TINKERCAD

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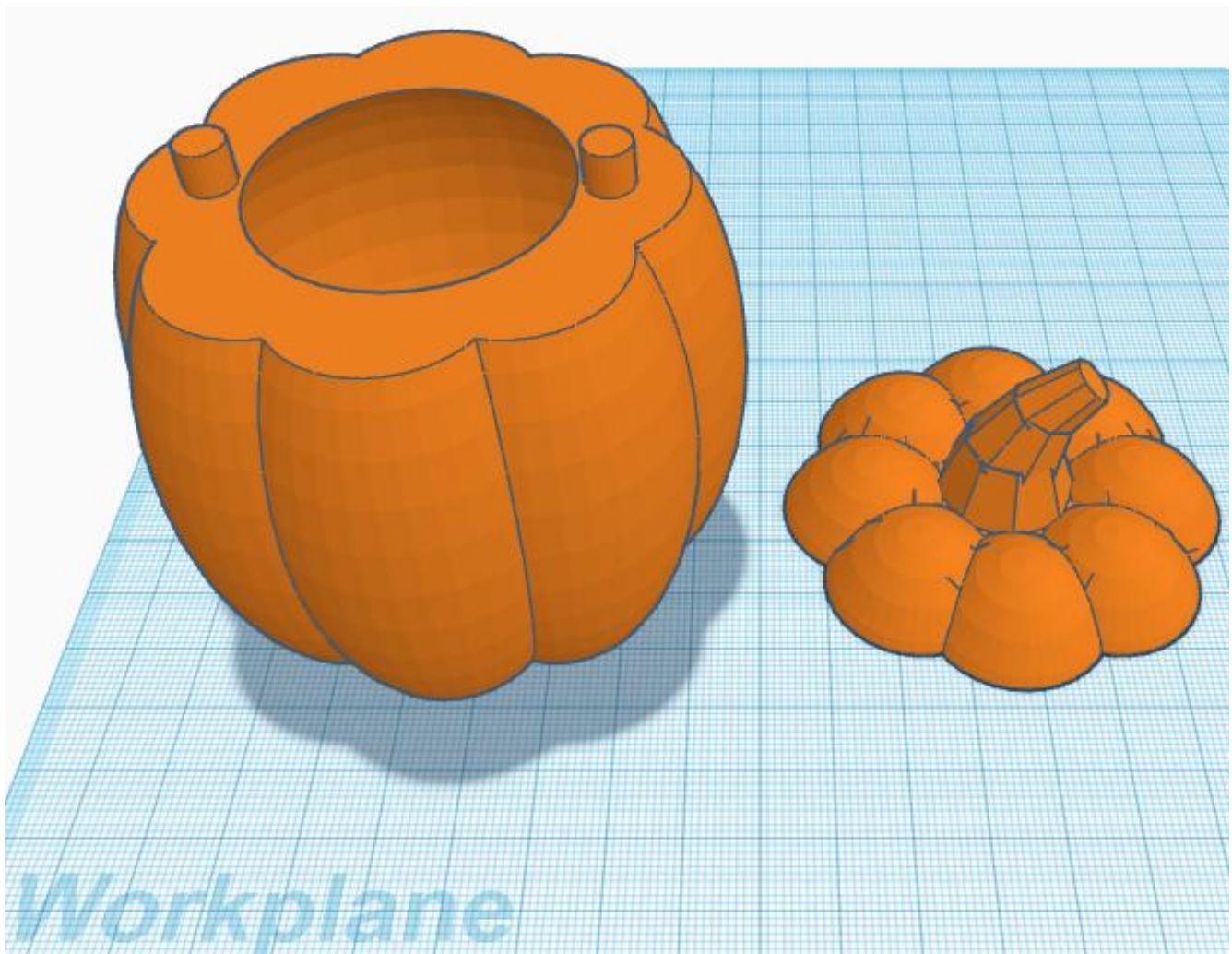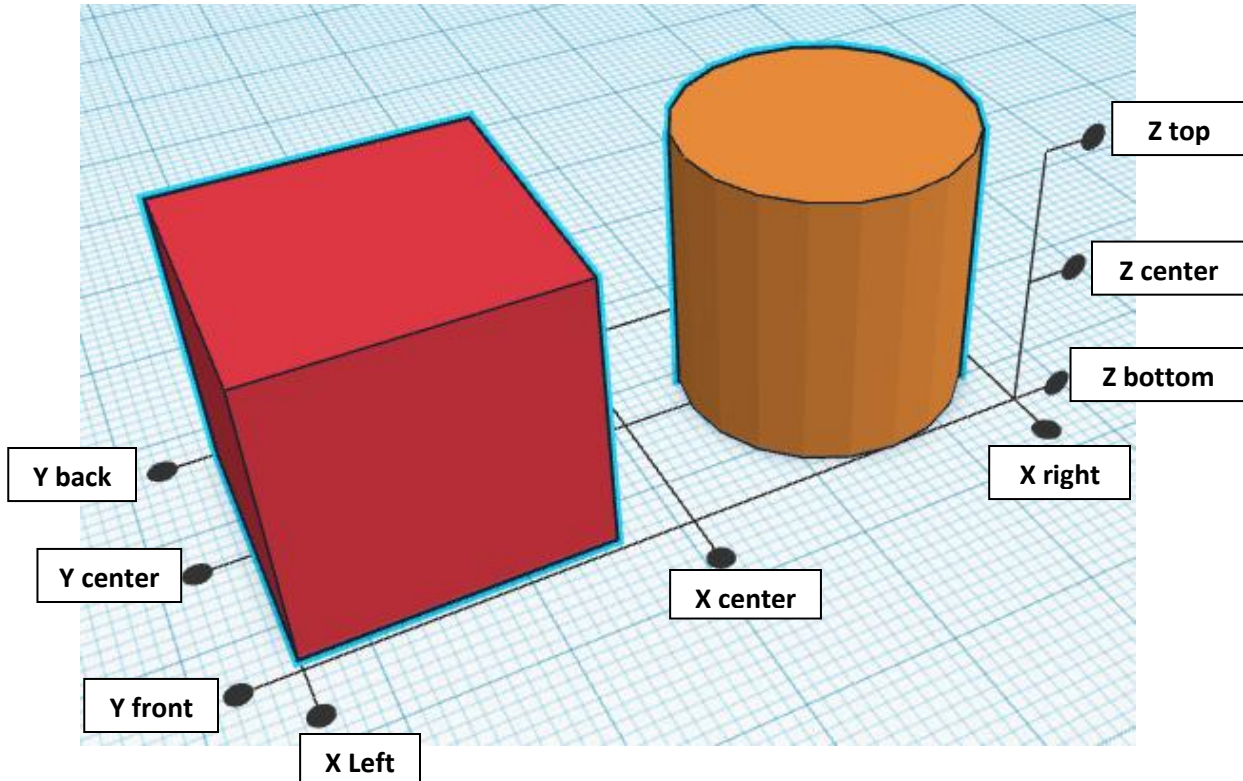
Reference to Aligning, Flip direction, Move direction, and Rotate direction.

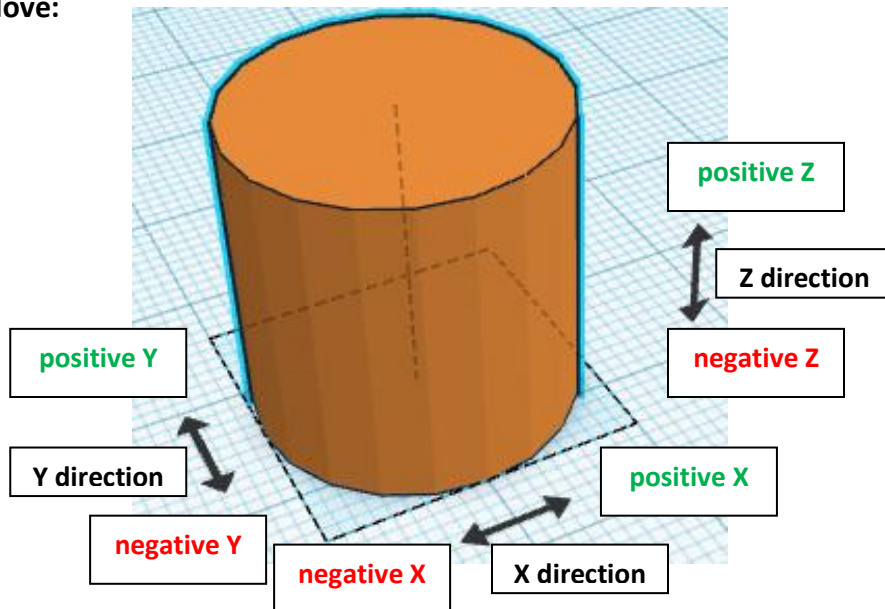## Always be in the "home view" 🏠 Home view when doing any of these!!!
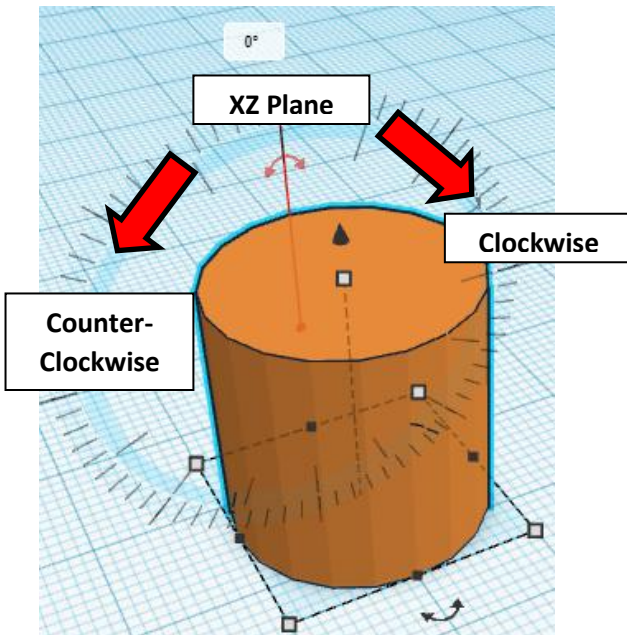
Aligning:

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

negative X   X direction

Rotate:

Counter-Clockwise

Clockwise

XY Plane

0°

0°

Counter-Clockwise

YZ Plane

Clockwise

0°

XZ Plane

Clockwise

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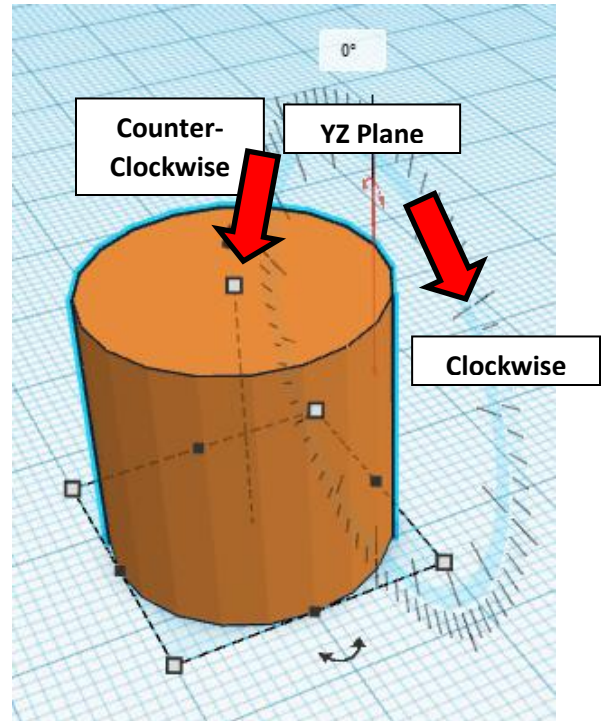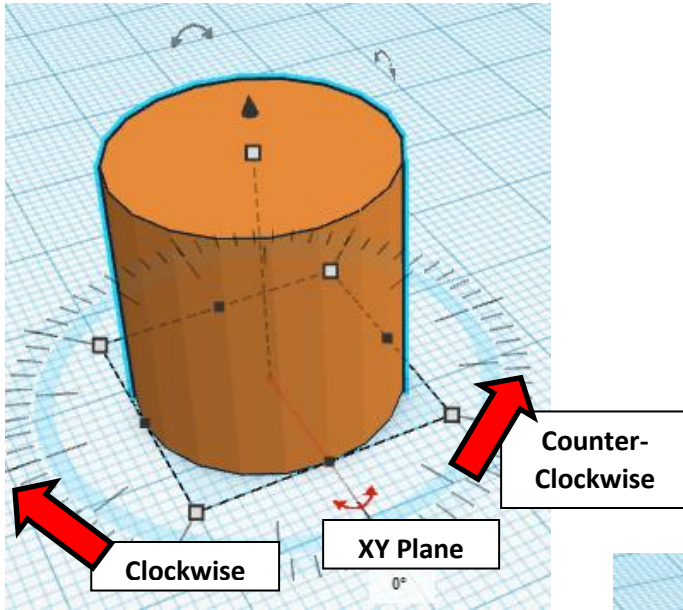
Let's start with the base. Go to "Create new design".

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

Change the dimensions:

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

Click on each dimension one at a time and type in 40, then enter. You may need to re-drag the Sphere back to the center.

Next select the Sphere again and click on the center white square. Click on the 20 and type in 80 and enter.
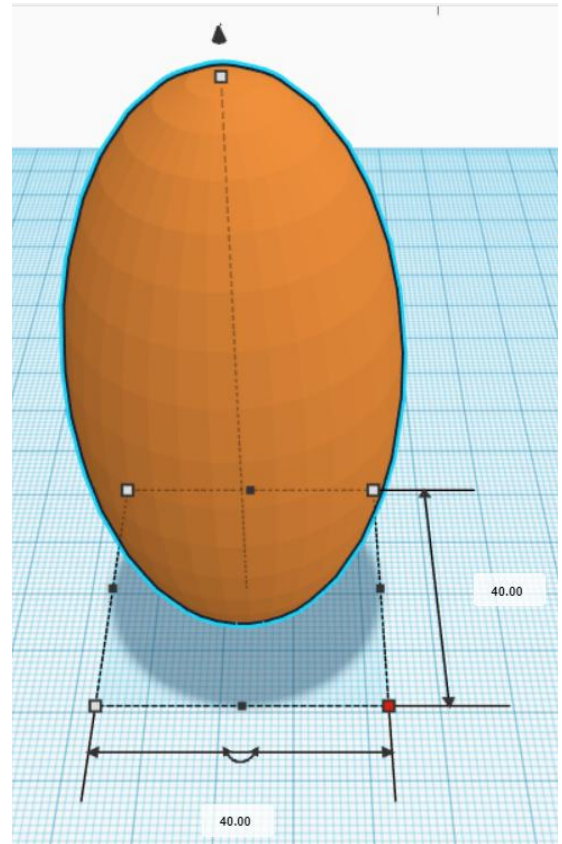
Make the outside of the pumpkin:

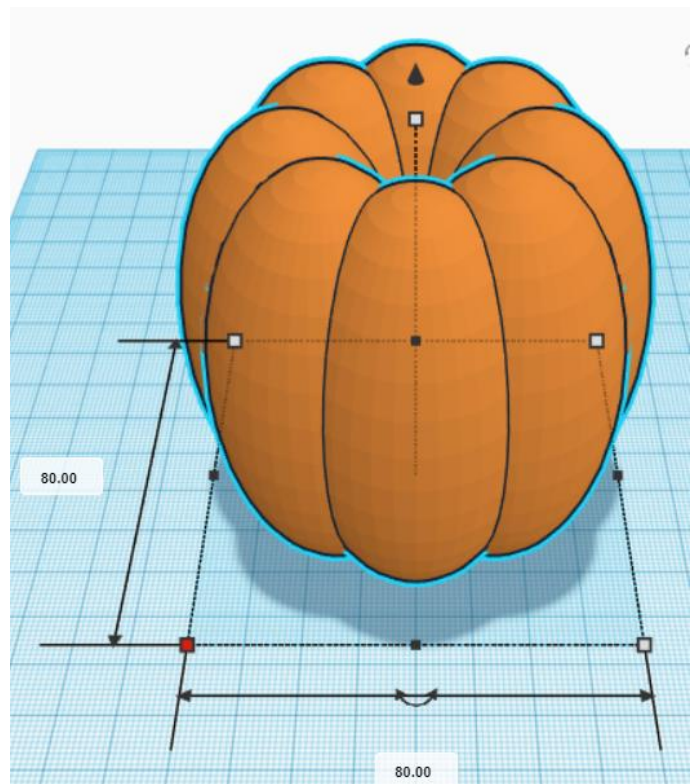Duplicate the Sphere.   Move one Sphere 40mm to the right.   Group the two Spheres.

Duplicate the pair of Spheres 3 times.

Rotate in the XY Plane 1 pair clockwise 45 degrees.
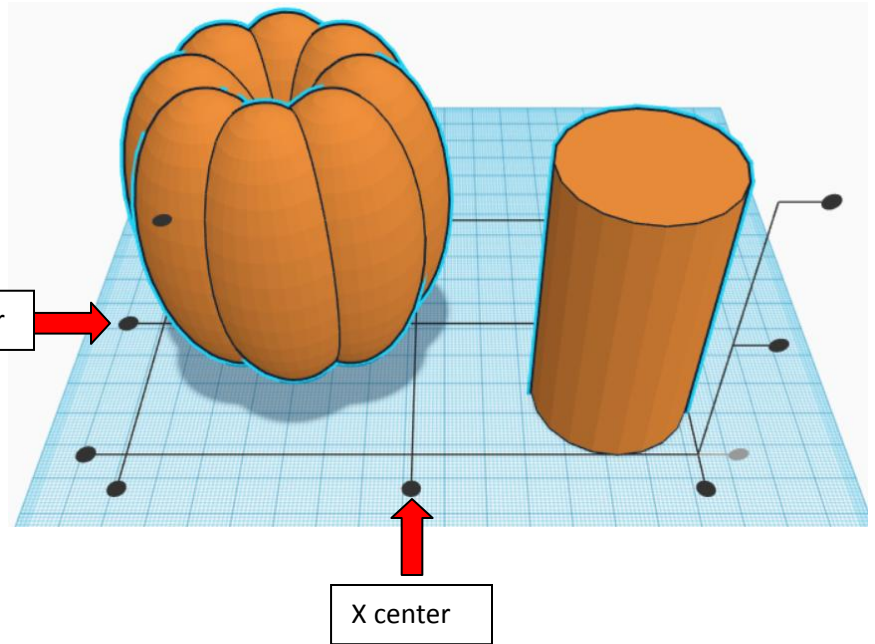Rotate 1 pair counter-clockwise 45 degrees.
Rotate 1 pair 90 degrees.

Group all the pair of spheres.

Make a flat base for printing:

Drag in a Cylinder. Set dimensions of Cylinder to 40mm length, 40mm width, and 74mm height.

Use the Align tool to align the Spheres and Cylinder "**X center**" and "**Y center**".

Group all.

Y Center

X center

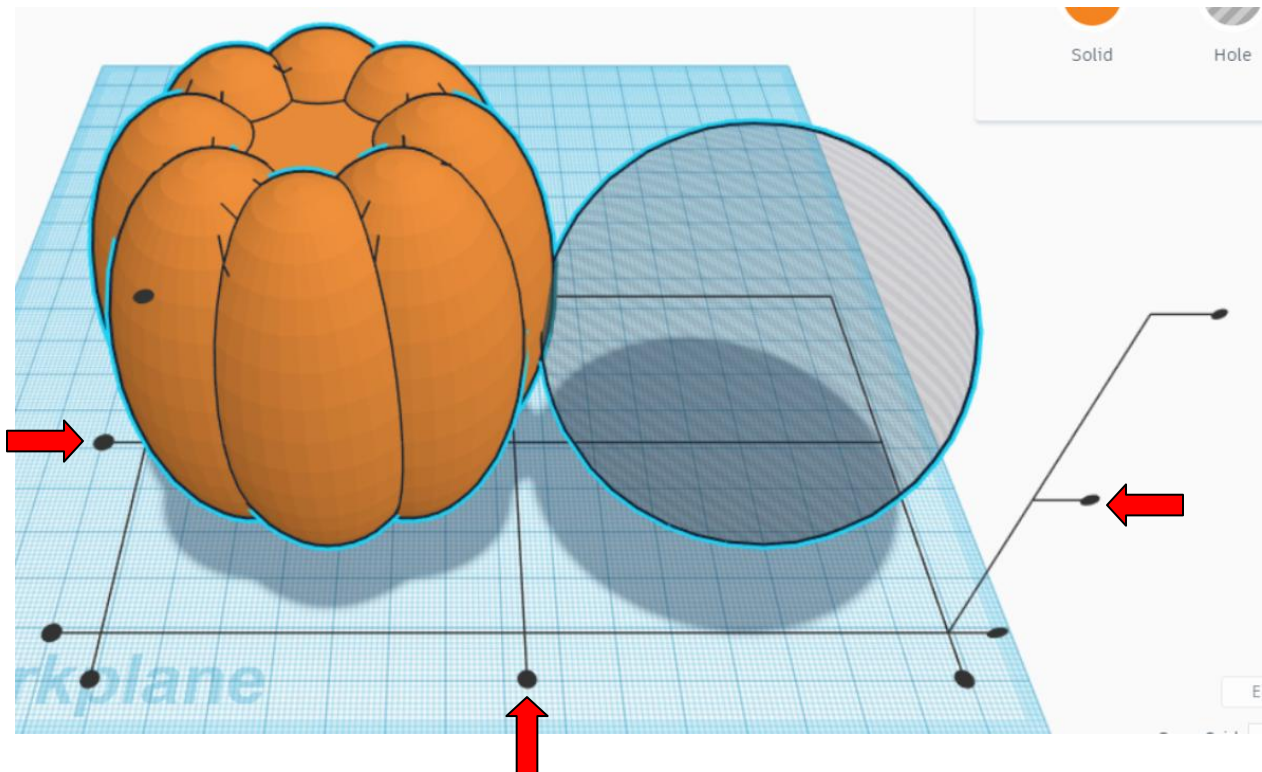**Make the Top and Bottom separate:**

Duplicate the pumpkin and move one off to the side.

Bring in a Sphere. Change all dimensions on the Sphere to 71mm.

Change the Sphere to a "Hole" by selecting it and typing "h".
Align one pumpkin, now known as the "Bottom Pumpkin", with the Sphere **X center**, **Y center**, and **Z center**, see figure below.

Group the Sphere and Bottom Pumpkin.

Cut the top off the Bottom Pumpkin:

Bring in a box.

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

Change the dimension to 100mm wide, 100mm length, and 69mm height.

Duplicate the box and set one off to the side for later use.

Using the black Cone above the box move one of the boxes up into the air 69mm.
Hint: Grab the black Cone and start dragging box up, notice two numbered boxes appear. Select the lower text box and type in 69 and enter.

Use the Align command to center the box with the Bottom Pumpkin and Group the two objects,
X center and **Y center**.
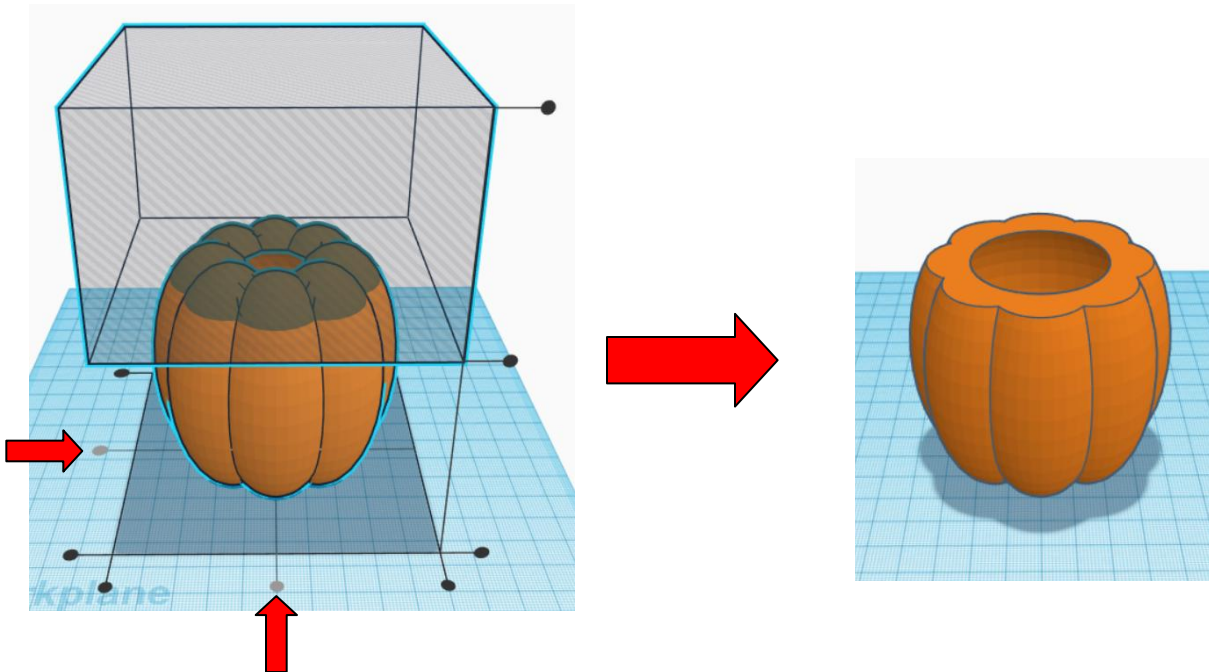
Create knobs to hold top on:

Drag in a new workplane on top of the Bottom Pumpkin. This will make an orange workplane on top of the pumpkin.

Drag in a Cylinder.

Change the dimensions on the Cylinder to 6mm wide, 6mm length, and 6mm height.

Use the Align command to center the Cylinder with the Bottom Pumpkin, **X center** and **Y center**.

Duplicate the Cylinder.

Using the arrow keys, move one Cylinder to the left 24mm, (negative X direction), and one Cylinder 24mm to the right, (positive X direction).

Hint: Select one Cylinder and push the left arrow key once for each 1mm you want it to move. Holding the Shift key while pushing the left arrow key will move the Cylinder 10mm each time.
This is the same for moving the other Cylinder to the right except for you will push the right arrow key.

When the Cylinders are in place group the two Cylinders and the Bottom Pumpkin.
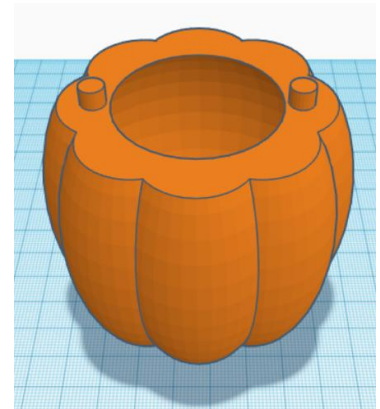
Except for creating a design in the Bottom Pumpkin, which you will do on your own, the Bottom Pumpkin is done.
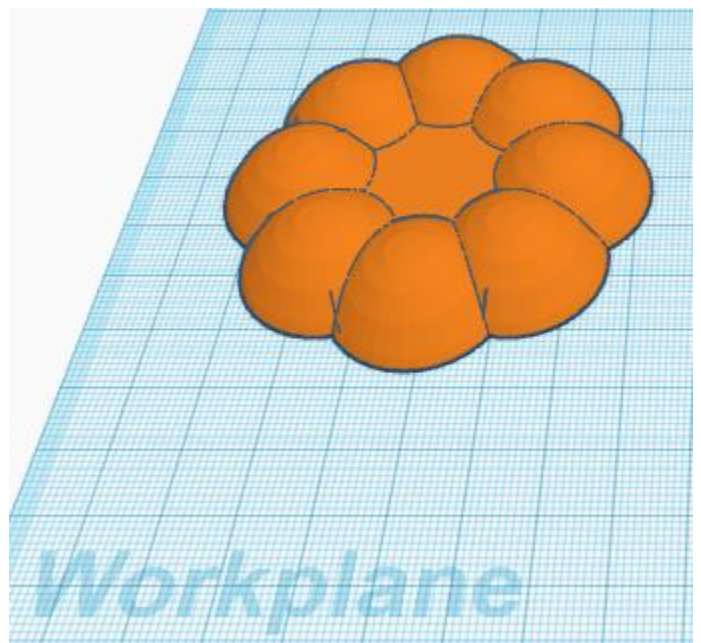
Make Top of Pumpkin:

Using the box and pumpkin, (from now on will be called Top of Pumpkin), use the Align command to center the box with the Top of Pumpkin and Group the two objects, **X center** and **Y center**.

Reset the workplane:

Drag the workplane out and set on the workplane, (not touching any object), this will change the workplane back to blue.

Move the Top of Pumpkin to workplane by selecting it and typing "d".

This will put the Top of Pumpkin on the workplane for printing.

Create knob holes to hold top on:

Drag in a Cylinder.

Change the Cylinder to a Hole.

Change the dimensions on the Cylinder to 8mm wide, 8mm length, and 7mm height.

Use the Align command to center the Cylinder with the Top of Pumpkin, X center and Y center.

Duplicate the Cylinder.

Using the arrow keys, move one Cylinder to the left 24mm, and one Cylinder 24mm to the right.
Hint: Select one Cylinder and push the left arrow key once for each 1mm you want it to move. Holding the Shift key while pushing the left arrow key will move the Cylinder 10mm each time.
This is the same for moving the other Cylinder to the right except for you will push the right arrow key.

When the Cylinders are in place group the two Cylinders and the Top of Pumpkin.

Create Vine on top of Pumpkin:

Drag in a Diamond.
Hint: the Diamond is at the bottom of the basic shapes on the right side.

Drag in a box.

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

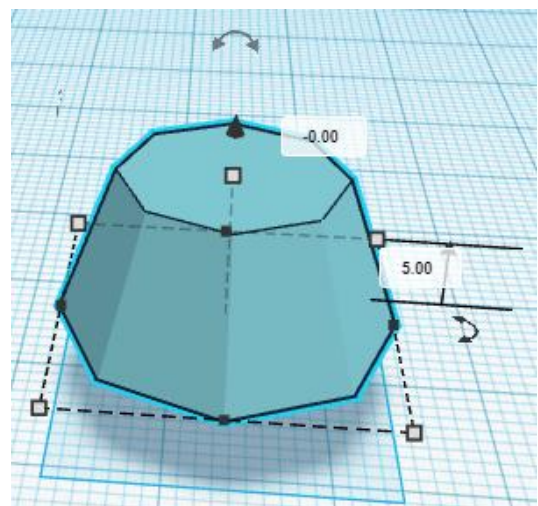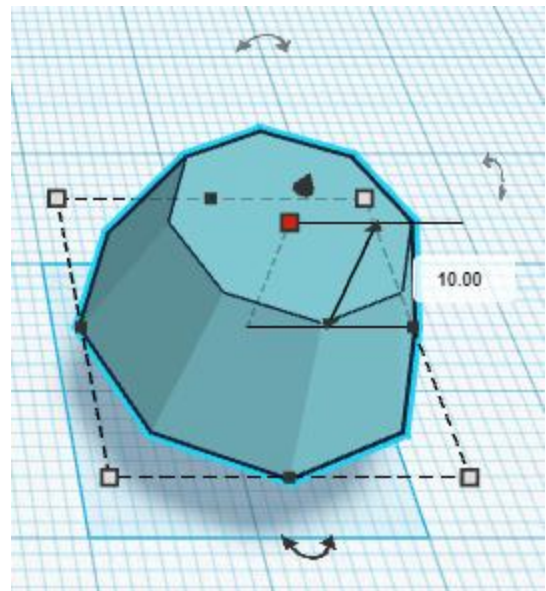Change the dimensions of the box to height of 7mm.

Use the Align command to center the Diamond with the Box, **X center** and **Y center**.

Group the Diamond with the Box.

Change the dimensions of the New Diamond to length 21mm, width 21mm and height 10mm.

Grab the black cone above the New Diamond and move the height above workplane to 5mm.
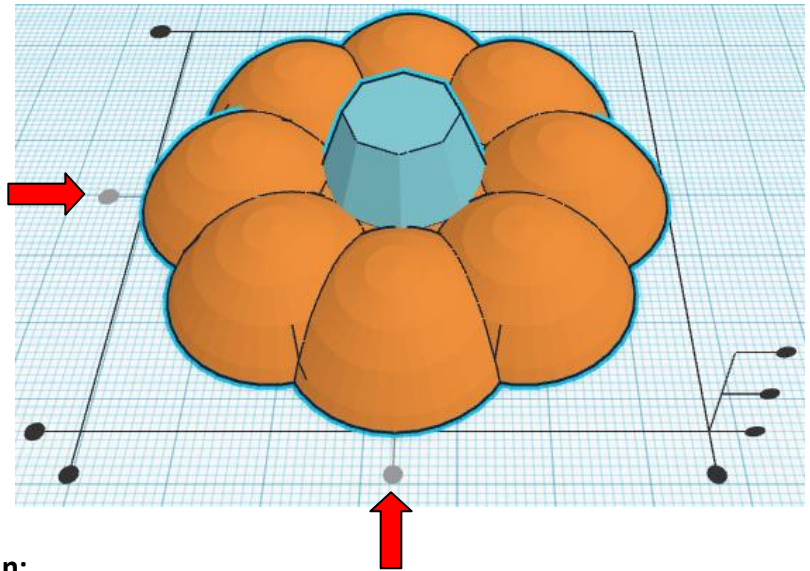
Duplicate the New Diamond 2 times.

Align one of the New Diamonds with the Top of Pumpkin, **X center** and **Y center**.

Group the New Diamond and Top of Pumpkin.

Continue making the Vine on top of Pumpkin:

Grab the black cone and move one of the New Diamonds up to 12mm above the work plane.

Change the dimensions of the higher New Diamond to length 15mm, and width 15mm.
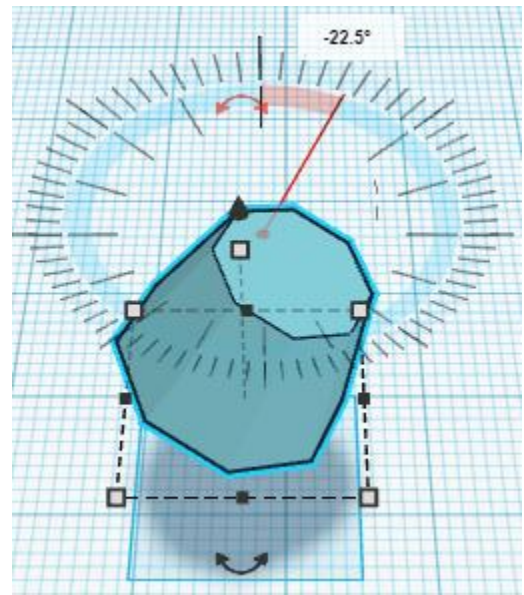
Rotate Top of Vine:

Select the top rotate arrow and rotate the New Diamond **22.5 degrees clockwise** in the **XZ Plane**.
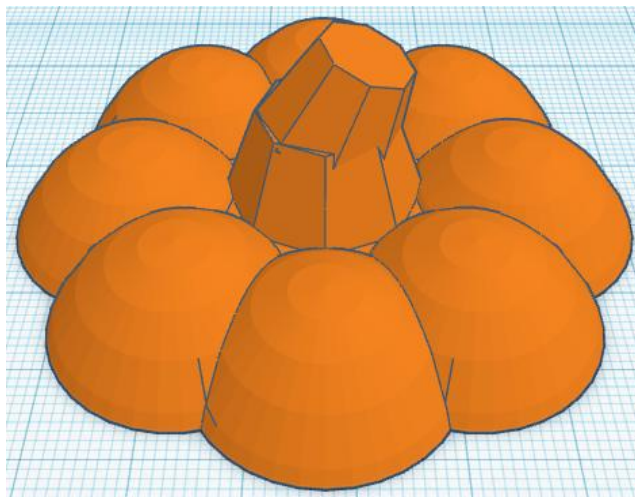
See Figure at right.

Align the New Diamond and Top of Pumpkin, **X center** and **Y center**.

Select the New Diamond and use the right arrow key to move the New Diamond **1mm to the right**, positive x direction.

Group the New Diamond and the Top of Pumpkin.

See Figure to right.

Continue making the Vine on top of Pumpkin:

You should have one more New Diamond from the first one that you Duplicated.

Select that New Diamond and grab the black cone and drag it up to 19mm above the workplane.

Change the dimensions of the New Diamond to length 10mm, and width 10mm.
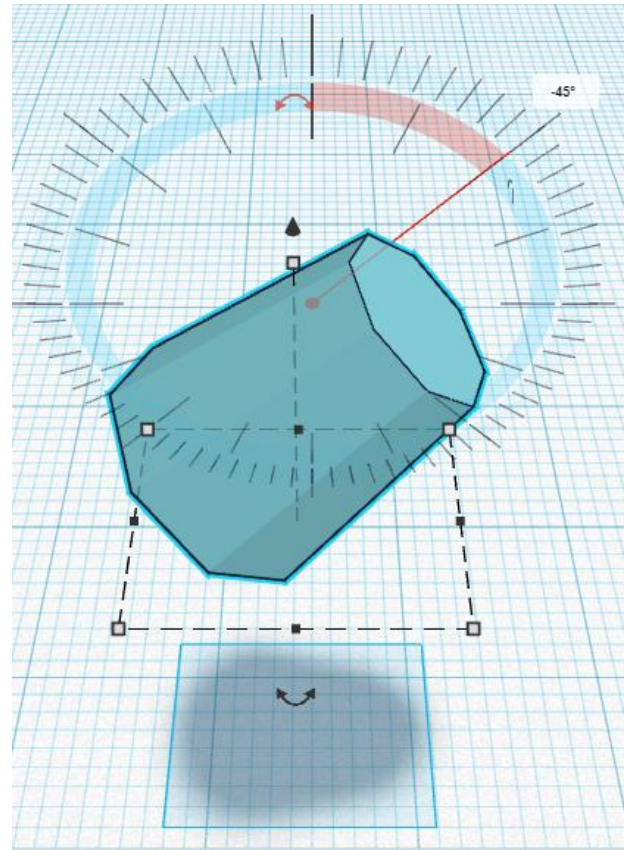
Rotate Top of Vine:

Select the top rotate arrow and rotate the New Diamond **45 degrees clockwise** in the **XZ plane**.
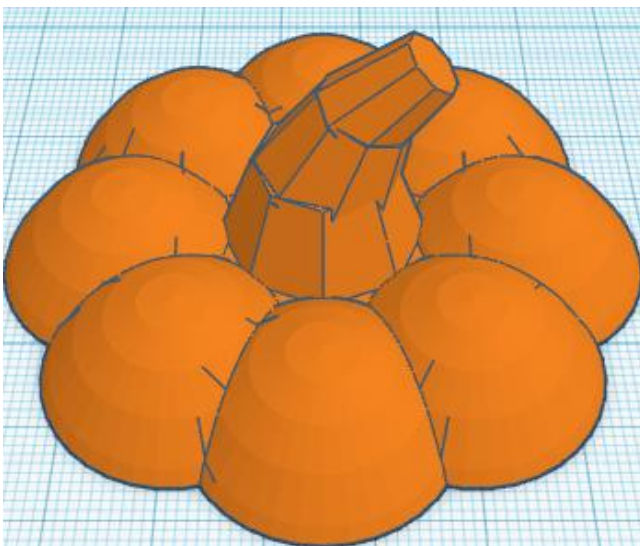
See Figure at right.

Align the New Diamond and Top of Pumpkin, **X center** and **Y center**.

Select the New Diamond and use the right arrow key to move the New Diamond **6mm to the right**, in the positive x direction.

Group the New Diamond and the Top of Pumpkin.

See Figure below.

You are done with the Pumpkin.

Now create your own Jack-o-Lantern face or picture or saying on the Bottom of Pumpkin.

Then 3D print and put a LED Tea Light inside to light up your creation.

Have a Happy Halloween!