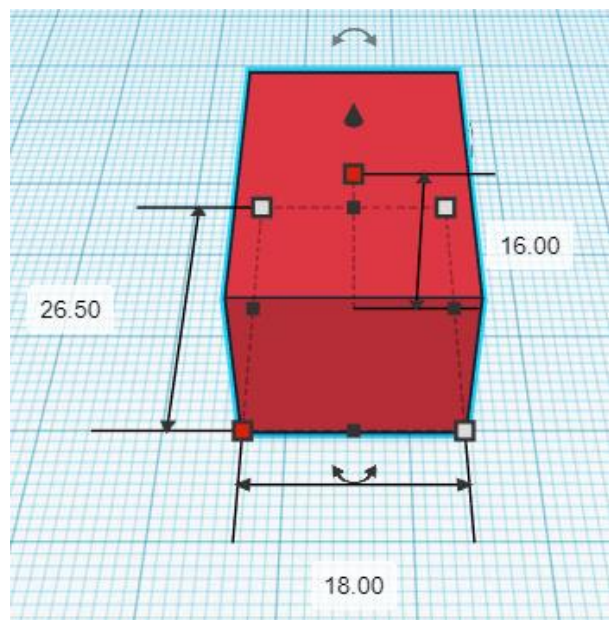centered of Y direction, and
top of Z direction.

Group Large Gear and Full Pencil Hole Sets
From now on this will be called the **Large Gear**
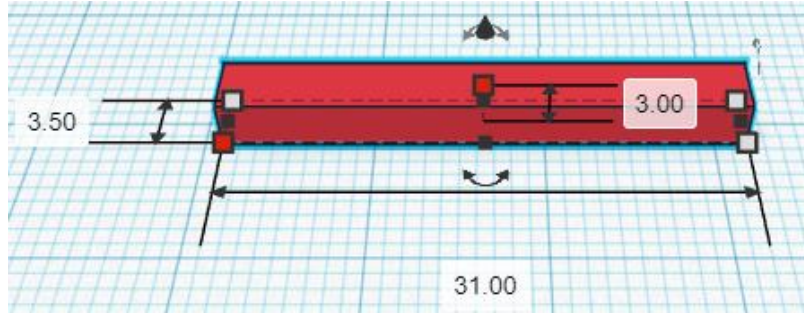

Top cutout:

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

Change the dimensions to
18mm X direction,
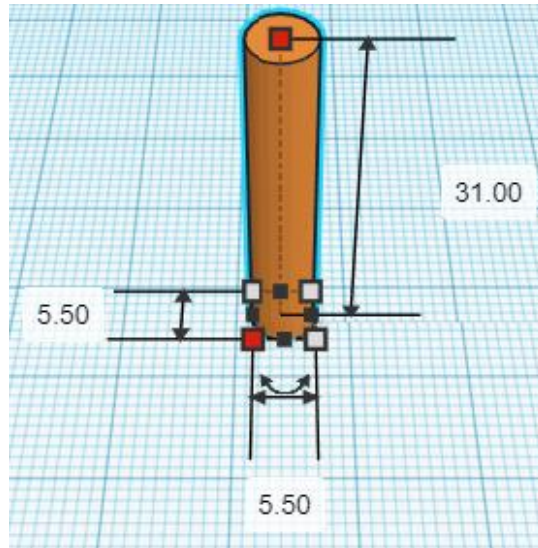26.5mm Y direction, and
16mm Z direction.

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

Change the dimensions to
31mm X direction,
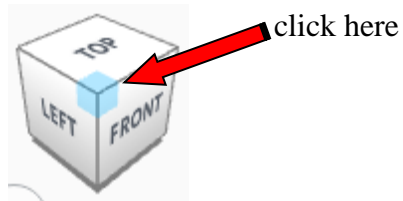3.5mm Y direction, and
3mm Z direction.

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

Change the dimensions to
5.5mm X direction,
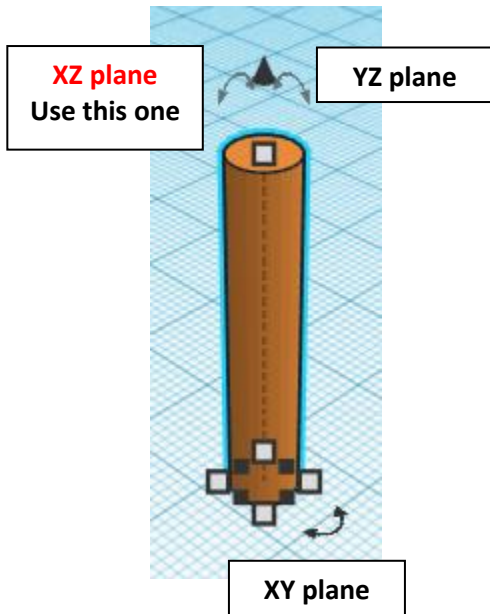5.5mm Y direction, and
31mm Z direction.
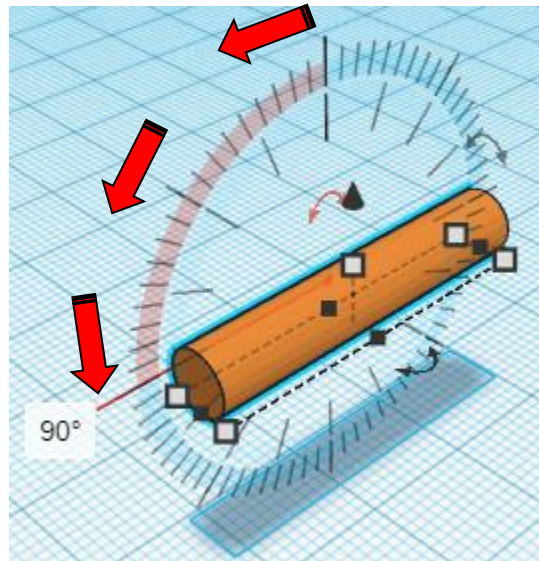
Go to TOP LEFT FRONT view for rotations click here

Rotate the Axle Cutout counter-clockwise 90 degrees in XZ plane.

Before   After

XZ plane
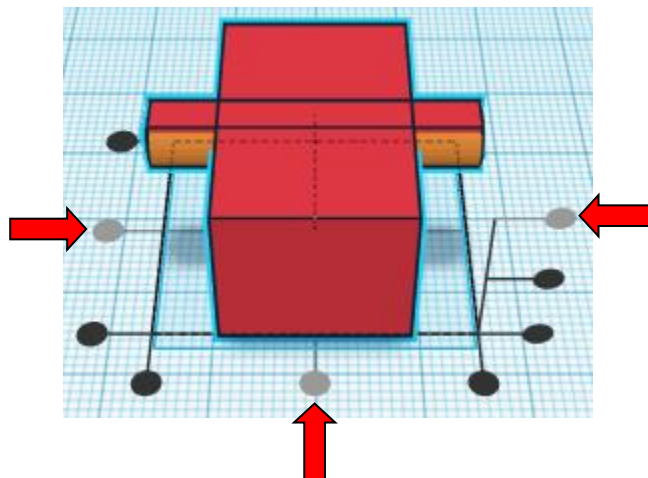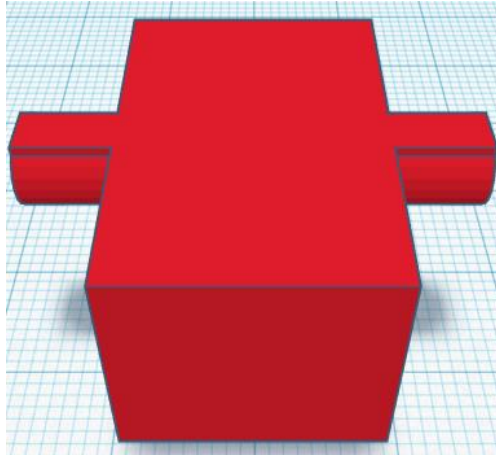Use this one

YZ plane

90°

XY plane

Align Large Box Cutout and Small Box Cutout and Axle Cutout
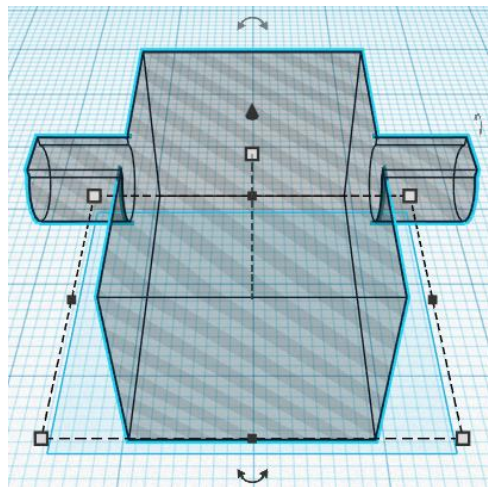
centered in X direction,
centered of Y direction, and
top of Z direction.

Group <u>Large Box Cutout</u> and <u>Small Box Cutout</u> and <u>Axle Cutout</u>
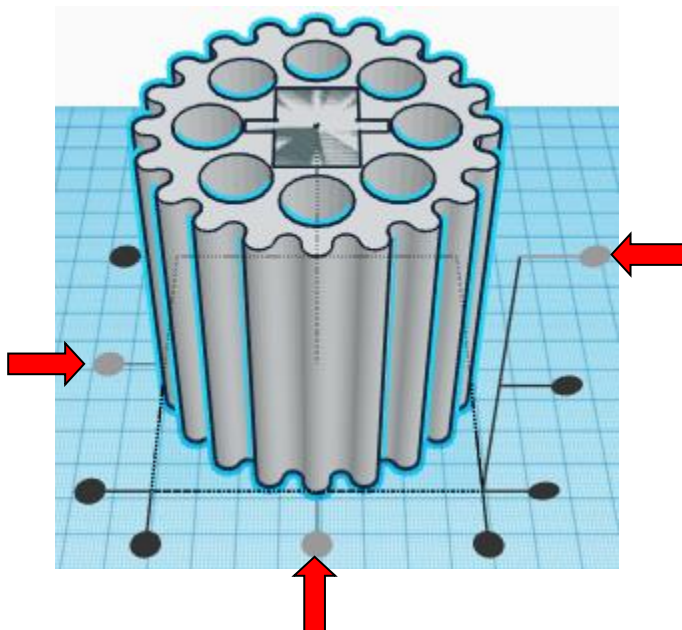From now on this will be called the **Top Cutout**

Change <u>Top Cutout</u> to **Hole**
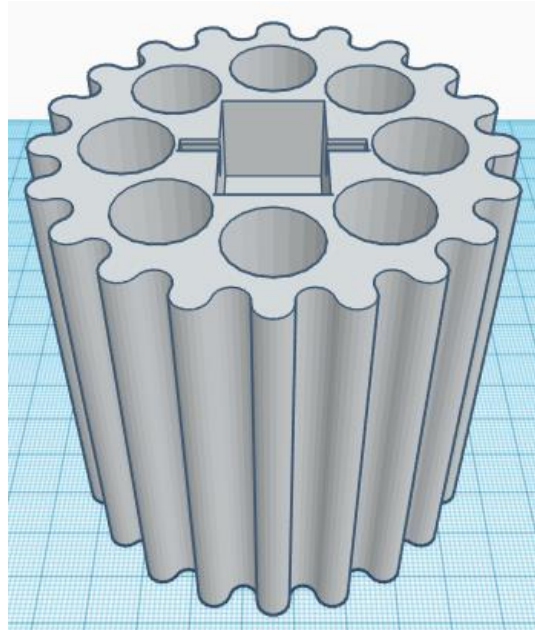by selecting <u>Top Cutout</u> and typing "h".

Align <u>Large Gear</u> and <u>Top Cutout</u>

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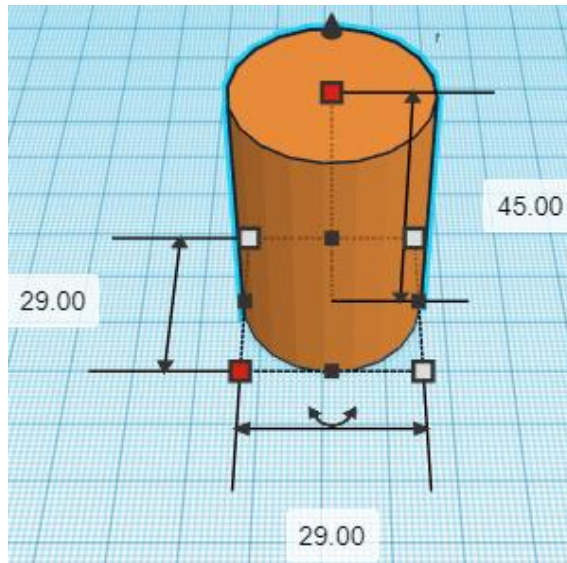centered of Y direction, and
top of Z direction.

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

Peg hole cutout:

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

Change the dimensions to
29mm X direction,
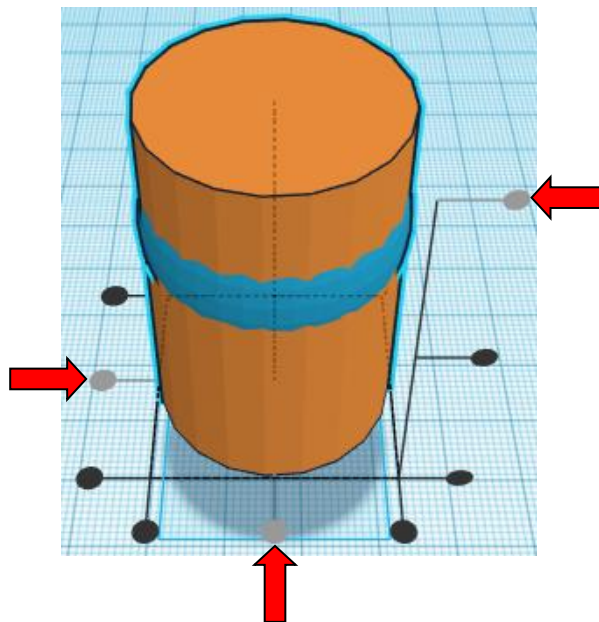29mm Y direction, and
45mm Z direction.

Bring in a Sphere, located in Basic Shapes on the left 3 shapes down.
From now on this will be called the **Peg Sphere Cutout.**

Change the dimensions to
30mm X direction,
30mm Y direction, and
30mm Z direction.
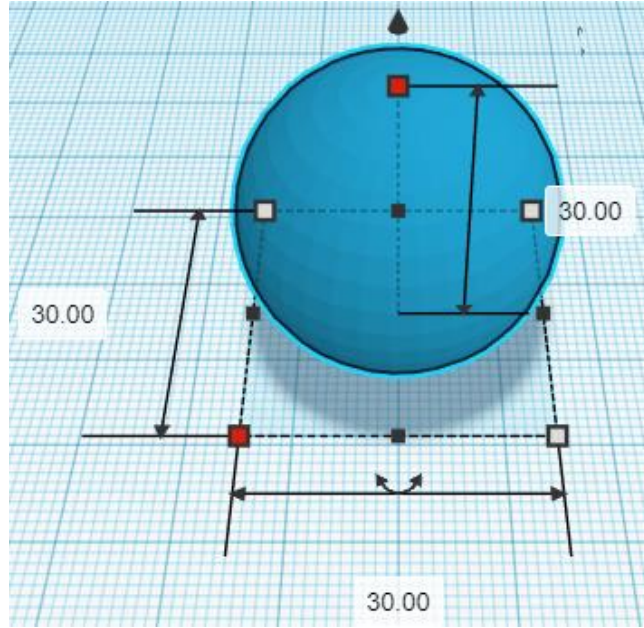
Align Peg Cylinder Cutout and Peg Sphere Cutout

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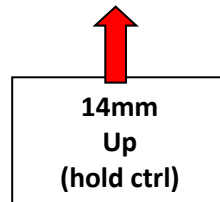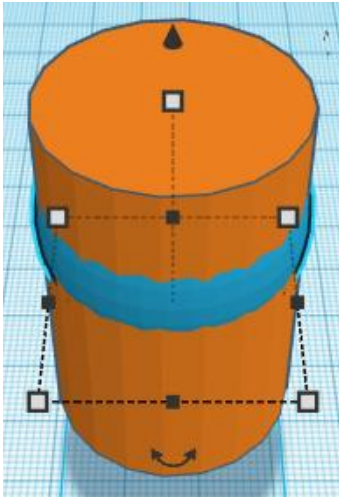centered of Y direction, and
top of Z direction.

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

Hint: Select Peg Sphere Cutout and hold control and push up arrow key 14 times.
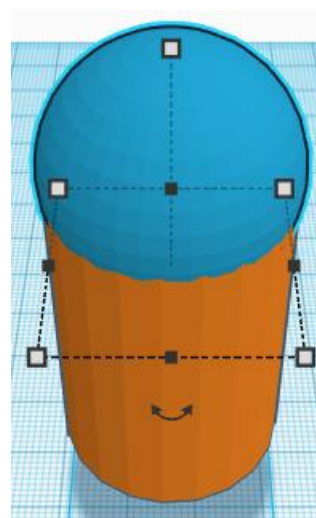   Or
     Select Peg Sphere Cutout and hold shift and hold control and push up arrow key 1 time, then release the shift key and push up arrow key 4 times.
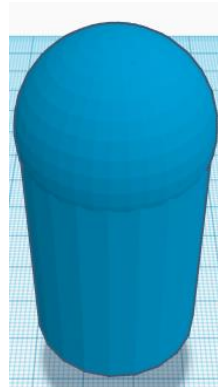
<table>
<tr><td align="center">Before</td><td></td><td align="center">After</td></tr>
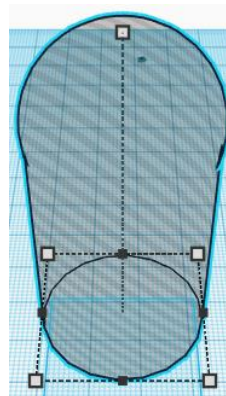</table>

14mm
Up
(hold ctrl)

Group Peg Cylinder Cutout and Peg Sphere Cutout
From now on this will be called the **Peg Cutout**
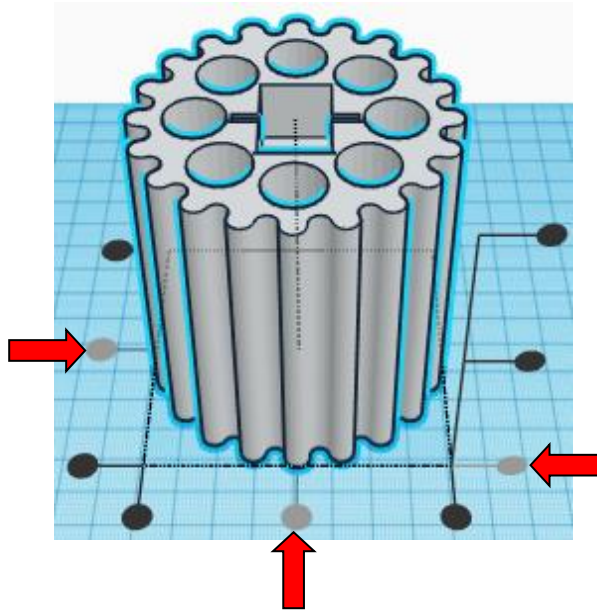

Change Peg Cutout to **Hole**
by selecting Peg Cutout and typing "h".
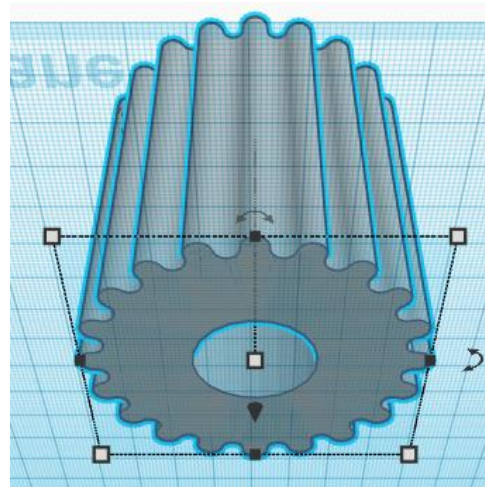
Align <u>Large Gear</u> and <u>Peg Cutout</u>

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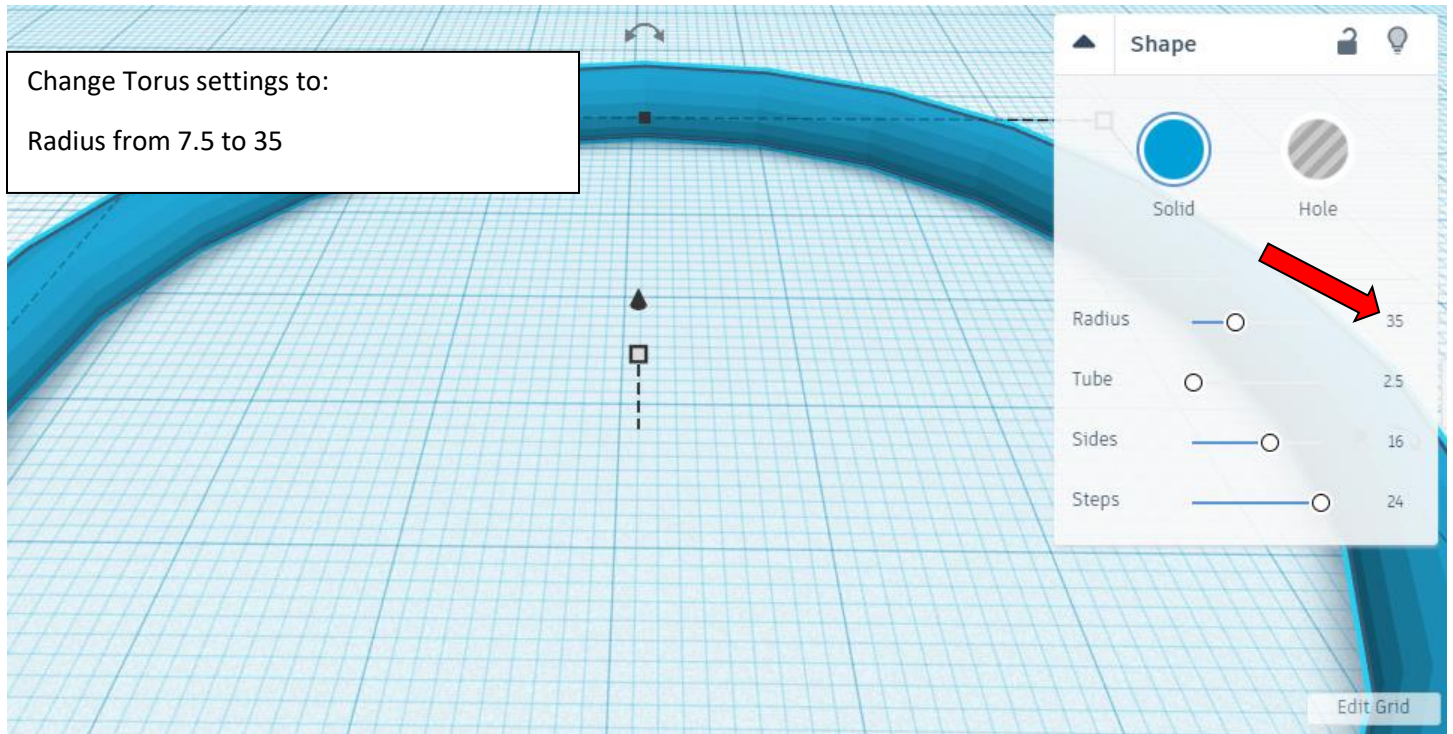bottom of Z direction.

Group <u>Large Gear</u> and <u>Peg Cutout</u>
From now on this will be called the **Large Gear**

Bottom view

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

Change Torus settings to:

Radius from 7.5 to 35

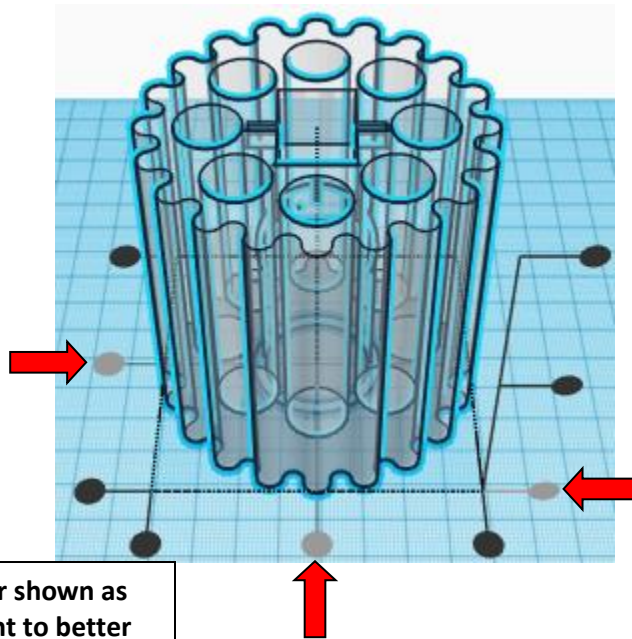|		
Radius	—O	35
Tube	O	2.5
Sides	—O	16
Steps	—O	24

Shape

Solid

Hole

Edit Grid

Change the dimensions to
32.15mm X direction,
32.15mm Y direction, and
1.21mm Z direction.

32.15

1.21

32.15
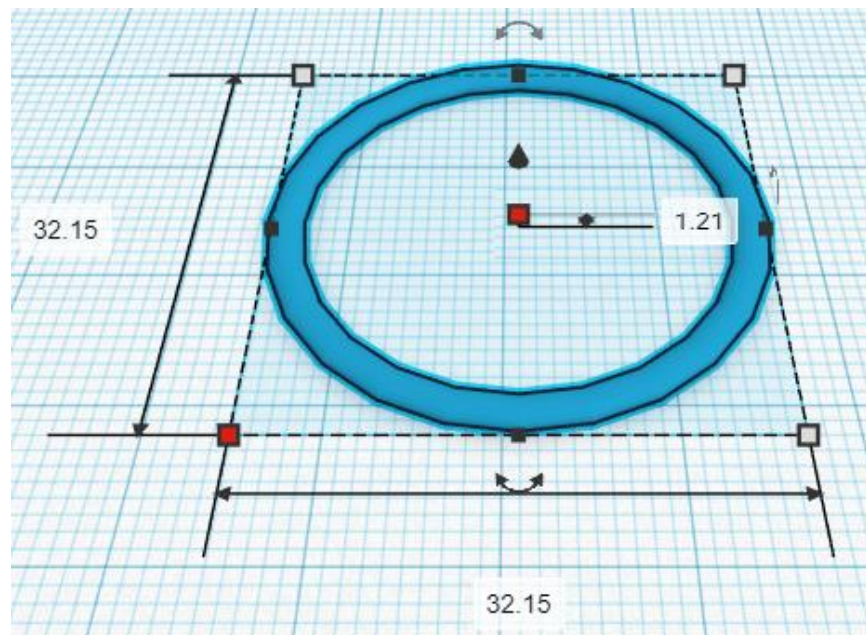
Align Large Gear and Locking Ring

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

Large Gear shown as
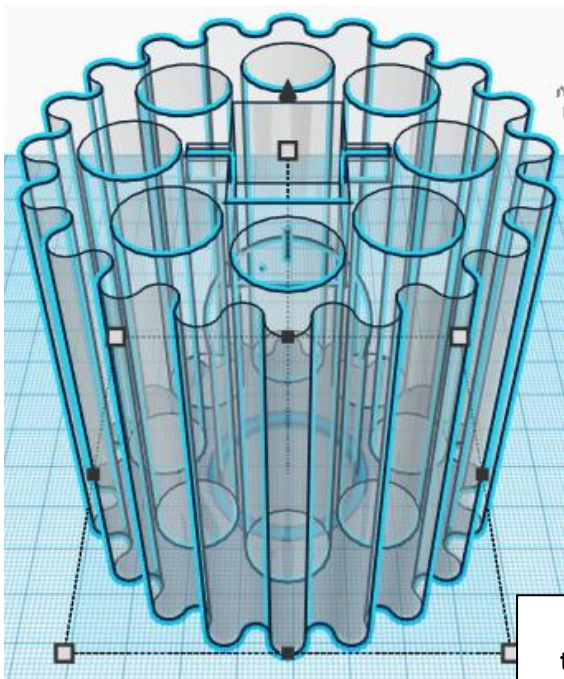transparent to better
see Locking Ring

Move Large Gear   (Must be in home view for this to work!)
move down in negative Z direction 37mm

Hint: Select Large Gear and hold control and push down arrow key 37 times.
Or
Select Large Gear and hold shift and hold control and push down arrow key 3 times, then release the
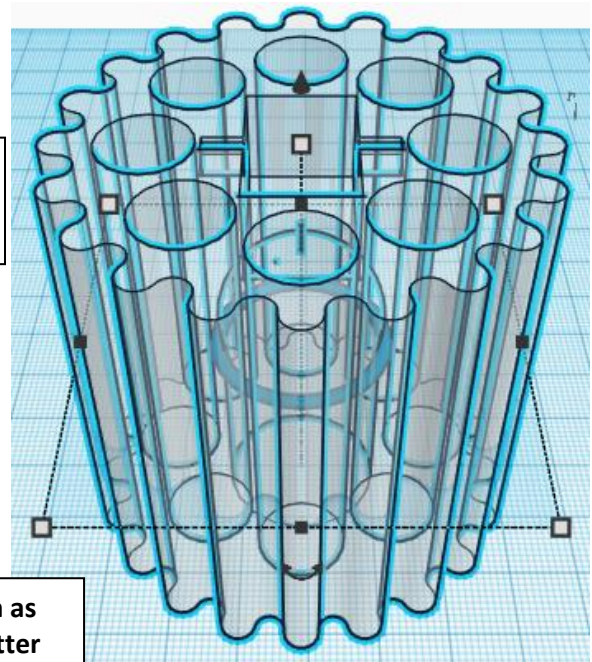shift key and push down arrow key 7 times.

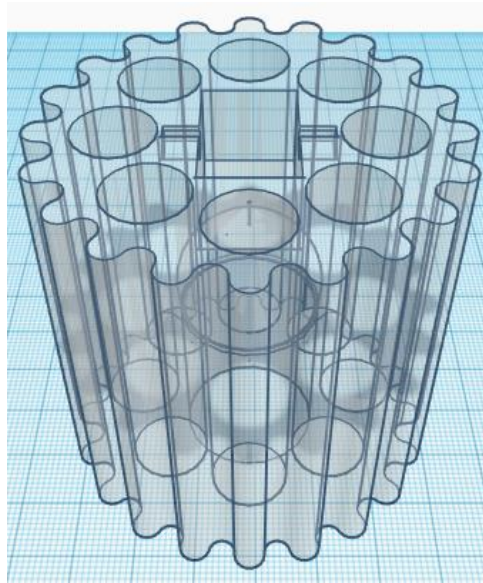Before   After

37mm
down
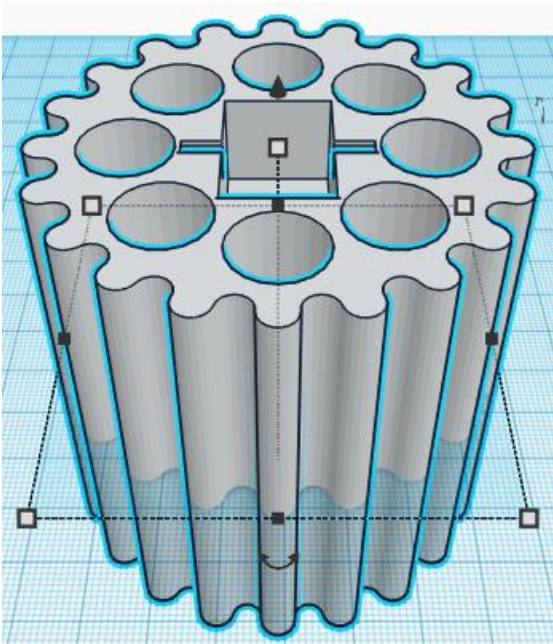(hold ctrl)

Large Gear shown as
transparent to better
see Locking Ring

Group Large Gear and Locking Ring
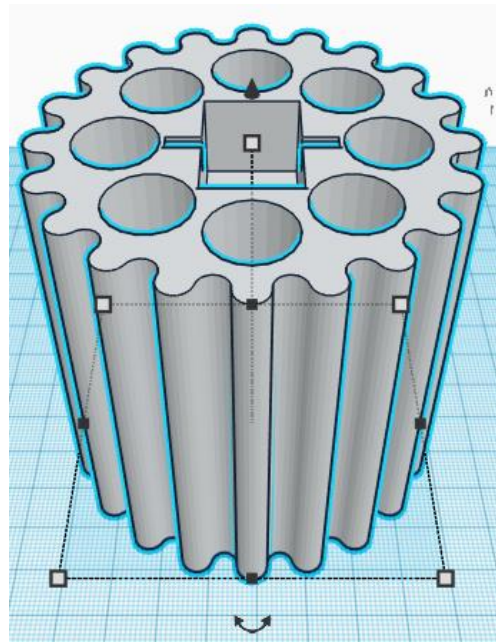From now on this will be called the **Large Gear**

Set on Workplane:

Select the Large Gear and type "d" to set the Large Gear on the work plane.

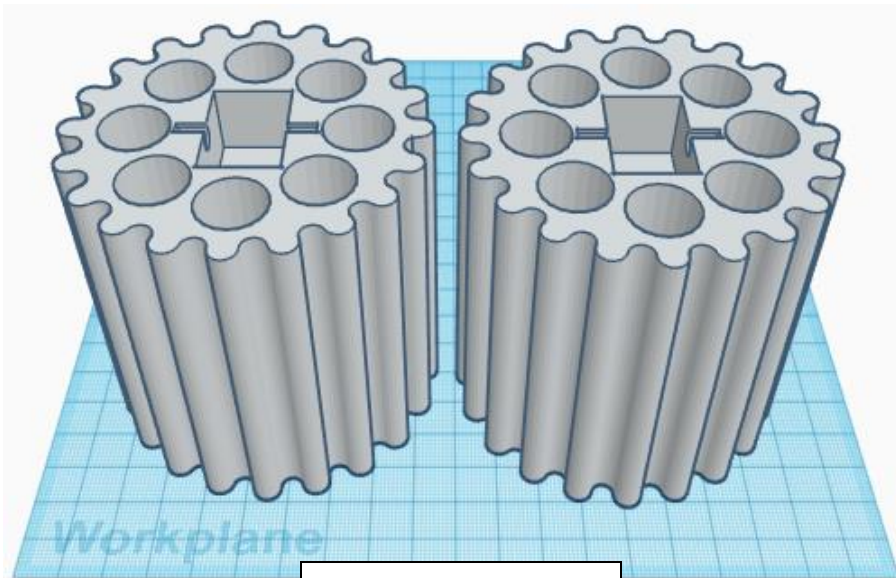Before   After

The Large Gear is done.
Print two large gears for the final project

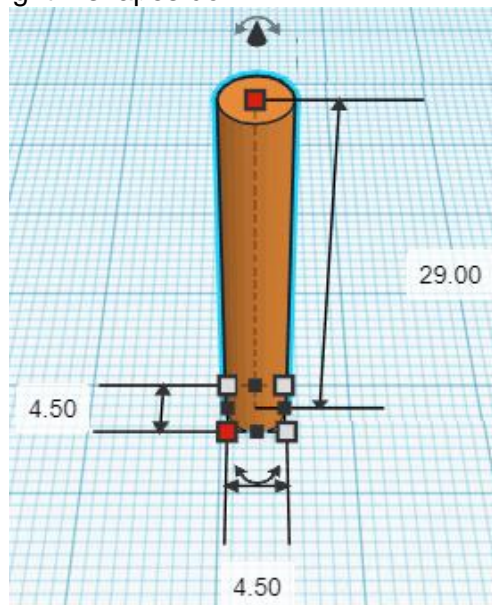Continue below for the next parts.

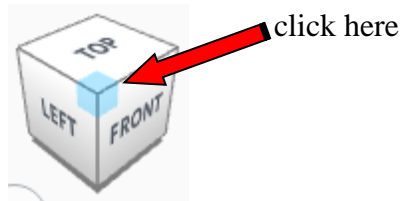Print two large gears
for the final project

Top Gear Decoration:

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

Change the dimensions to
4.5mm X direction,
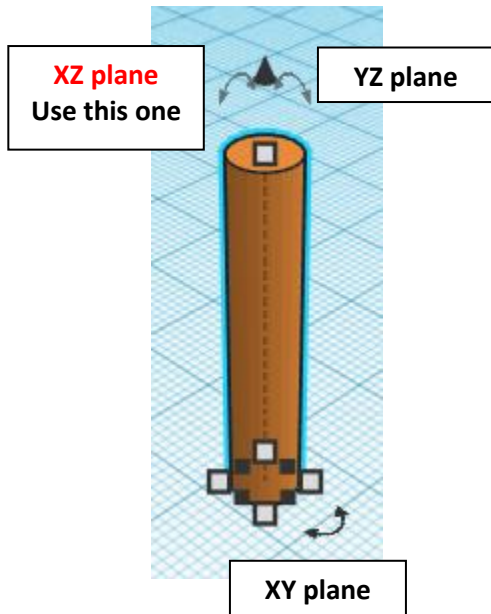4.5mm Y direction, and
29mm Z direction.
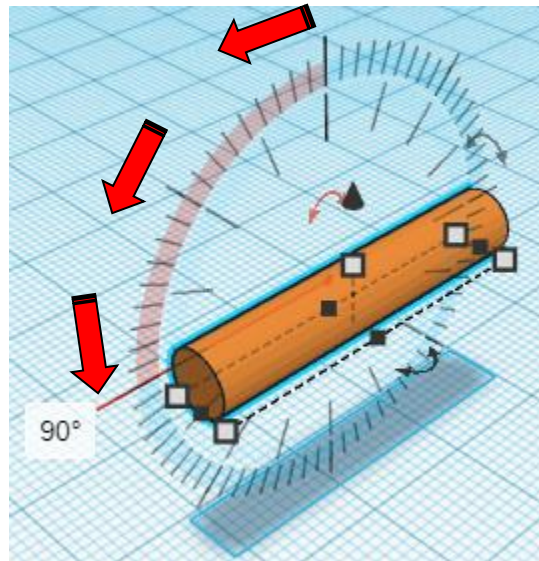
Go to TOP LEFT FRONT view for rotations click here

Rotate the Gear Axle counter-clockwise 90 degrees in XZ plane.

Before   After

XZ plane
Use this one

YZ plane

XY plane

90°

Set on Workplane:

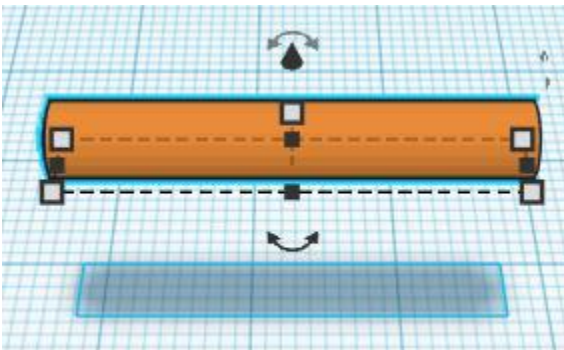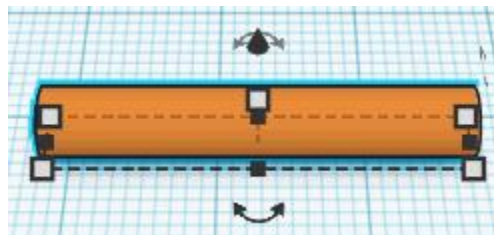Select the Gear Axle and type "d" to set the Gear Axle on the work plane.

Before   After

The Gear Axle is done.
Print two gear axles for the final project

Continue below for the next parts.

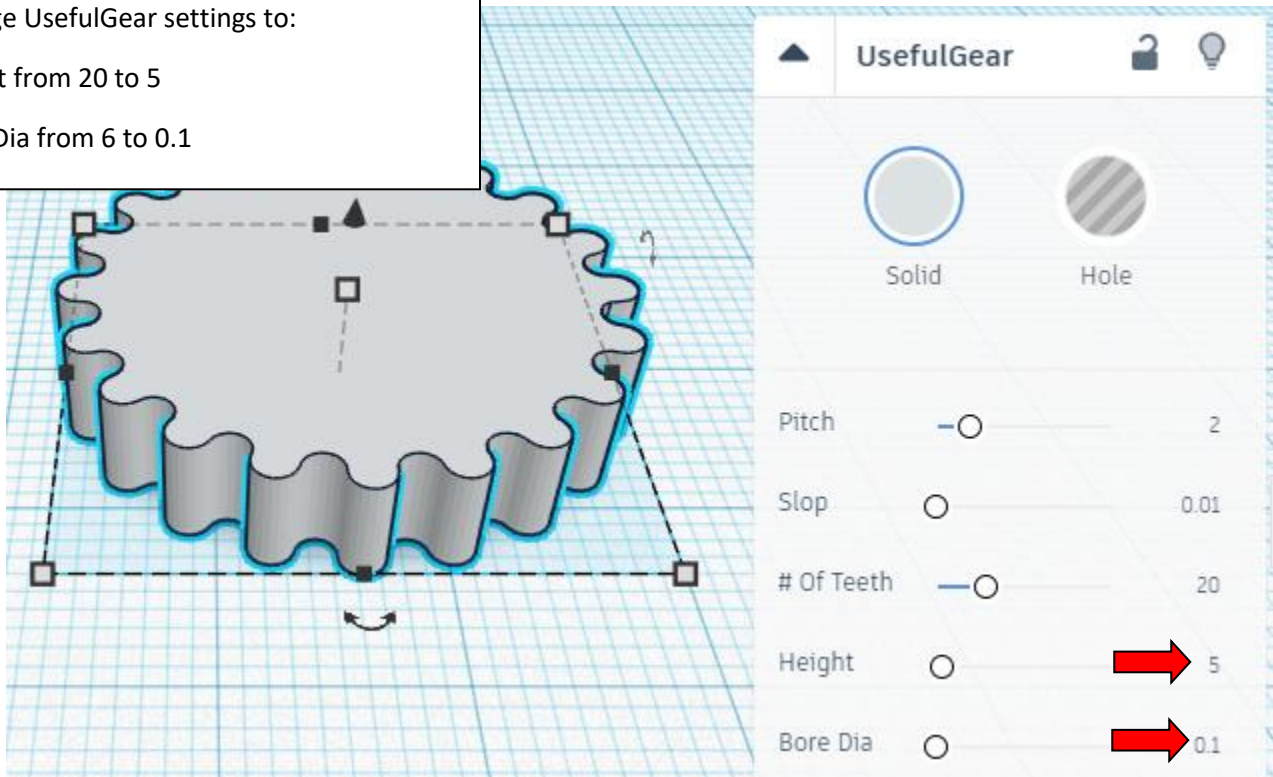Print two gear axles for the final project

Small Gear:

Bring in a Useful gear, located in All, (things in All move each time that TinkerCad adds items to All), this was last seen on page 3, on the right second from bottom.
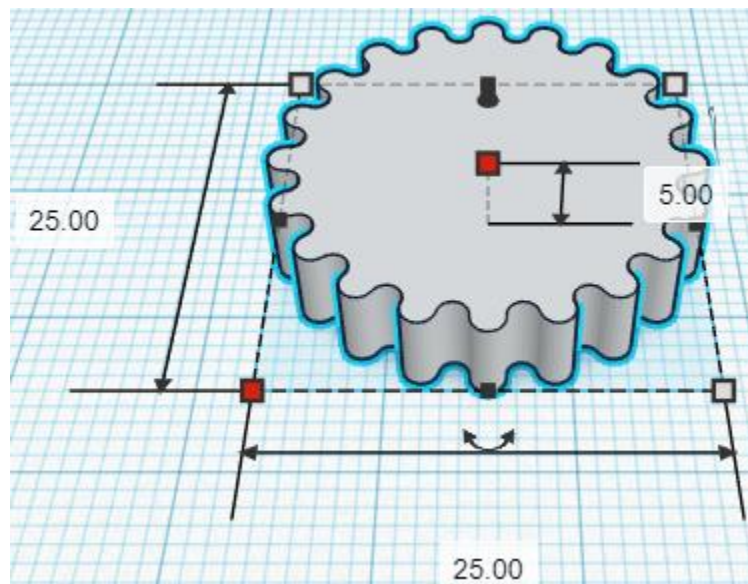From now on this will be called the **Small Gear**

Change UsefulGear settings to:
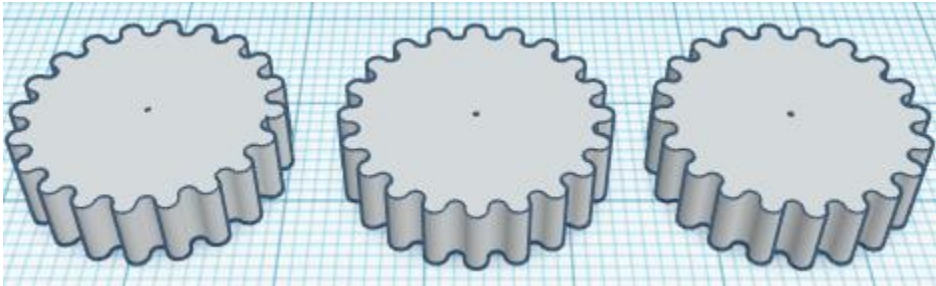
Height from 20 to 5

Bore Dia from 6 to 0.1

Change the dimensions to
25mm X direction,
25mm Y direction, and
5mm Z direction.

Duplicate Small Gear 2 times
From now on these will be called the **Small Gear 1, Small Gear 2,** and **Small Gear 3**

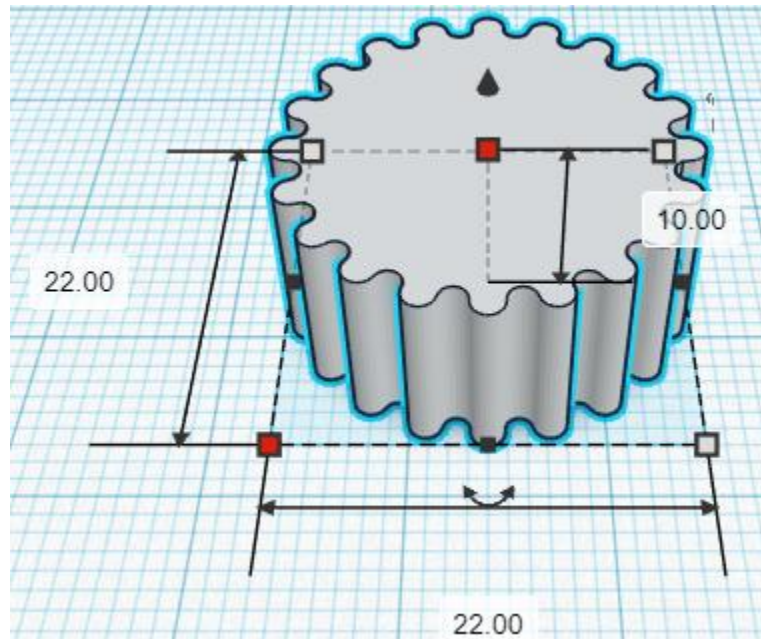Move the **Small Gears** to where you can see all three.
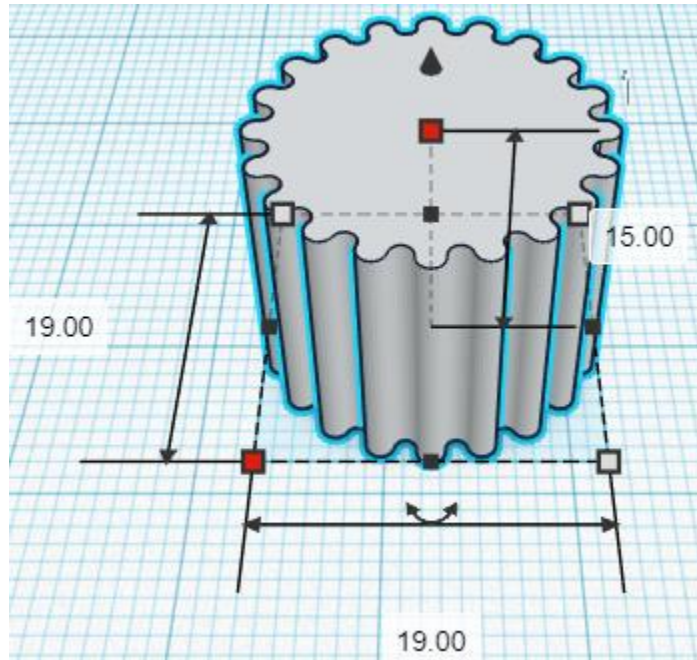

Small Gear 1   Small Gear 2   Small Gear 3

Small Gear 2

Change the dimensions to
22mm X direction,
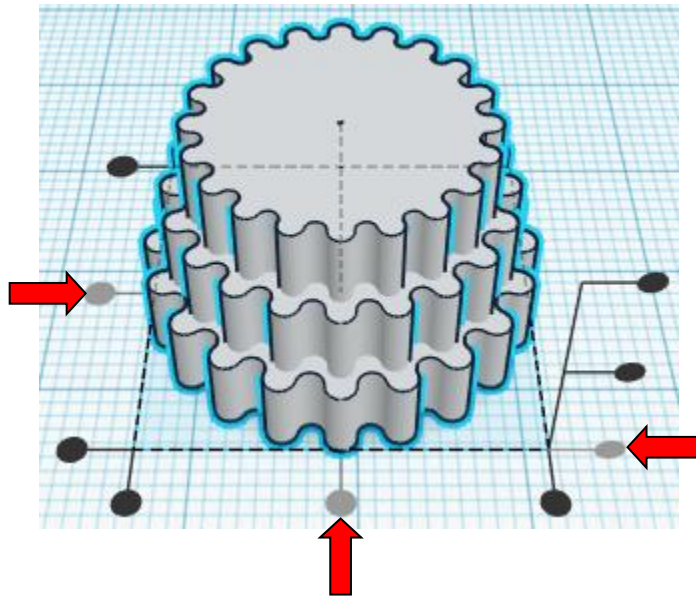22mm Y direction, and
10mm Z direction.

Small Gear 3

Change the dimensions to
19mm X direction,
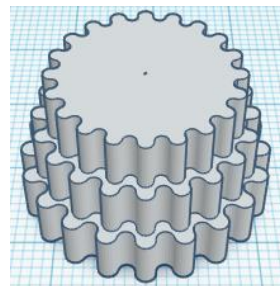19mm Y direction, and
15mm Z direction.

Align Small Gear 1 and Small Gear 2 and Small Gear 3

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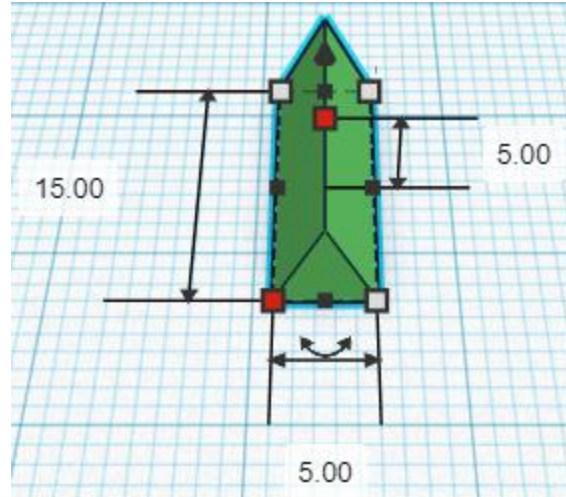centered of Y direction, and
bottom of Z direction.

Group Small Gear 1 and Small Gear 2 and Small Gear 3
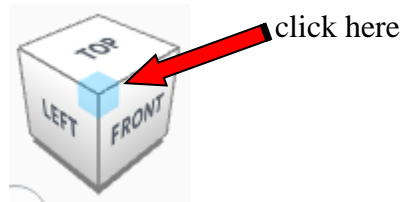From now on this will be called the **Small Gear Set**

Bring in a Roof, located in Basic Shapes on the right 4 shapes down.
From now on this will be called the **Small Gear Cutout**.

Change the dimensions to
5mm X direction,
15mm Y direction, and
5mm Z direction.

Go to TOP LEFT FRONT view for rotations   click here

Rotate the Small Gear Cutout counter-clockwise 90 degrees in YZ plane.

Before   After

XZ plane

YZ plane
Use this one

-90°

XY plane

Bring in a Round Roof, located in Basic Shapes on the left 5 shapes down.
From now on this will be called the **Small Gear Cutout End**.

Change the dimensions to
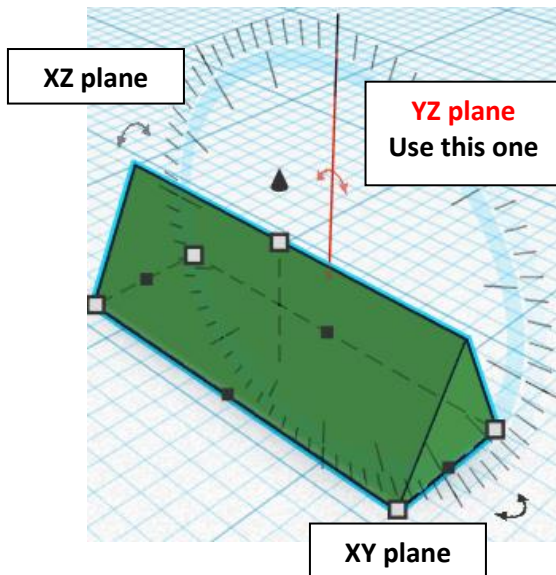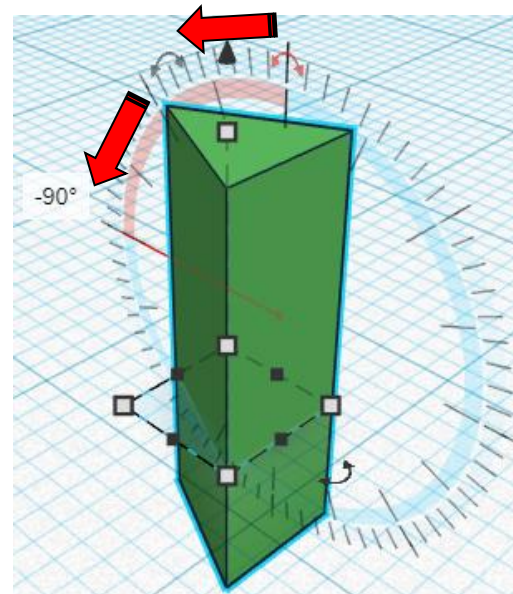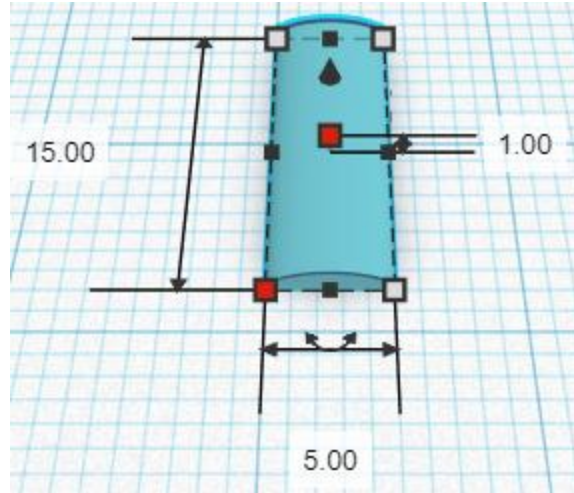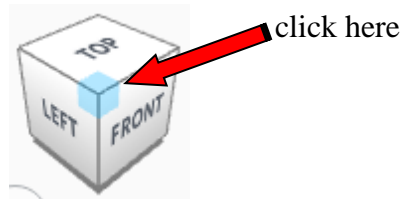5mm X direction,
15mm Y direction, and
1mm Z direction.

15.00   1.00

5.00
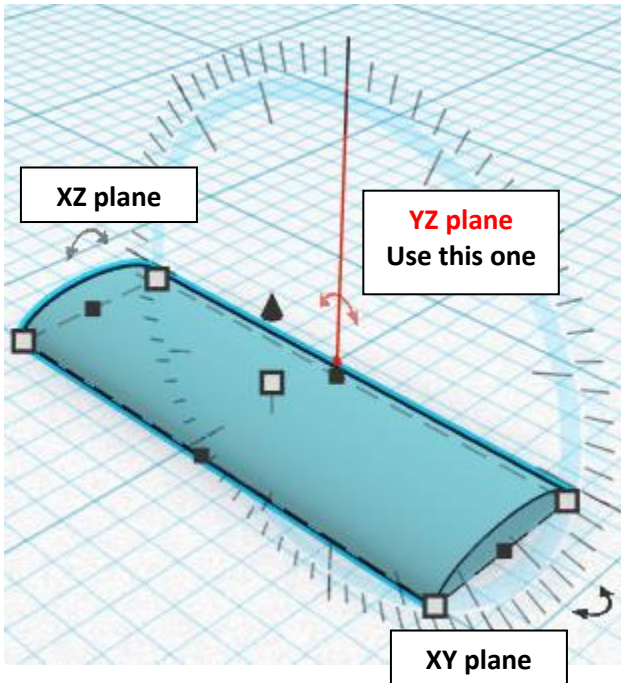
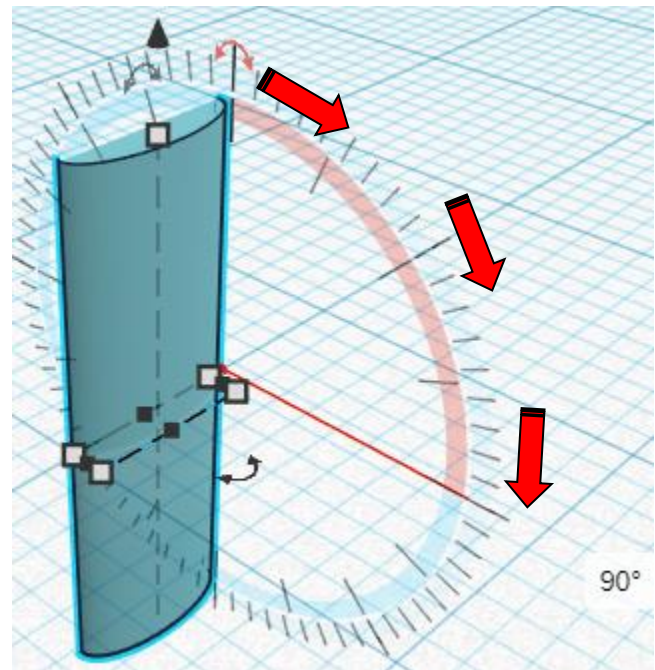Go to TOP LEFT FRONT view for rotations   click here

Rotate the Small Gear Cutout End clockwise 90 degrees in YZ plane.

Before   After

XZ plane

YZ plane
Use this one

XY plane

90°

23

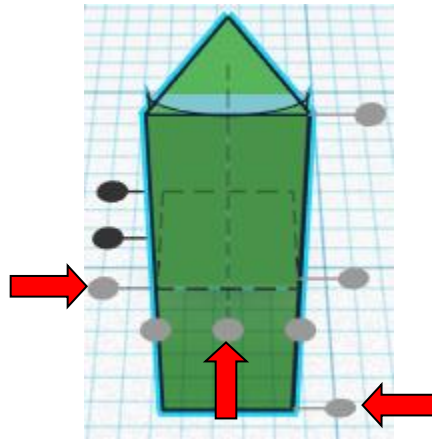**Align** <u>Small Gear Cutout</u> and <u>Small Gear Cutout End</u>
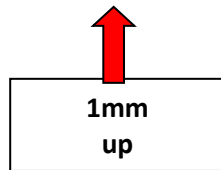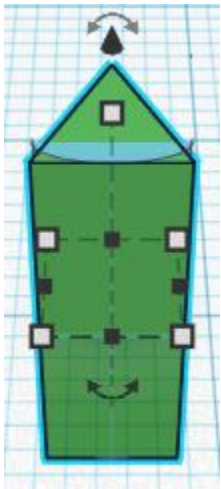
centered in X direction,
front of Y direction, and
bottom of Z direction.

Move <u>Small Gear Cutout</u>   (Must be in home view for this to work!)
move back in positive Y direction 1mm

Hint: Select <u>Small Gear Cutout</u> and push up arrow key 1 time.

Before   After

1mm
up

Group <u>Small Gear Cutout</u> and <u>Small Gear Cutout End</u>
From now on this will be called the **Small Gear Cutout**

Set on Workplane:

Select the <u>Small Gear Cutout</u> and type "d" to set the <u>Small Gear Cutout</u> on the work plane.

Before   After

Duplicate <u>Small Gear Cutout</u> 1 time
From now on this will be called the **Top Small Gear Cutout**

Flip Top Small Gear Cutout in Y direction.

Before   After

Y direction
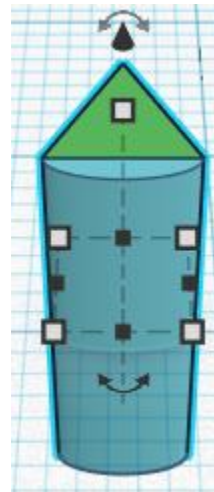Use this one
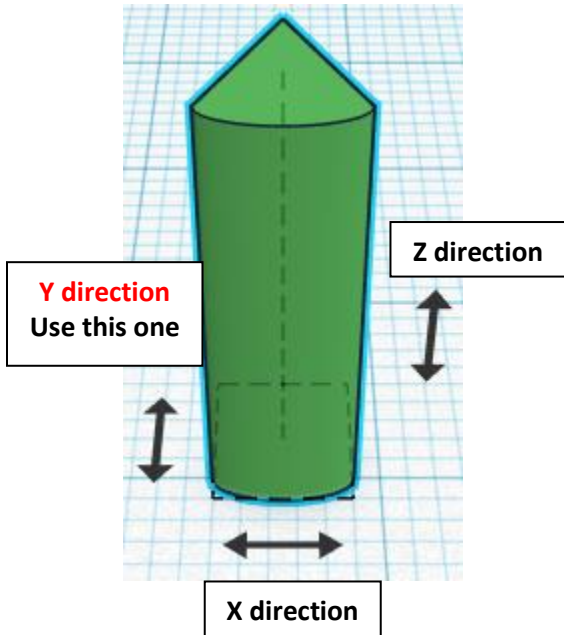
Z direction
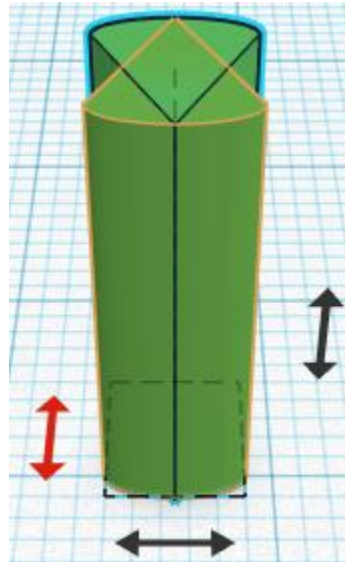
X direction

Move Top Small Gear Cutout(Must be in home view for this to work!)
move back in positive Y direction 6mm

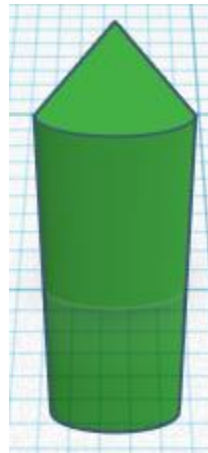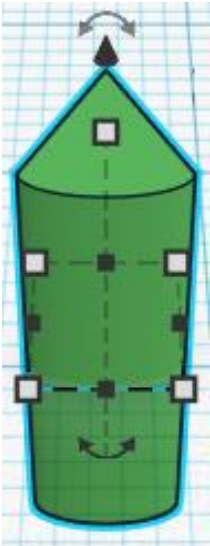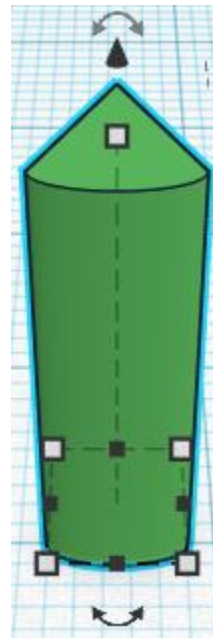**Hint:** Select Top Small Gear Cutout and push up arrow key 6 times.

Before   After

6mm
up

26
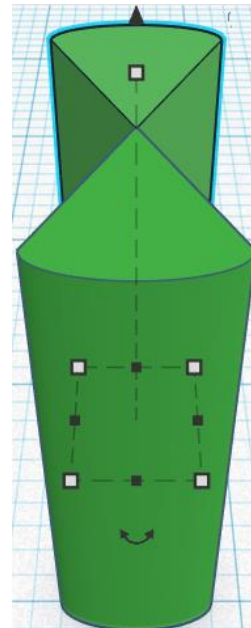
Group Small Gear Cutout and Top Small Gear Cutout
From now on this will be called the **Small Gear Cutout**

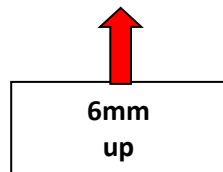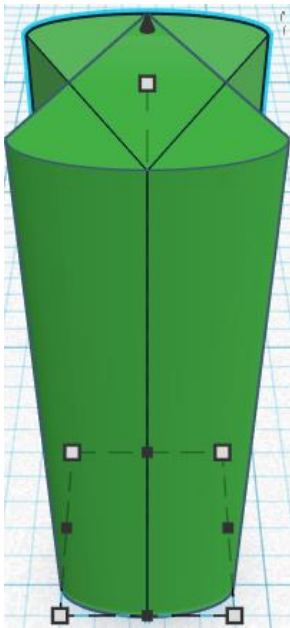**Duplicate** Small Gear Cutout 1 time
From now on this will be called the **Rotated Small Gear Cutout**

Go to TOP LEFT FRONT view for rotations click here

Rotate the Rotated Small Gear Cutout clockwise 90 degrees in XY plane.

Before   After

XZ plane

YZ plane

XY plane
Use this one

0°

90°
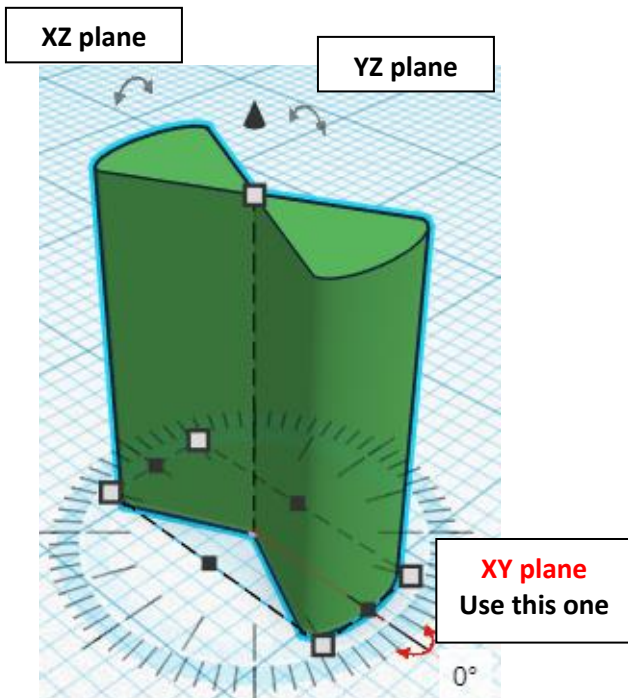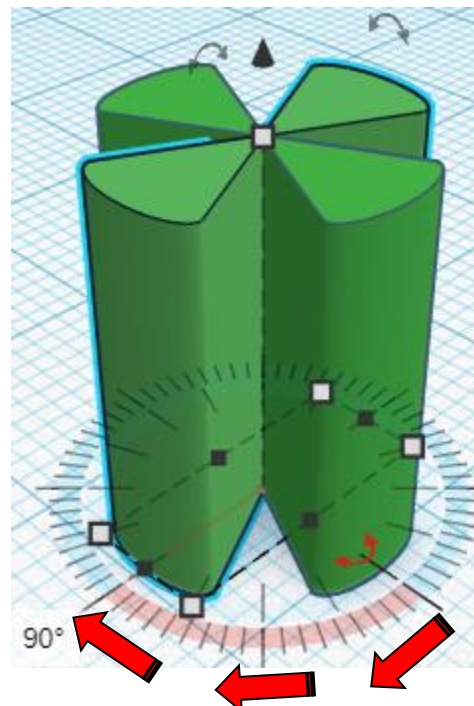
Group Small Gear Cutout and Rotated Small Gear Cutout
From now on this will be called the **Small Gear Cutout Set**
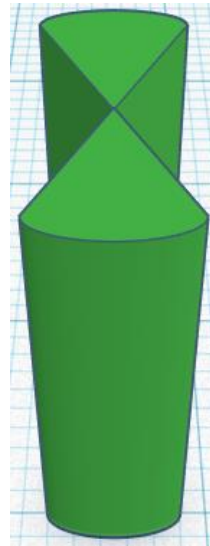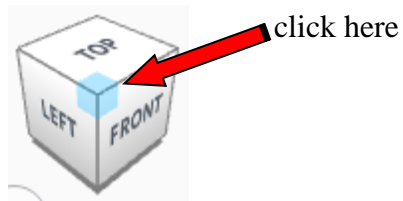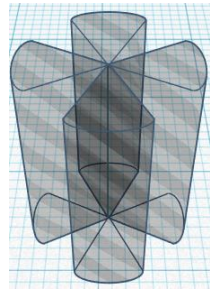

Change Small Gear Cutout Set to **Hole** by
selecting Small Gear Cutout Set and typing "h".

Align Small Gear Set and Small Gear Cutout Set

centered in X direction,
centered of Y direction, and
bottom of Z direction.
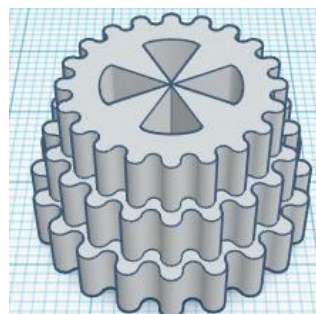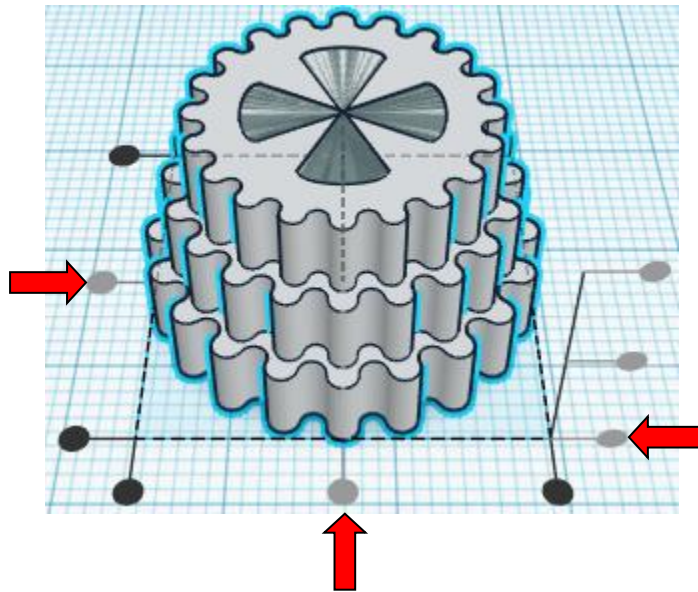
Group Small Gear Set and Small Gear Cutout Set
From now on this will be called the **Small Gear Set**

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

Change the dimensions to
7mm X direction,
7mm Y direction, and
15mm Z direction.

Align Small Gear Set and Axle Hole Ring

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

Group Small Gear Set and Axle Hole Ring
From now on this will be called the **Small Gear Set**

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

Change the dimensions to
5.5mm X direction,
5.5mm Y direction, and
15mm Z direction.
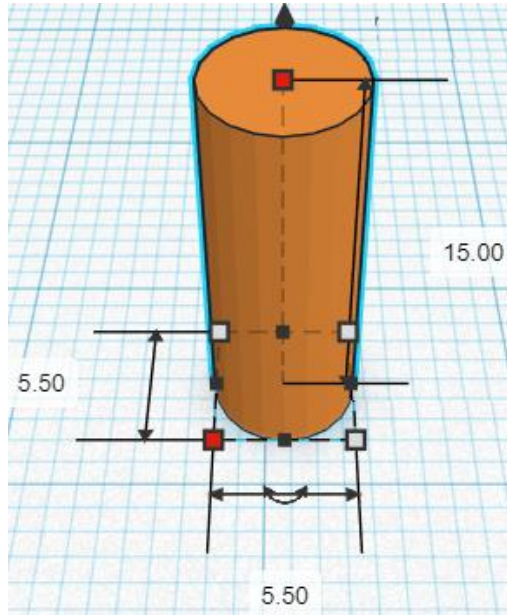
Change Axle Hole Cutout to **Hole** by
selecting Axle Hole Cutout and typing "h".

Align Small Gear Set and Axle Hole Cutout
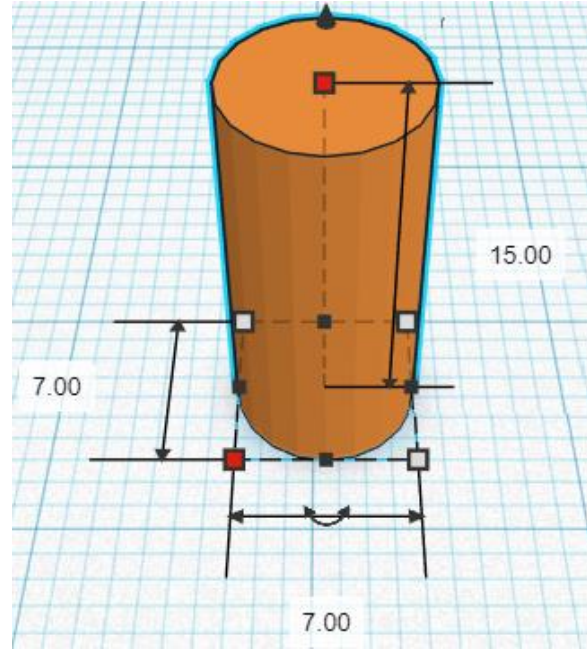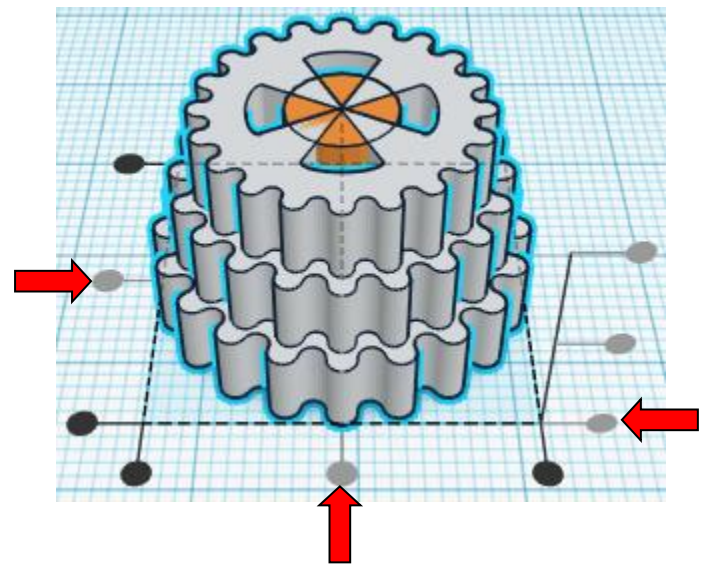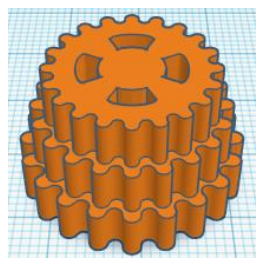
centered in X direction,
centered of Y direction, and
bottom of Z direction.
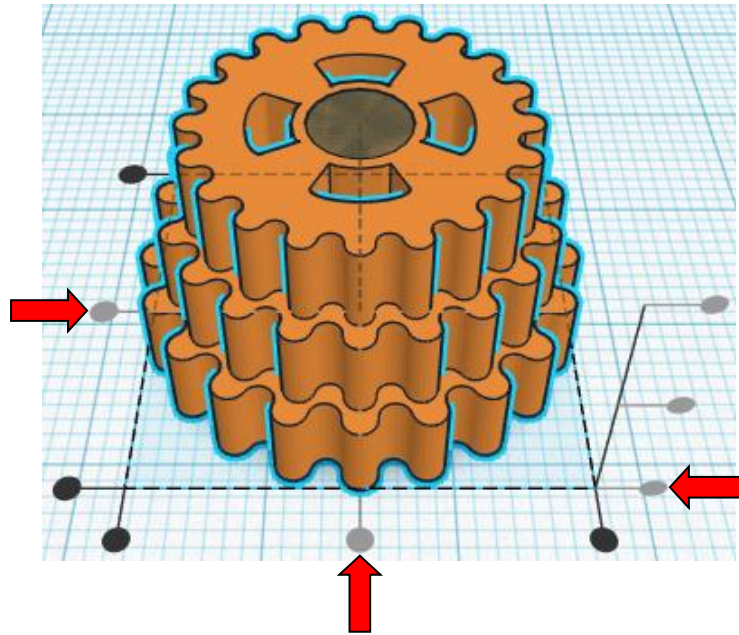
Group Small Gear Set and Axle Hole Cutout
From now on this will be called the **Small Gear Set**
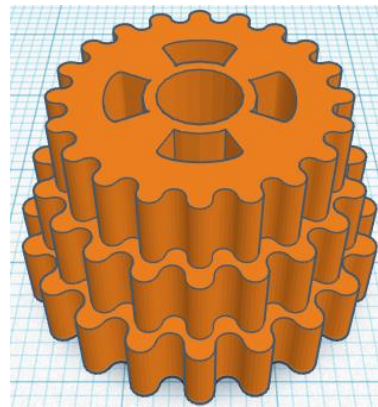
The Small Gear Set is done.
Print two small gear sets for the final project

Continue below for the next parts.

Print two small gear
sets for the final project

31
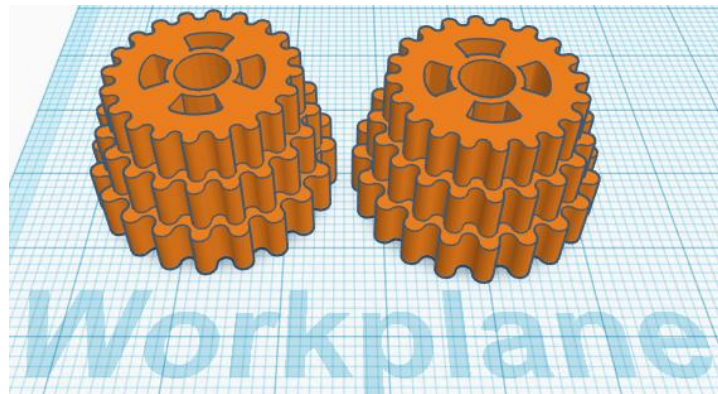
Base:

Bring in a Useful gear, located in All, (things in All move each time that TinkerCad adds items to All), this was last seen on page 3, on the right second from bottom.
From now on this will be called the **Base Gear**

Change the dimensions to
140mm X direction,
140mm Y direction, and
5mm Z direction.
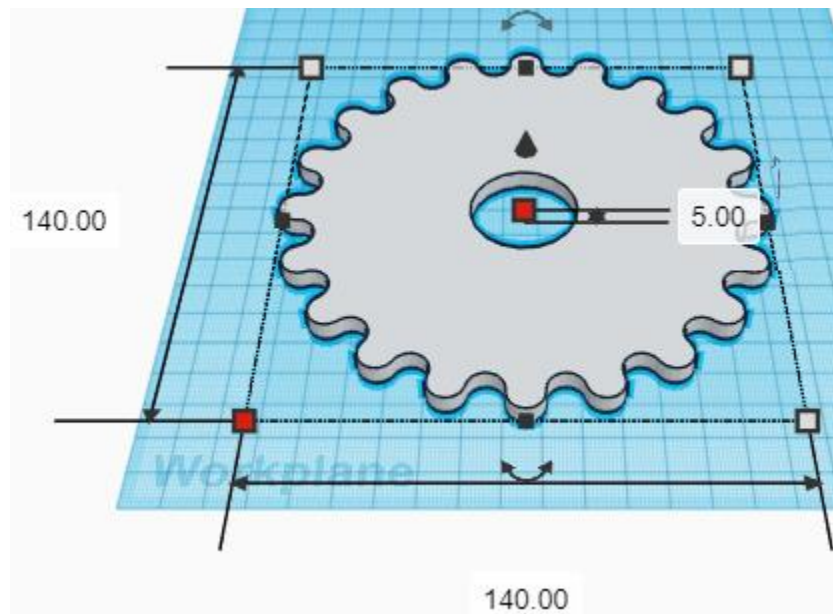
140.00

5.00

140.00

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

Change the dimensions to
26mm X direction,
26mm Y direction, and
51mm Z direction.

51.00

26.00

26.00

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

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

Align Peg Cylinder and Peg Sphere

centered in X direction,
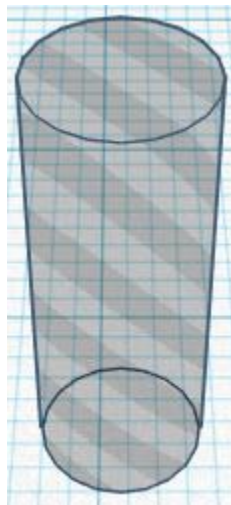centered of Y direction, and
top of Z direction.
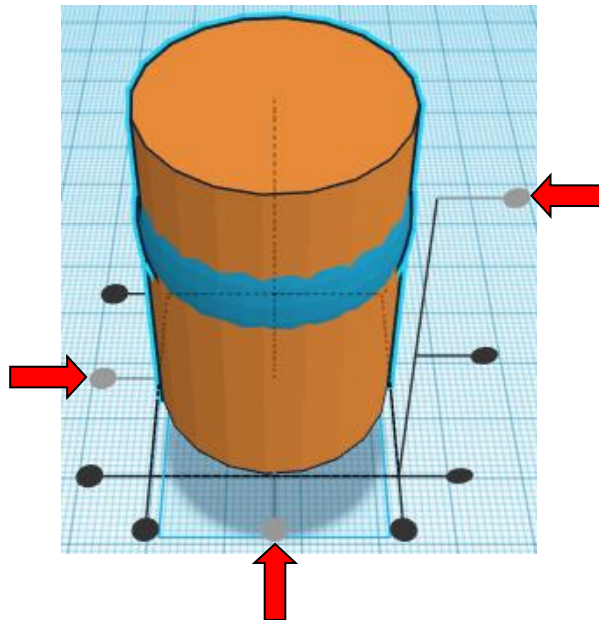
Move <u>Peg Sphere</u>   (Must be in home view for this to work!)
move up in positive Z direction 15mm

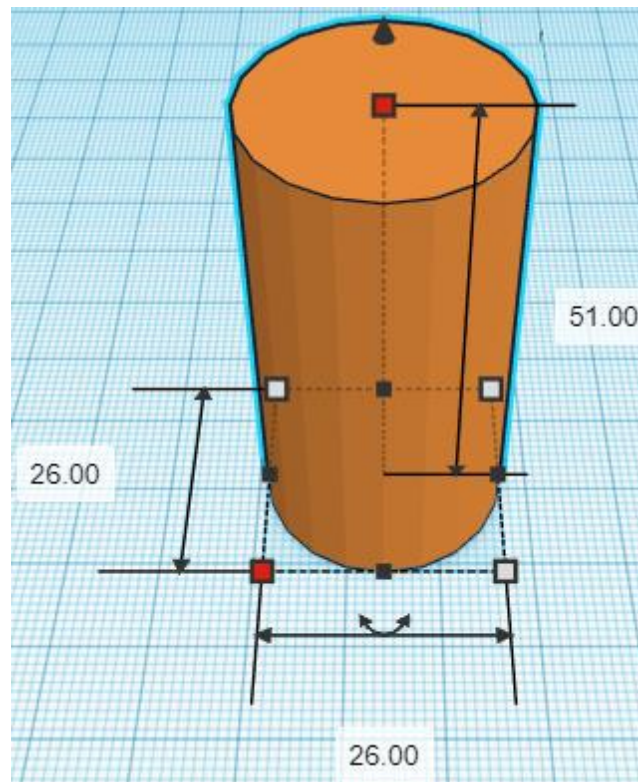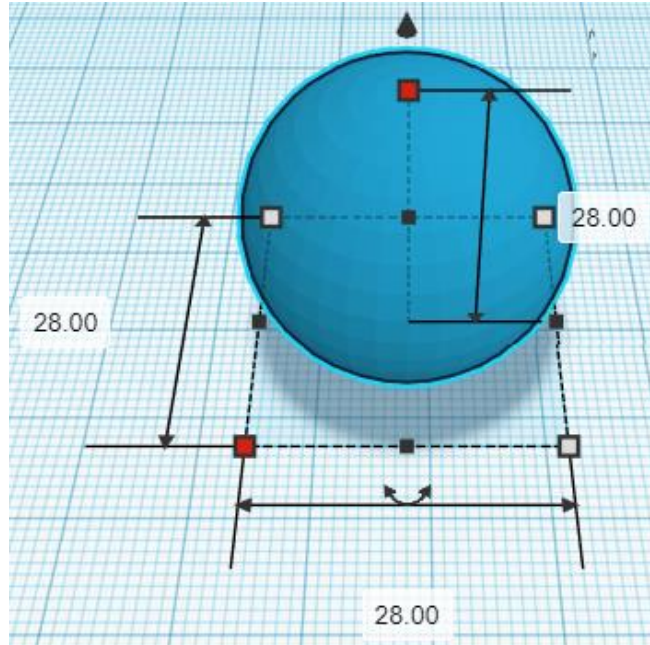**Hint:** Select <u>Peg Sphere Cutout</u> and hold control and push up arrow key 15 times.
 Or
 Select <u>Peg Sphere Cutout</u> and hold shift and hold control and push up arrow key 1 time,
 then release the shift key and push up arrow key 5 times.

Before   After

**15mm
Up
(hold ctrl)**
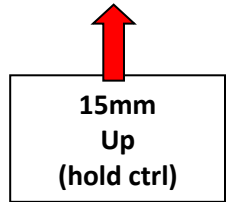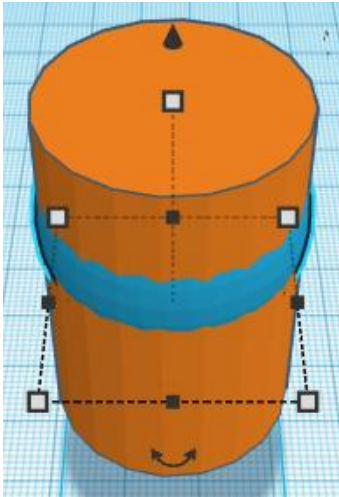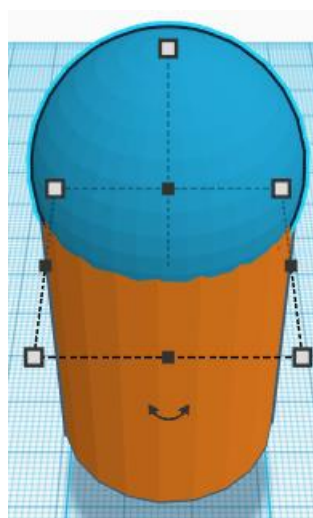
Group <u>Peg Cylinder</u> and <u>Peg Sphere</u>
From now on this will be called the **Peg**
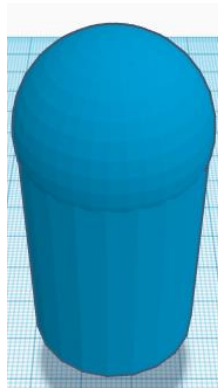
Duplicate Peg 1 time
From now on this will be called the **Right Peg**

Move Right Peg   (Must be in home view for this to work!)
move right in positive X direction 76mm

Hint: Select Right Peg and push right arrow key 76 times.
          Or
          Select Right Peg and hold shift and push right arrow key 7 time,
          then release the shift key and push right arrow key 6 times.

Before   After

76mm
right
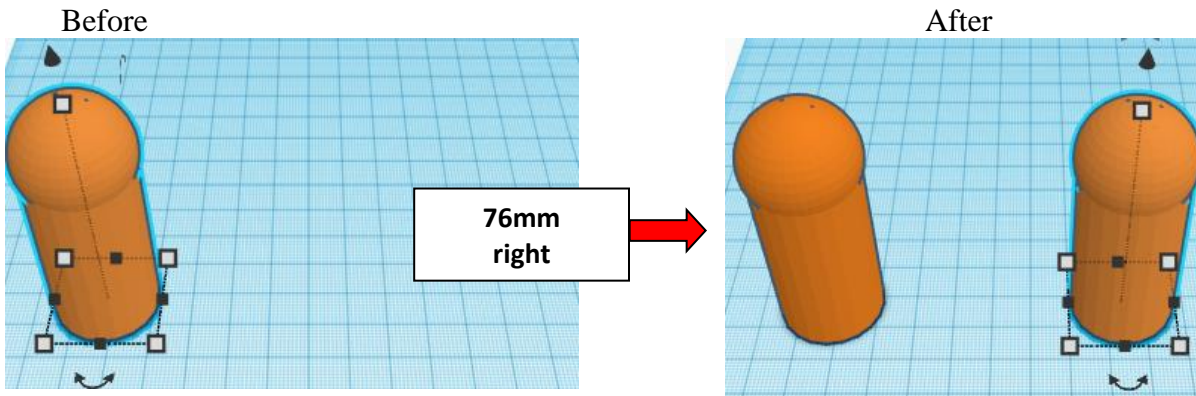
Group Peg and Right Peg
From now on this will be called the **Peg Set**
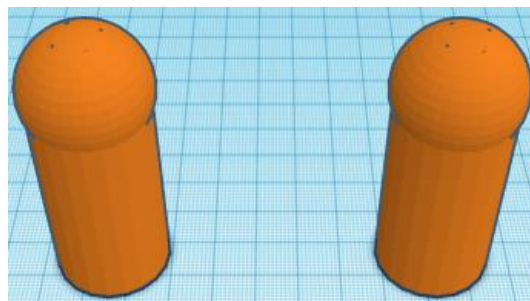
Align Base Gear and Peg Set

centered in X direction,
centered of Y direction, and
bottom of Z direction.
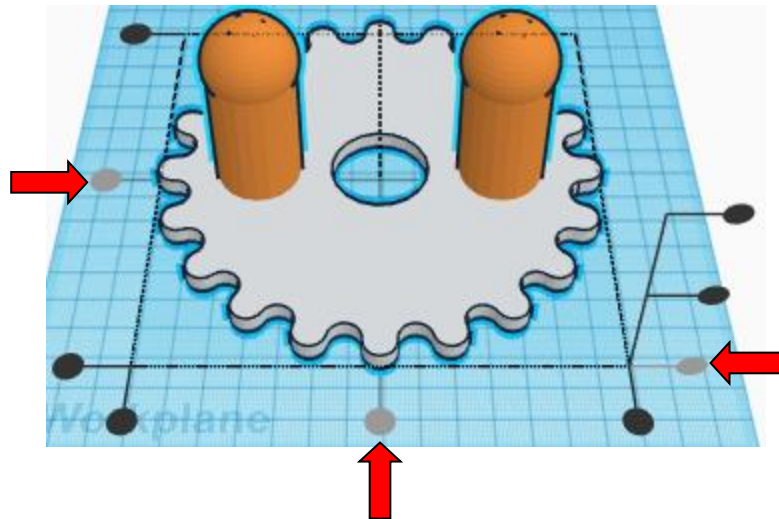
Group Base Gear and Peg Set
From now on this will be called Base
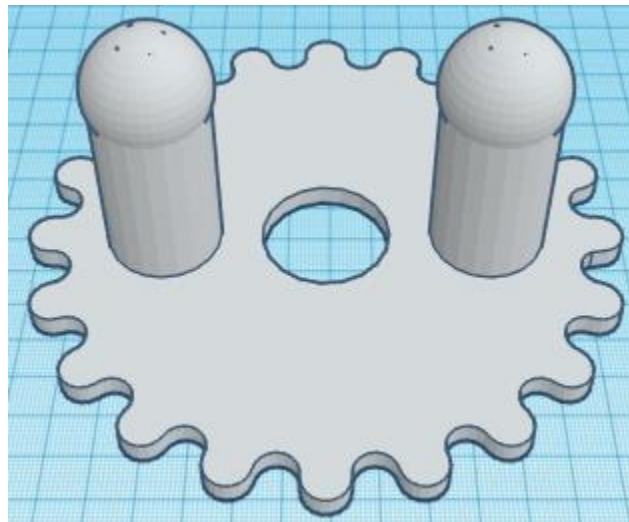
Keep clear for
large gears

The Base is done. The Base can be printed as is and works great. Some room has been left for those that what to add their own design to the base.

Just keep the area around each peg clear up to a diameter of 82mm minimum.

Keep clear for large gears
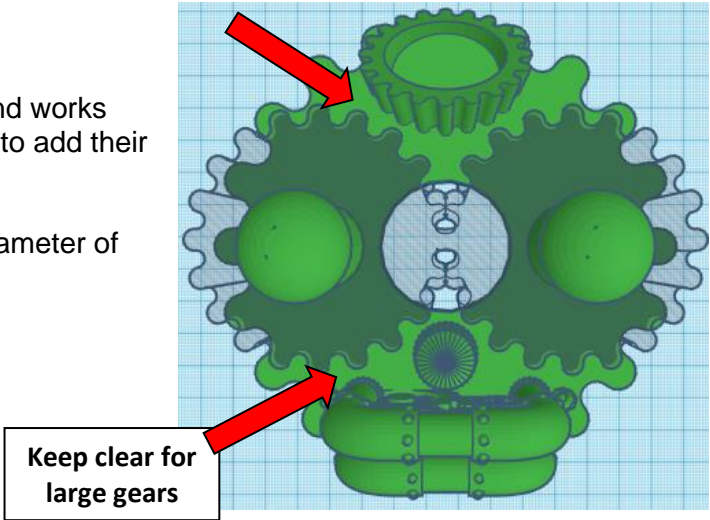
Here is an example of some added details you can add:

Business Card Slot

Paperclip cup
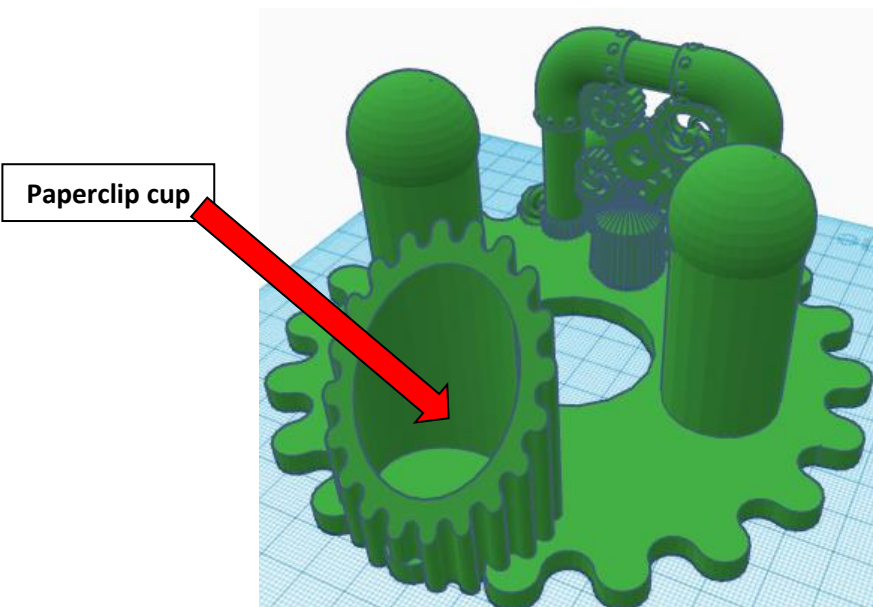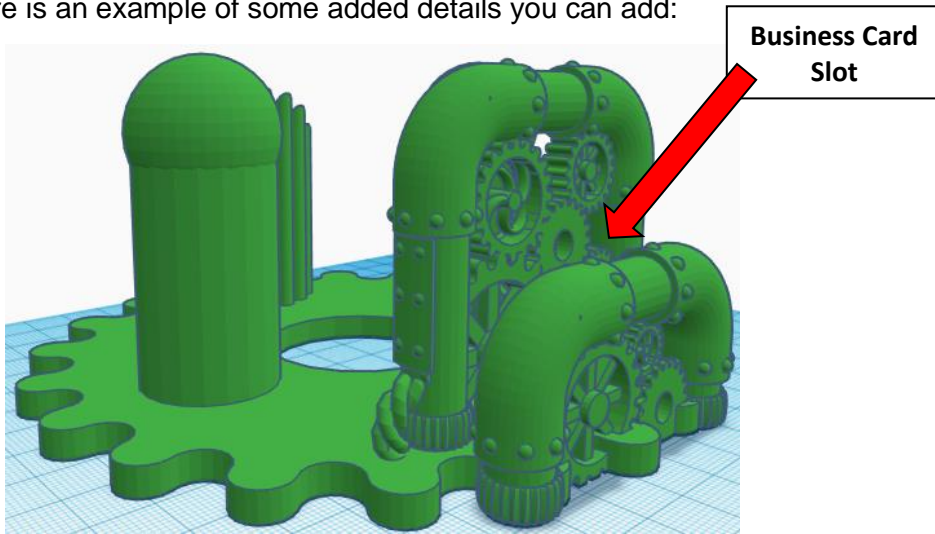
Assembly Steam Punk Desk Pencil Holder:

Print each part, here is a list of what you should have:

1 Base
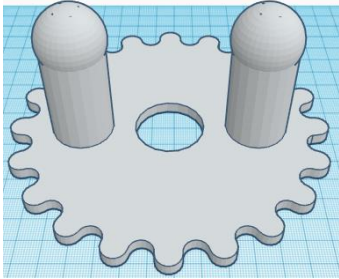
2 Large Gears
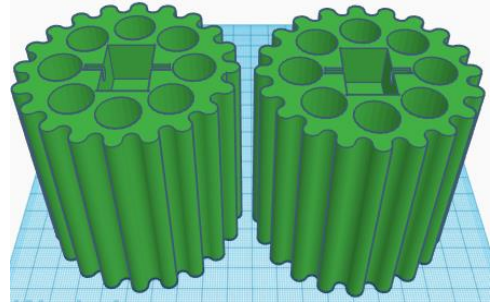
2 Gear Axles

2 Small Gear Sets
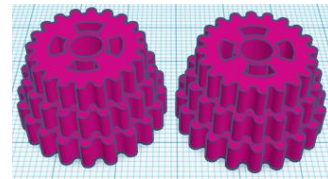
Take a Gear Axle and put it through the Small Gear Set.
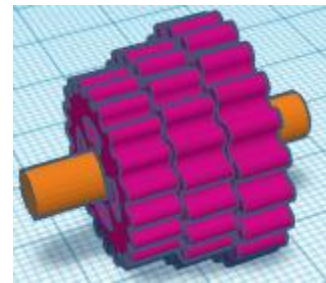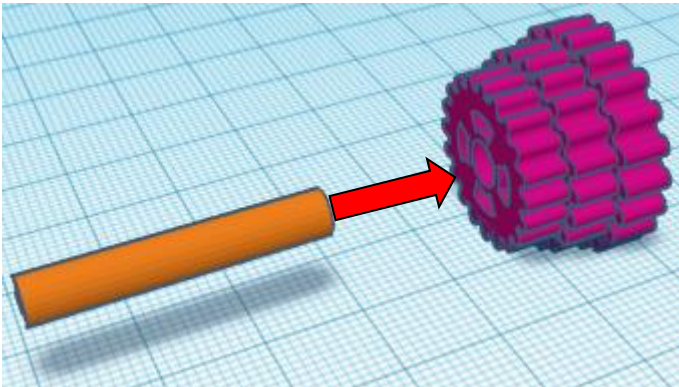
Now place the Axle and Small Gear on the Large Gear aligning the axle up with the small axle cutout.
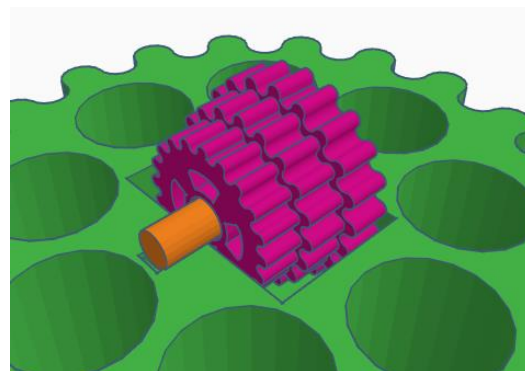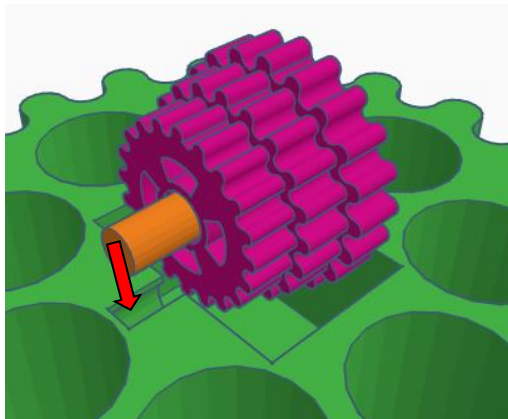
The next part will require using tools. You need a tool that will compress the axle into the axle cutout. Possible tools to use are: Clamp or vise or large pipe wrench.

The following is a pic of me using a wrench to pop the axle into the groove.

Make sure you do both sides!

After you have both sides popped into the grooves, the Small Gear should spin freely.
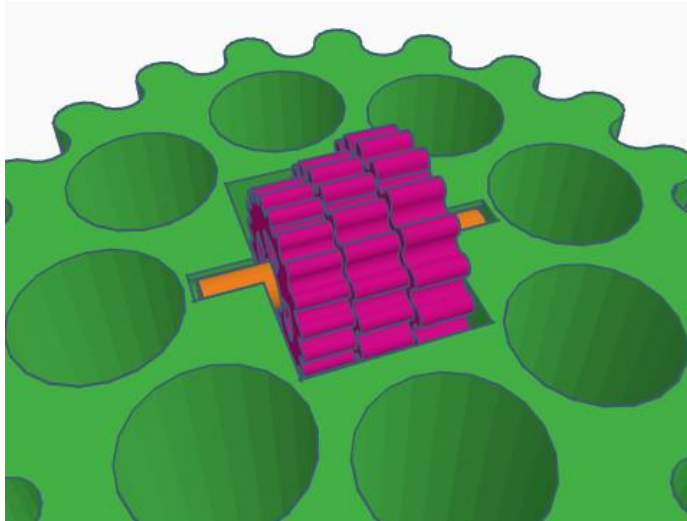
Repeat this step with the second Large Gear.
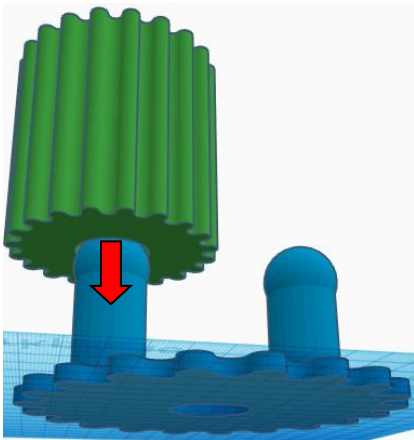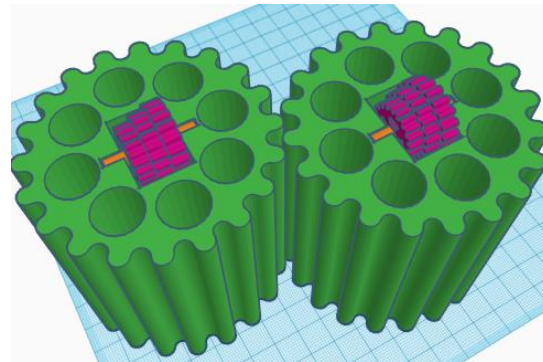
Put the Large Gear onto the Base Peg

The Large Gear will go down about half way down the peg before hitting the locking ring.
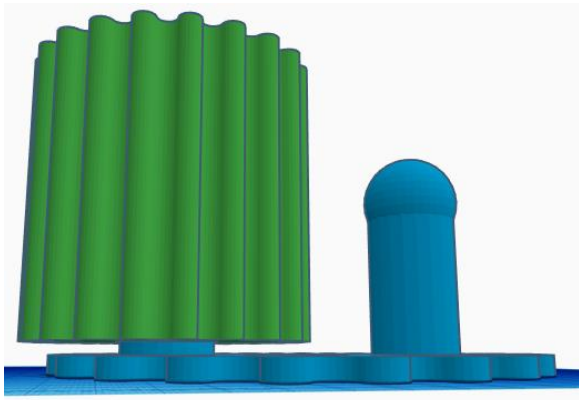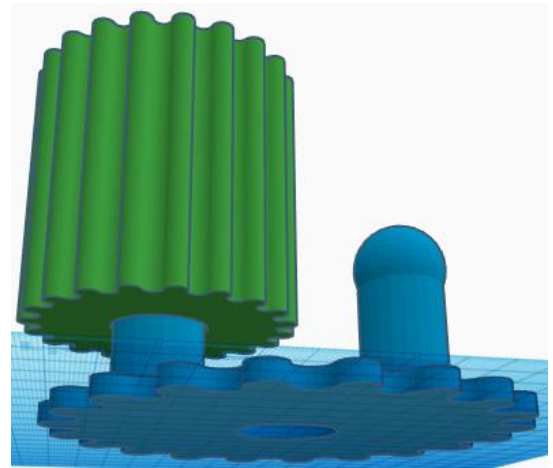
Put the palm of your hand flat on top of the Large Gear and push straight down. The locking ring will bend and let the gear slide past the ball on top of the peg. The Large Gear is now on.

Repeat this step with the second Large Gear.

You are done. Enjoy

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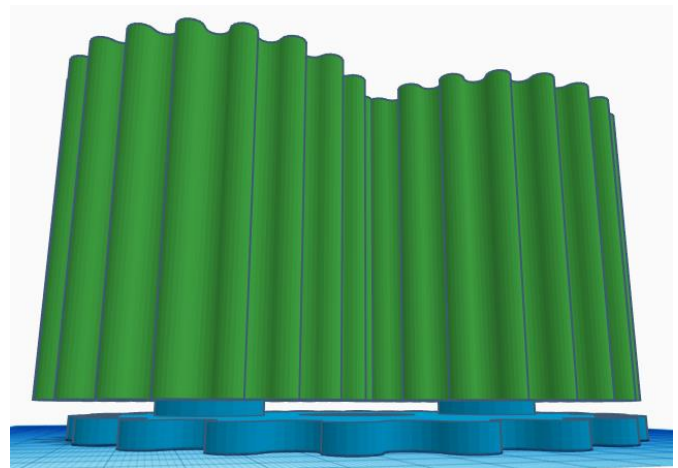
Reference to Aligning, Flip direction, Move direction, and Rotate direction.

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

Home view

Aligning:

Z top

Z center

Z bottom

Y back

X right

Y center

X center

Y front

X Left

Flip or Mirror and Move:

positive Z

Z direction

positive Y

negative Z

Y direction

positive X

negative Y

X direction

negative X

42

Rotate:

Counter-Clockwise

Clockwise

XY Plane

0°

0°

Counter-Clockwise

YZ Plane

Clockwise

0°

XZ Plane

Clockwise

Counter-Clockwise

43
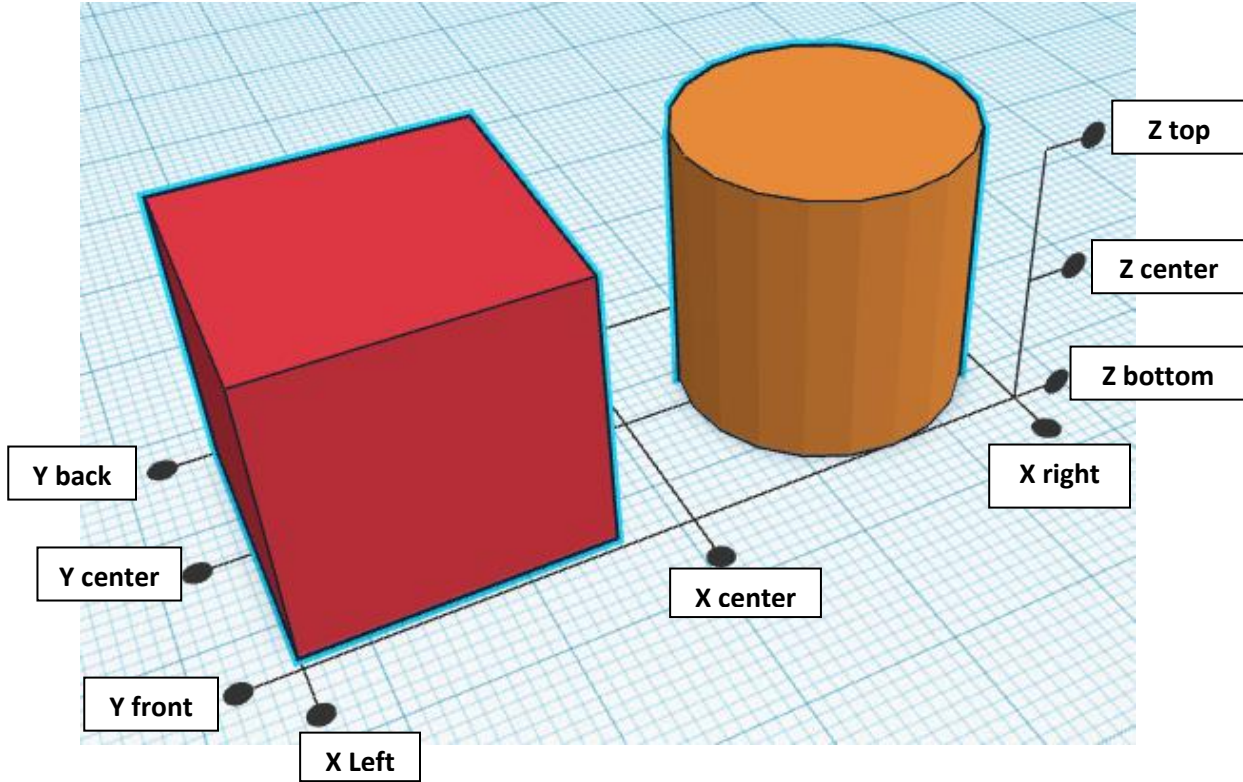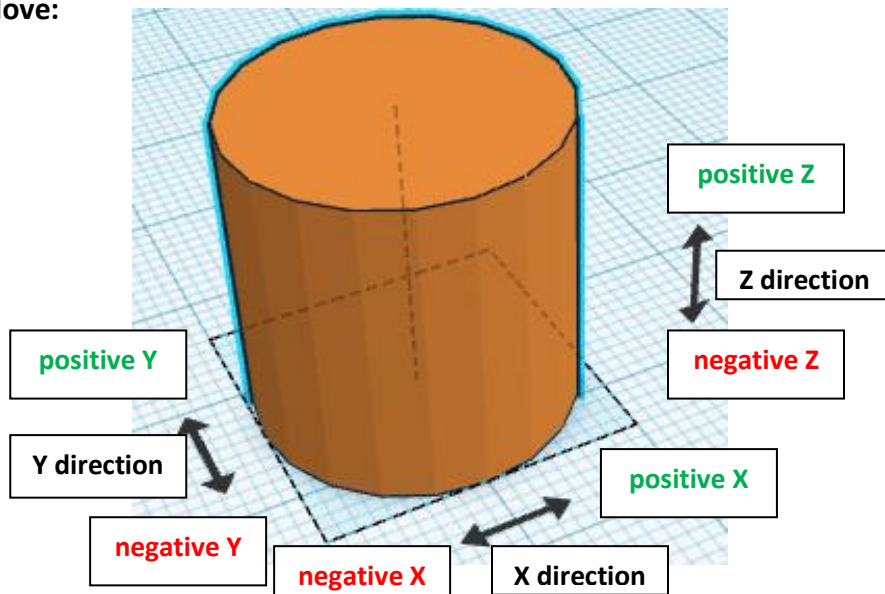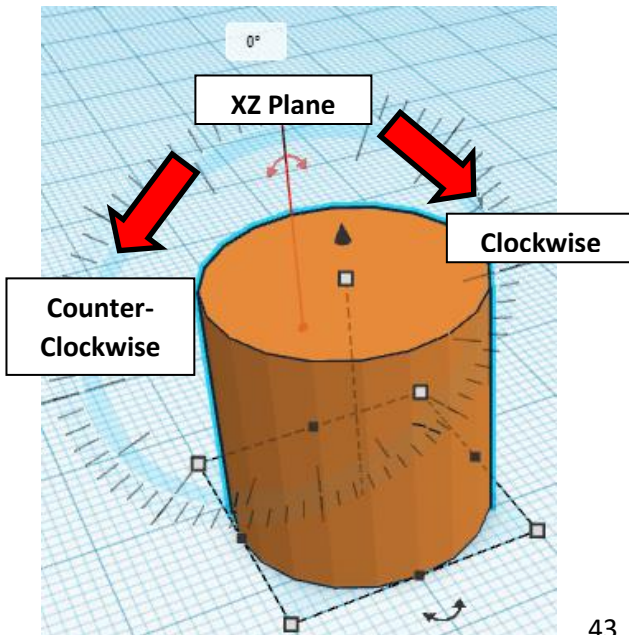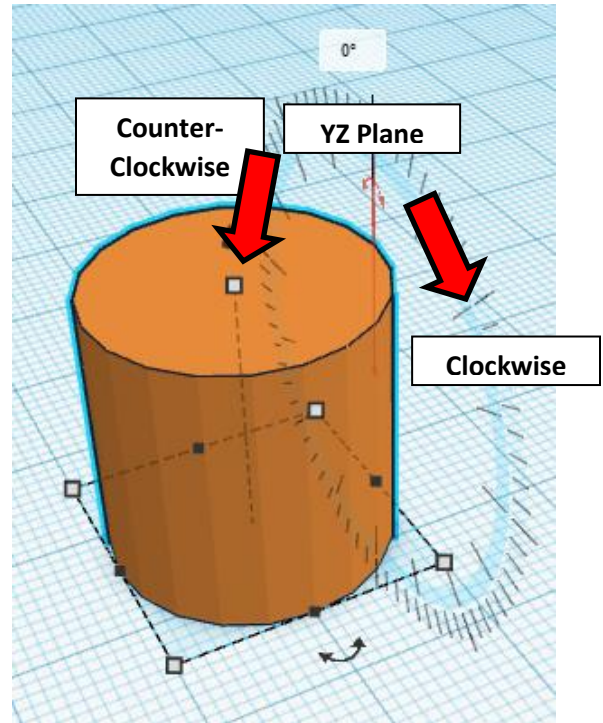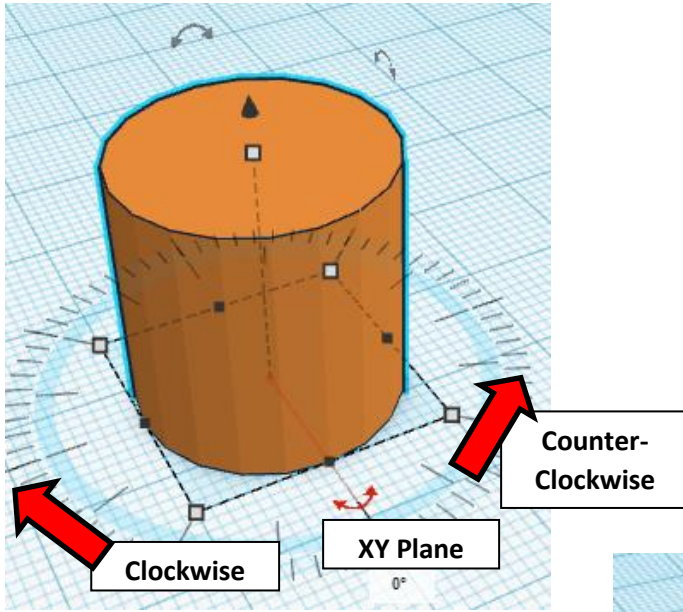
TinkerCAD Tool Guide

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 objects(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.

44
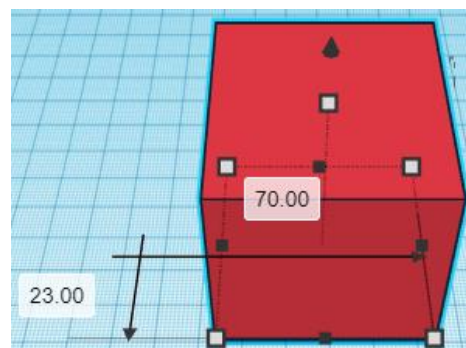
Moving Object(s) continued:

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 <u>black cone</u> at top of object.
Move mouse up or down to desired height.

black cone

22.00

22.00
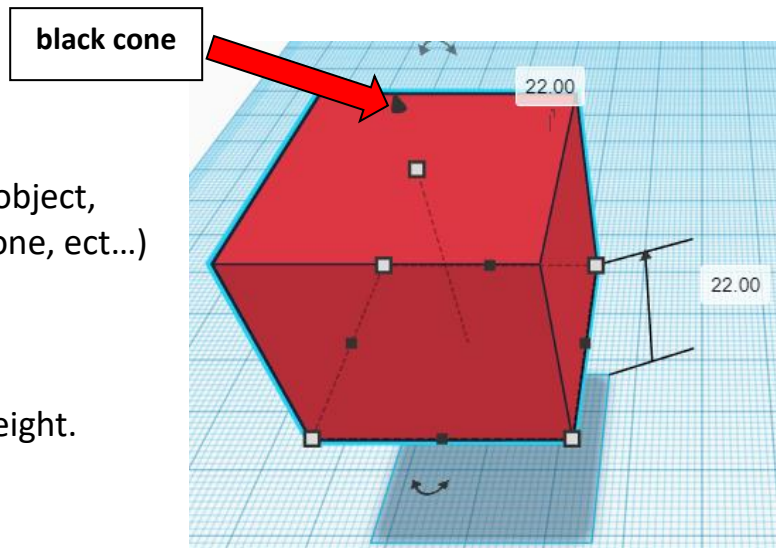
To move object(s) with keyboard:

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

Select object with left mouse button.

Use arrow keys to move the object in <u>1mm</u> 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 <u>10mm</u> 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 <u>1mm</u> 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 <u>10mm</u> increments.

Using on screen icons:

TinkerCAD main screen:

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

TinkerCAD Tool Guide
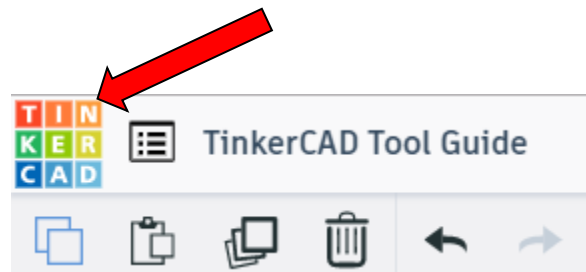
My designs:

Pulls up menu of your designs.

TinkerCAD Tool Guide
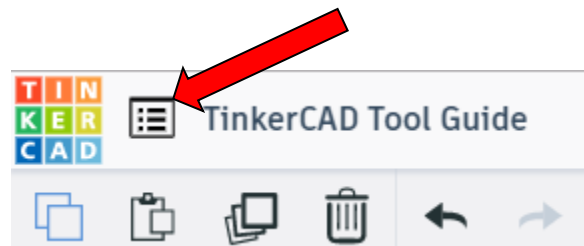
Design name:

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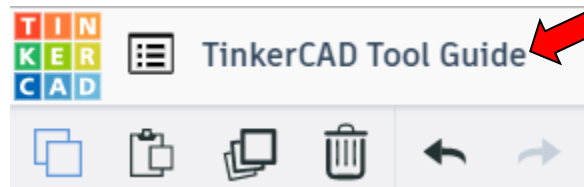
Copy:

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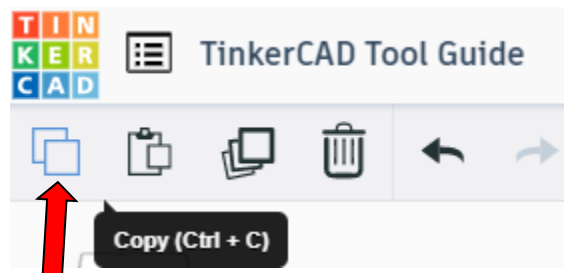
Paste:

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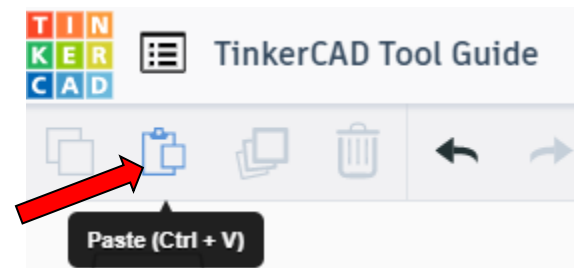
Duplicate:

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.
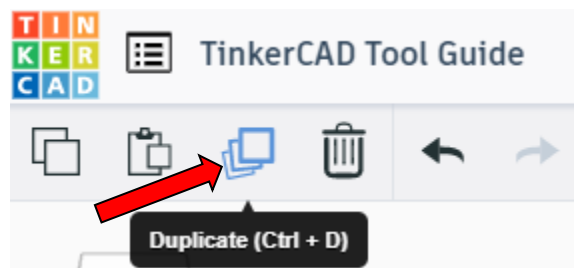
Delete:

Select shape.
Click delete or delete key.
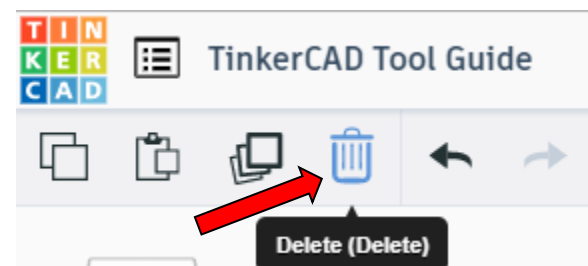
Undo:

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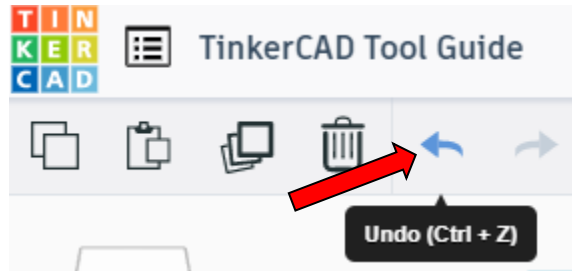
Redo:

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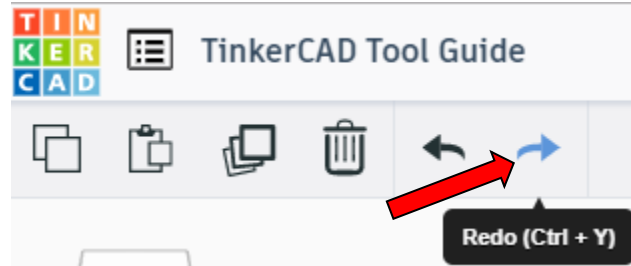
Change View:

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.
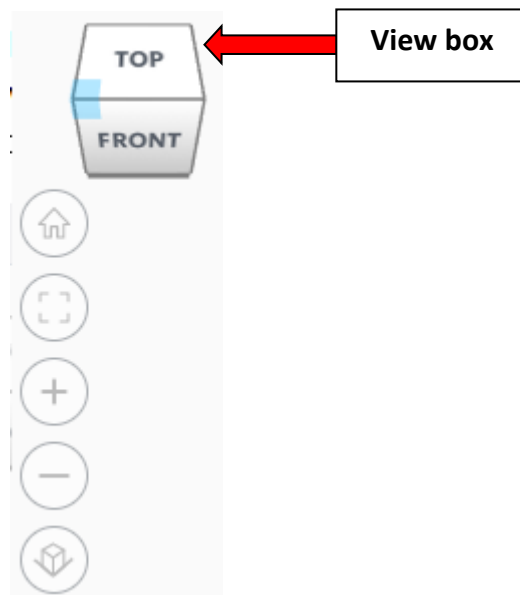
Change view to home view:

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.
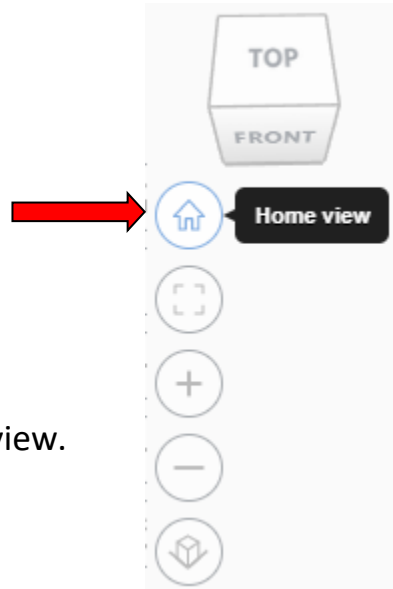
Fit all in view:

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.
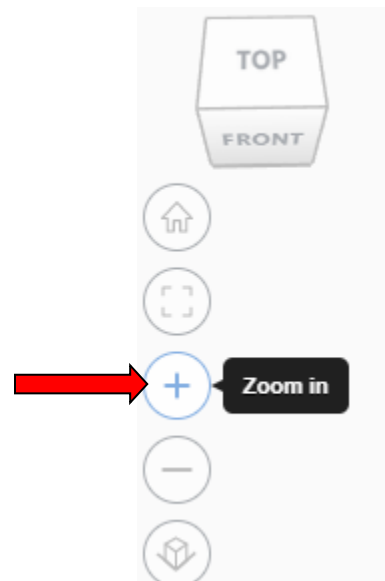
Zoom out:

Click the Zoom out icon or click the "-" key to zoom out.
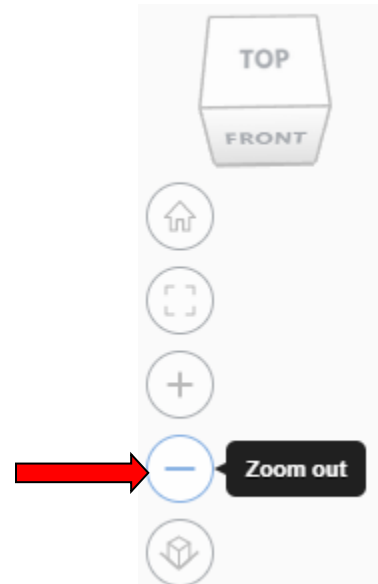
Switching to orthographic and perspective view:

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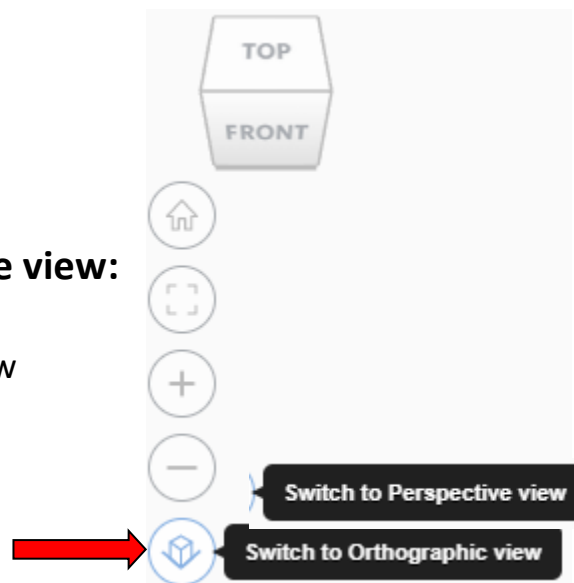
Group:

To combine two or more objects into one object.

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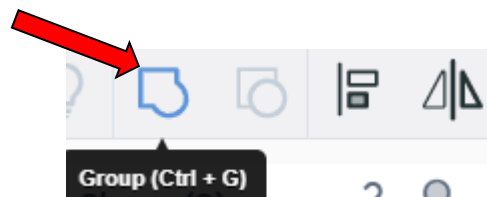
Ungroup:

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)

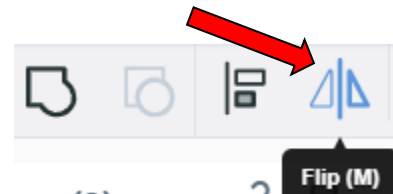|	
Duplicate dragged object(s)	Alt + Drag left mouse button
Select multiple object(s)	Shift + Left mouse button
45° rotation	Shift (Hold while rotating)
Scale in one direction	Alt + Hold side handle
Scale in two directions	Alt + Hold corner handle
Uniform scale	Shift + Hold corner handle
Uniform scale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