Course: 3D Design
Title: Flashlight
Blender: Version 2.6X
Level: Beginning
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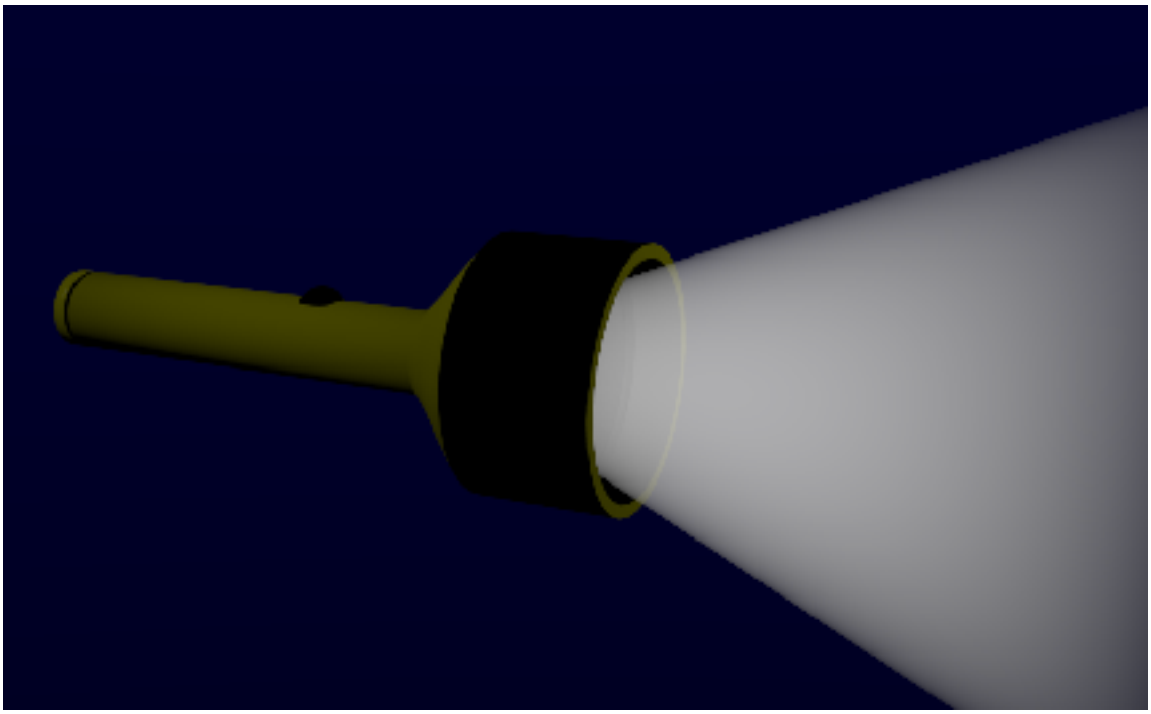
(May 2012)

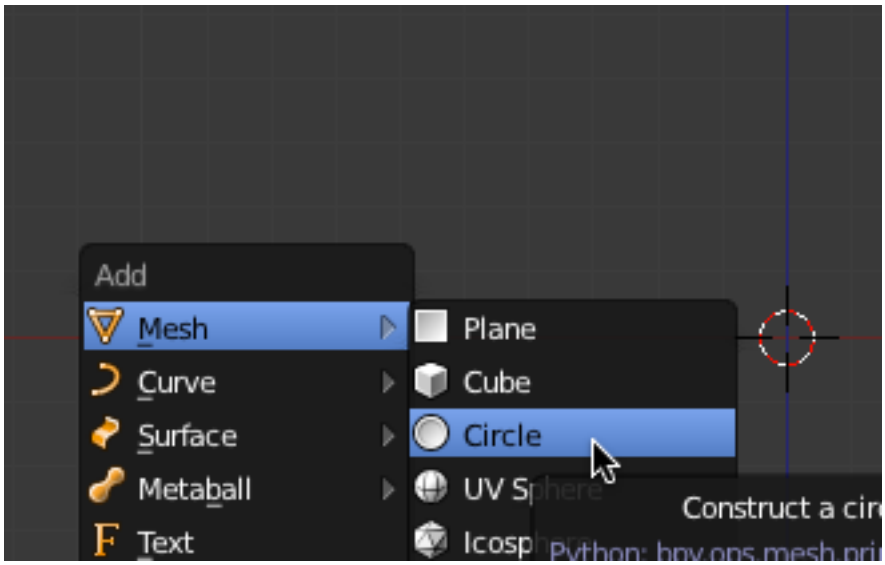
Flashlight



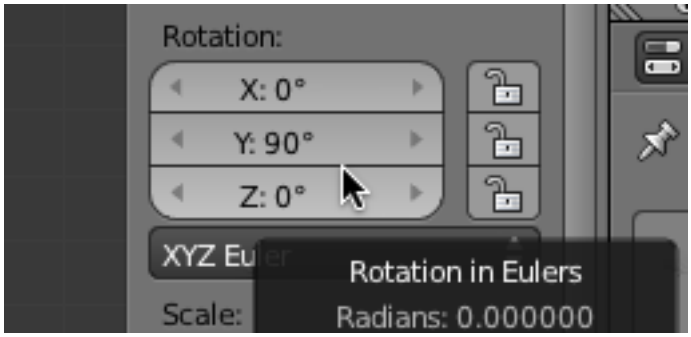
In this tutorial we will model a simple flashlight as shown above.

Open Blender. Delete the default cube object. Go to Front View. Press the NKEY to display the properties panel on the right (if it it not already displayed). Press NUMPAD-5 to go into Orthographic Projection view (if your front view is in perspective).

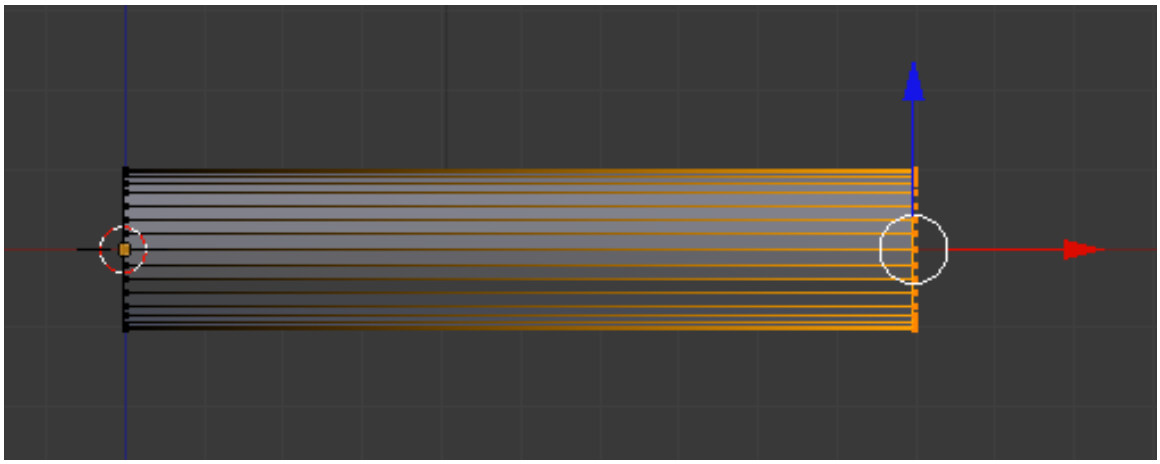
Place your 3D cursor in the center of the display and press SHIFT-A and add a Circle object.



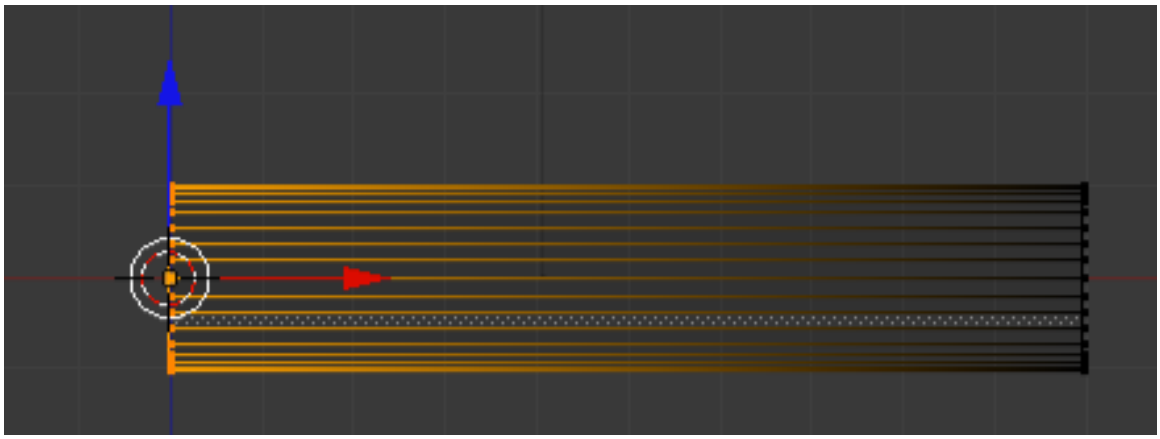
In the properties panel, set the Y rotation to 90



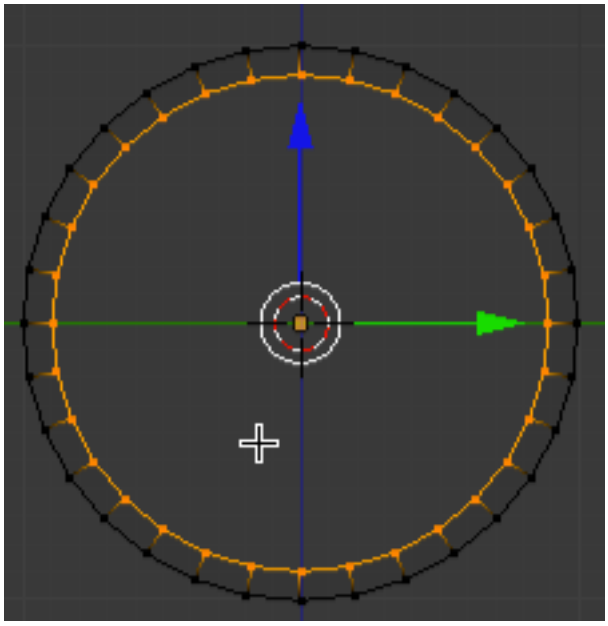
TAB into edit mode. With all of the vertices selected, press the EKEY (Extrude) followed by the XKEY and extrude the vertices along the X-axis 10 Blender units to the right as shown below.



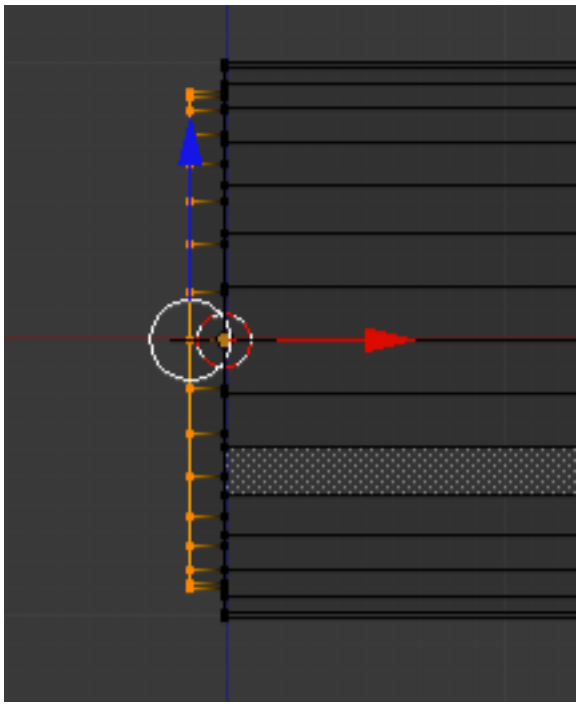
Deselect the vertices. We will now model the back end of the flashlight. Box select (BKEY) the vertices on the left as shown below.



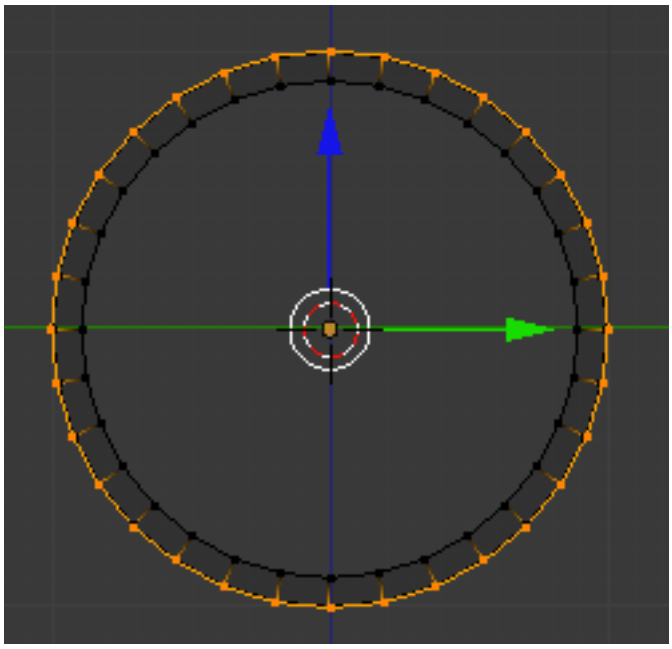
Go to side view. Press the EKEY (Extrude) then left click to set. Now press the SKEY (scale) and scale the vertices down as shown below.



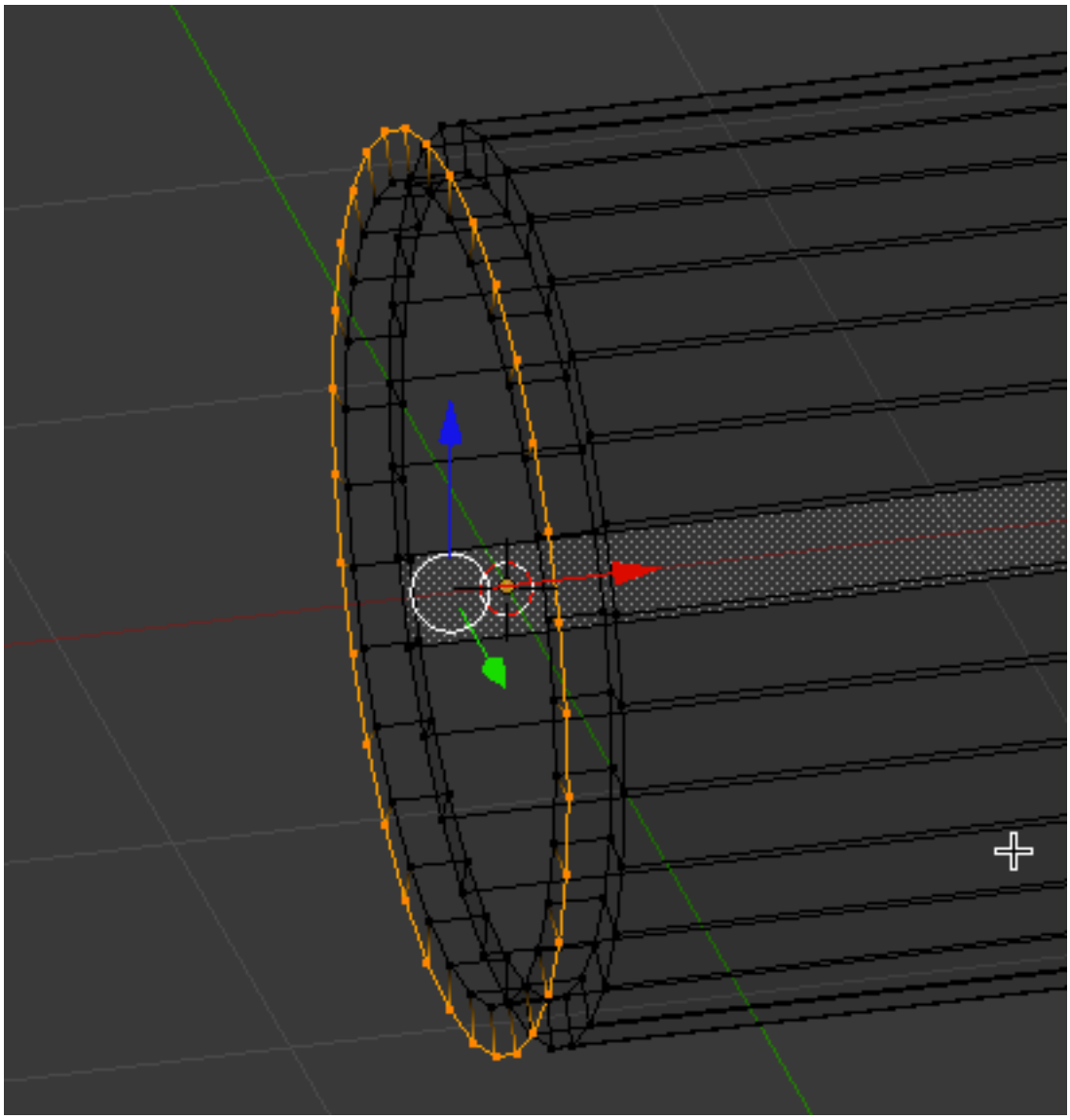
Go to front view. Extrude the vertices slightly to the left along the X axis (EKEY then XKey) as shown below.



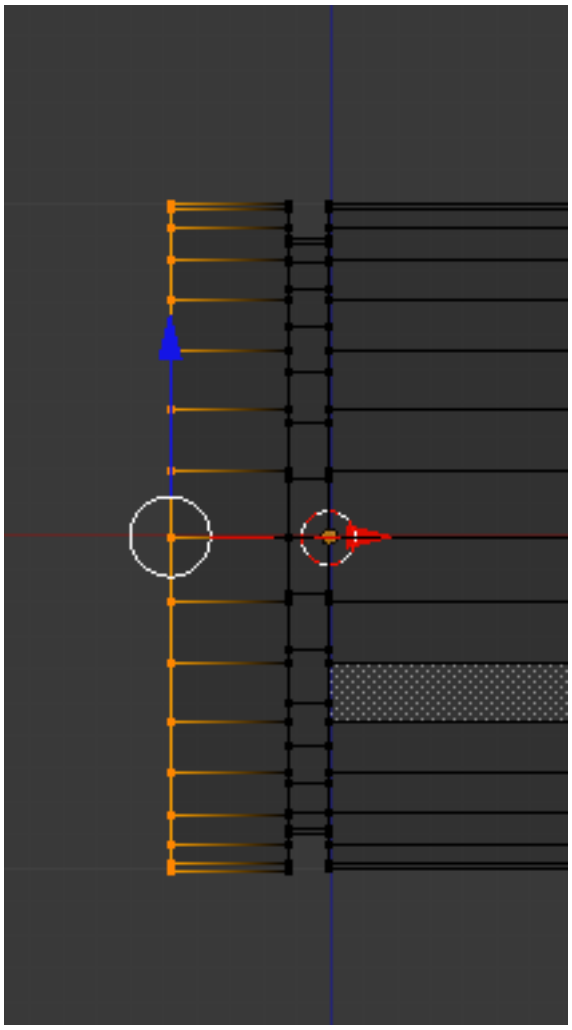
Go to side view. Press the EKEY (extrude) then left-click to set. The press the SKEY (scale) and scale up the vertices as shown below.



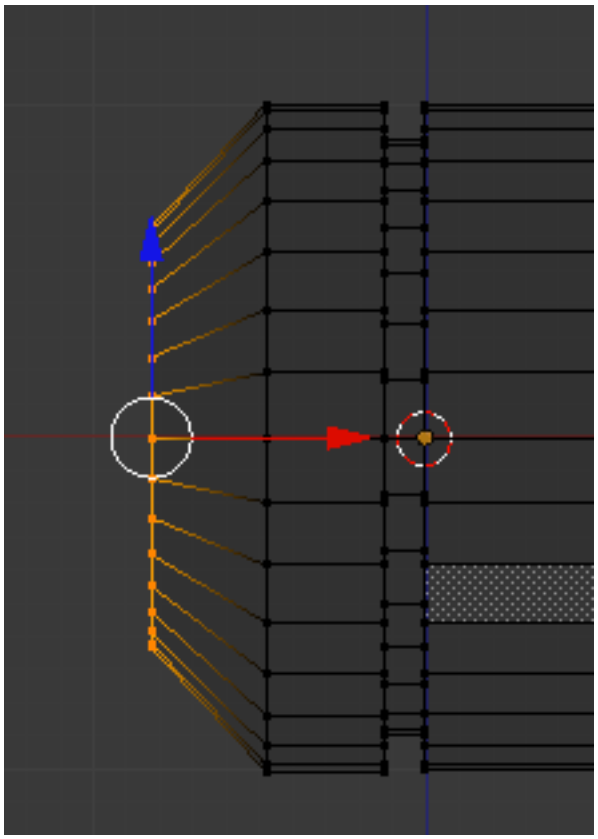
We have made a little indentation to indicate the screw end of the flashlight.



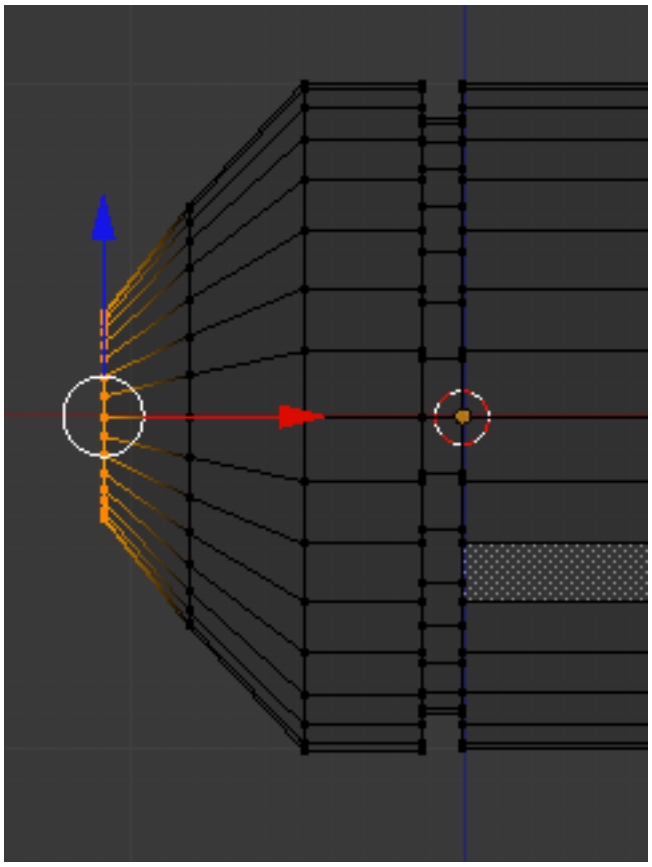
In front view, extrude the vertices along the X axis to the left again as shown below.



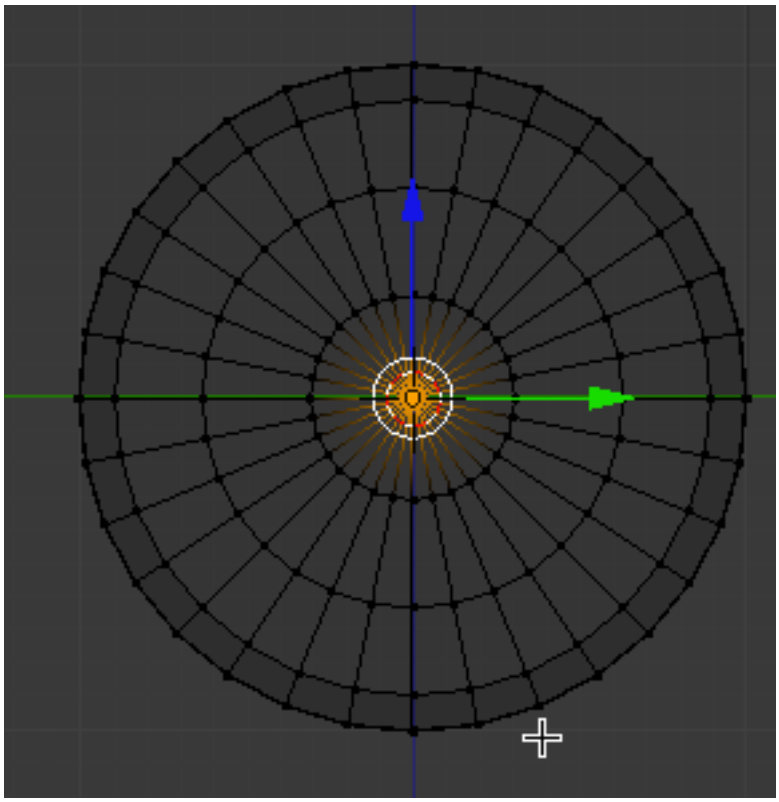
Extrude again along the X-axis and scale as shown below.

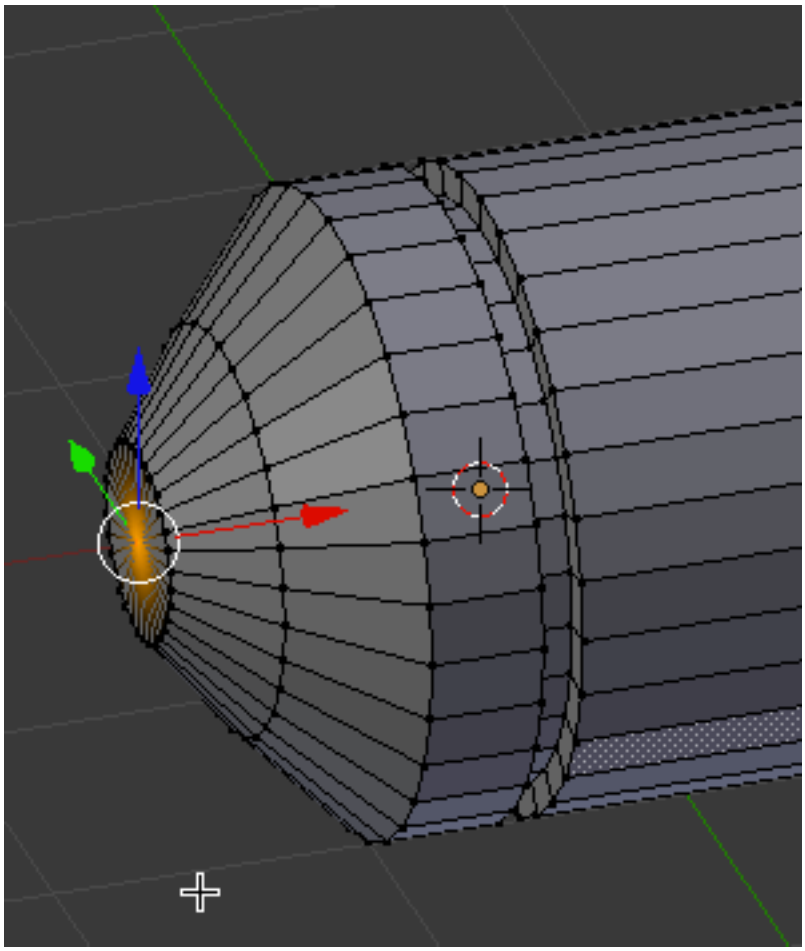


Extrude again to the left along the X-axis and scale as shown below.



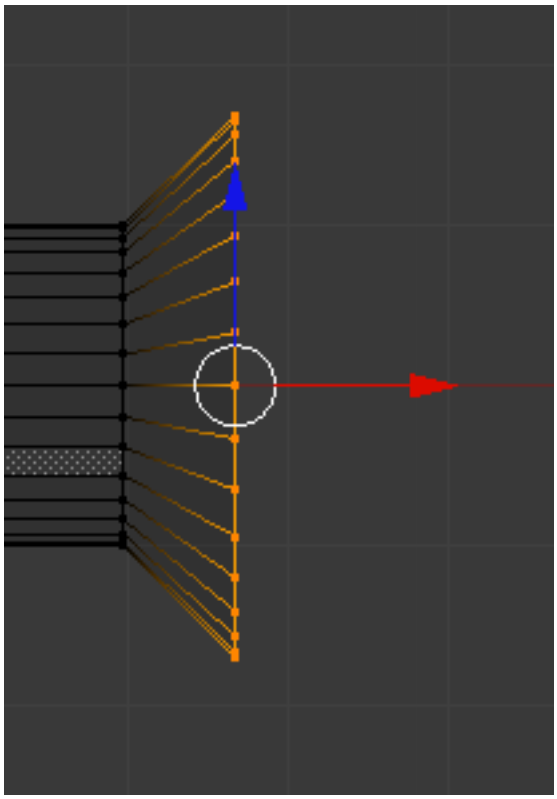
Go to side view. Press the EKEY (Extrude) then left-click to set. Press CTRL-V (Vertex Menu). Select Merge then Collapse.



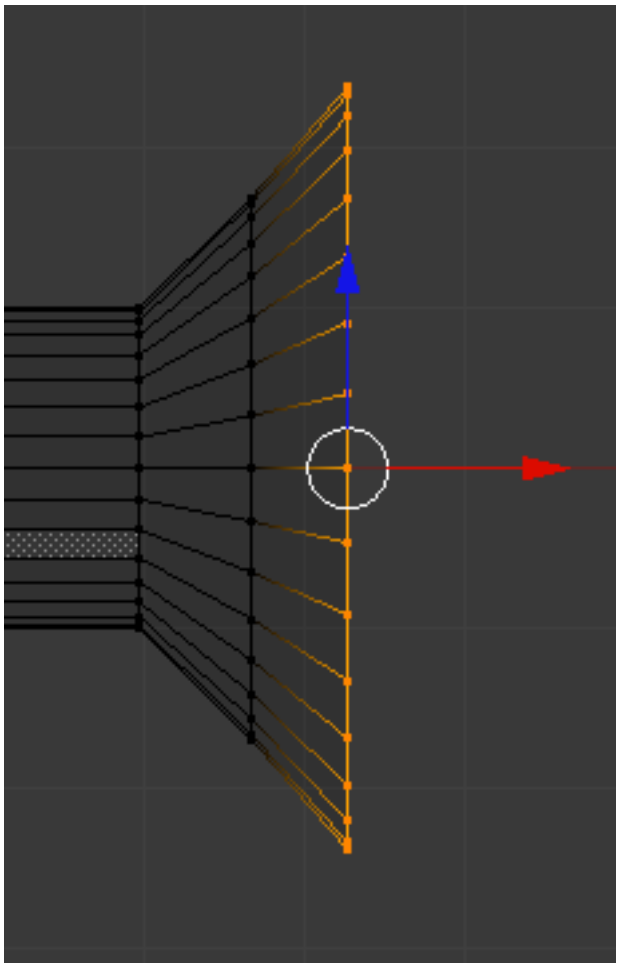


Deselect the vertices; go to front view (make sure you are in wireframe).

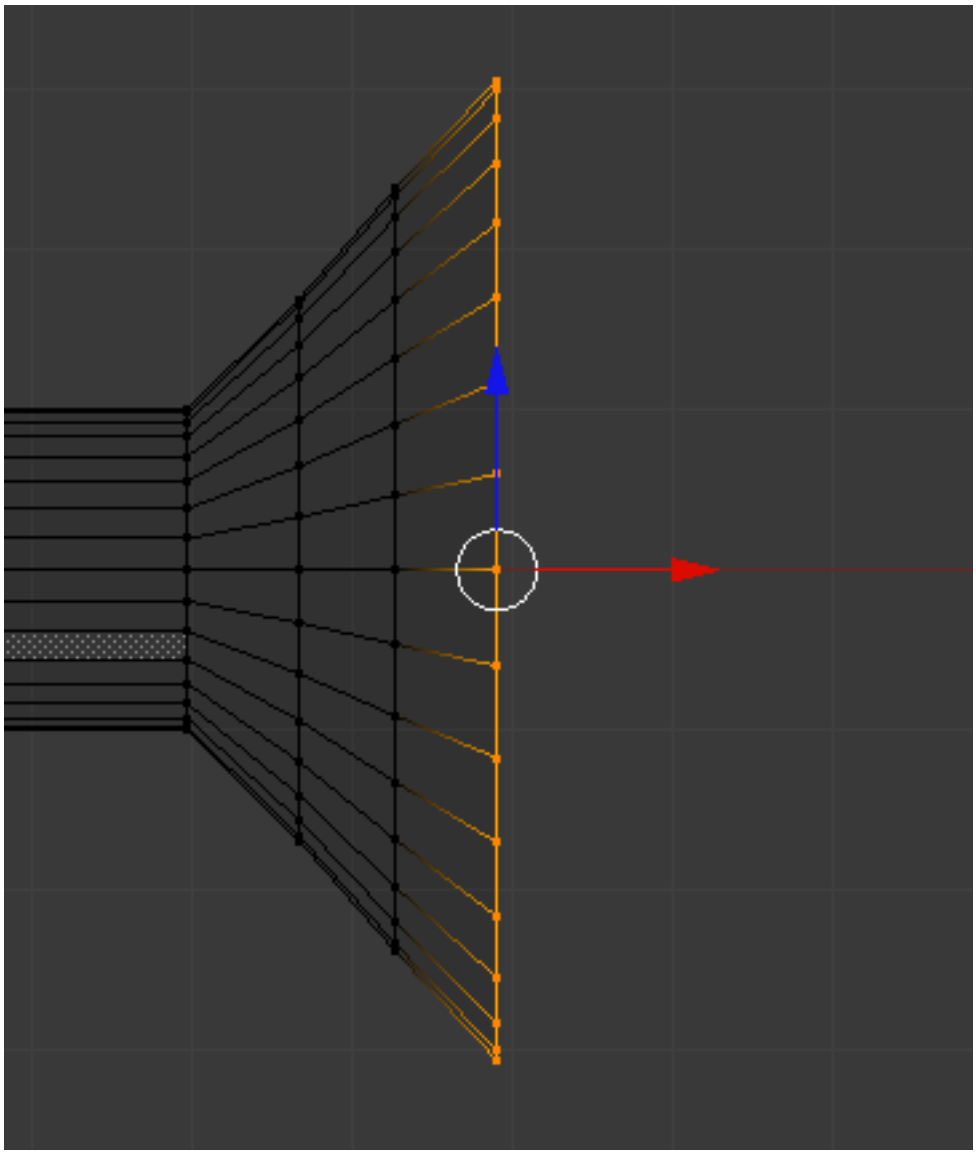
Box select the vertices on the right end of the barrel. Press the EKEY (extrude) followed by the XKEY and extrude them a bit along the X axis. The press the SKEY (Scale) and scale them up as shown below.



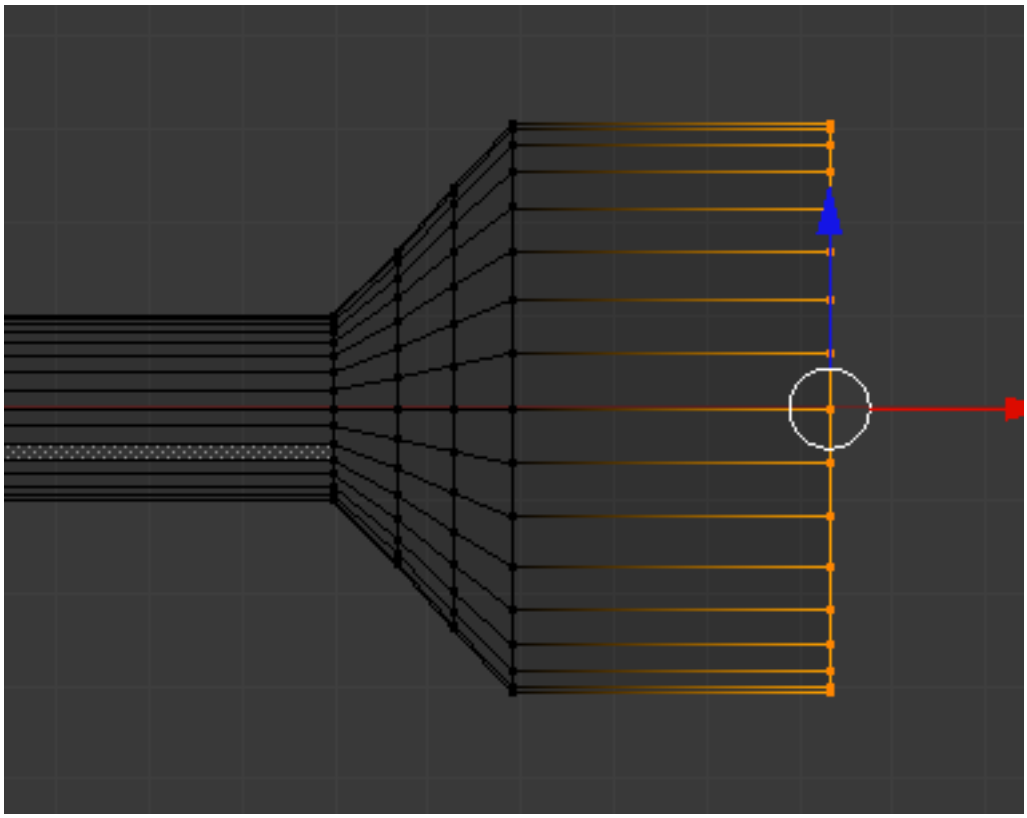
Extrude again along the X axis and scale up as shown below.



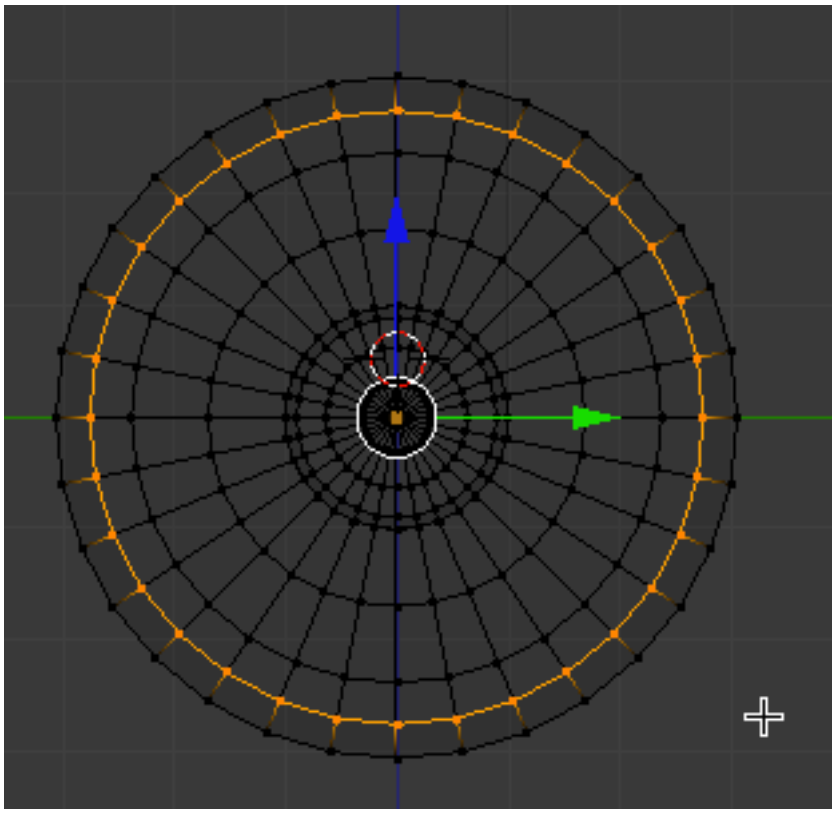
Extrude again along the X axis and scale up as shown below.



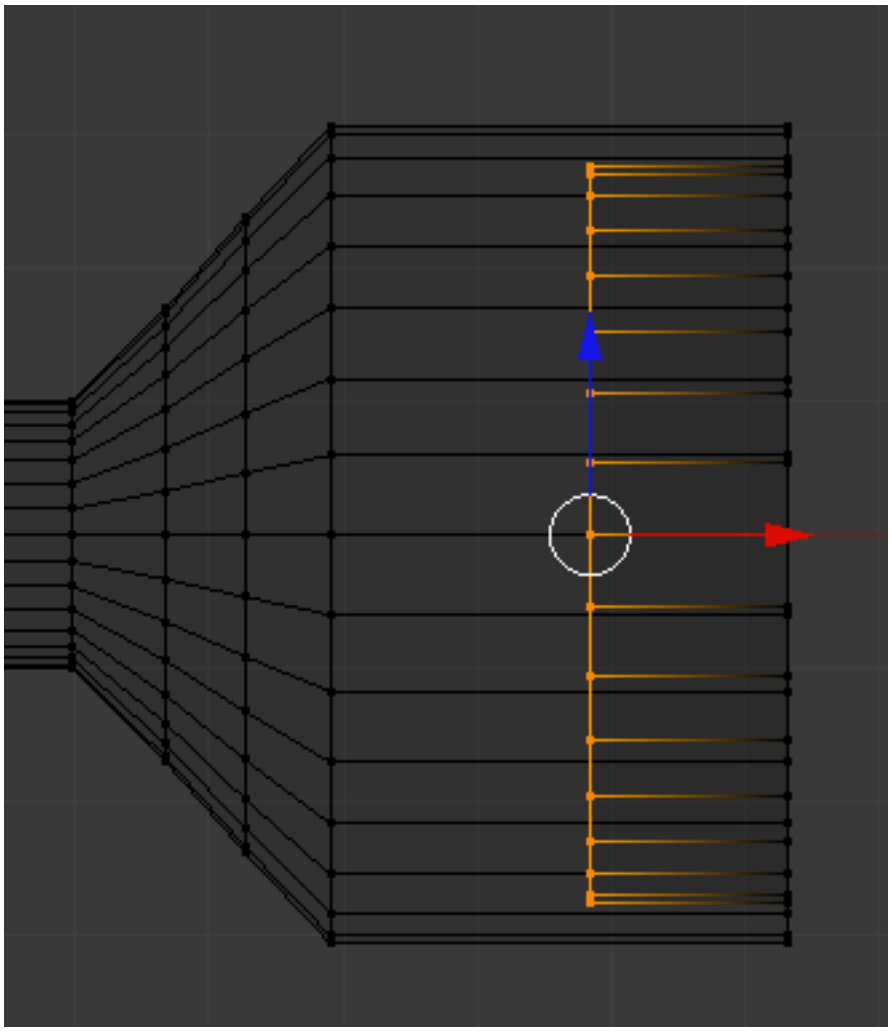
Now extrude along the X-axis to the right as shown below.



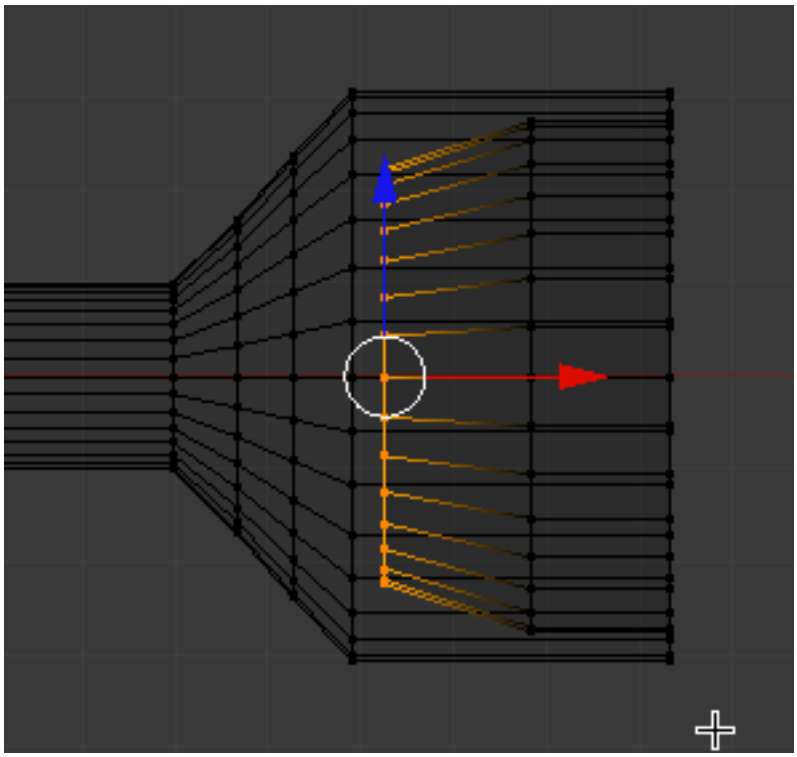
Go to side view. Press the EKEY (extrude) then left-click to set. Then press the SKEY (scale) and scale the vertices down as shown below.



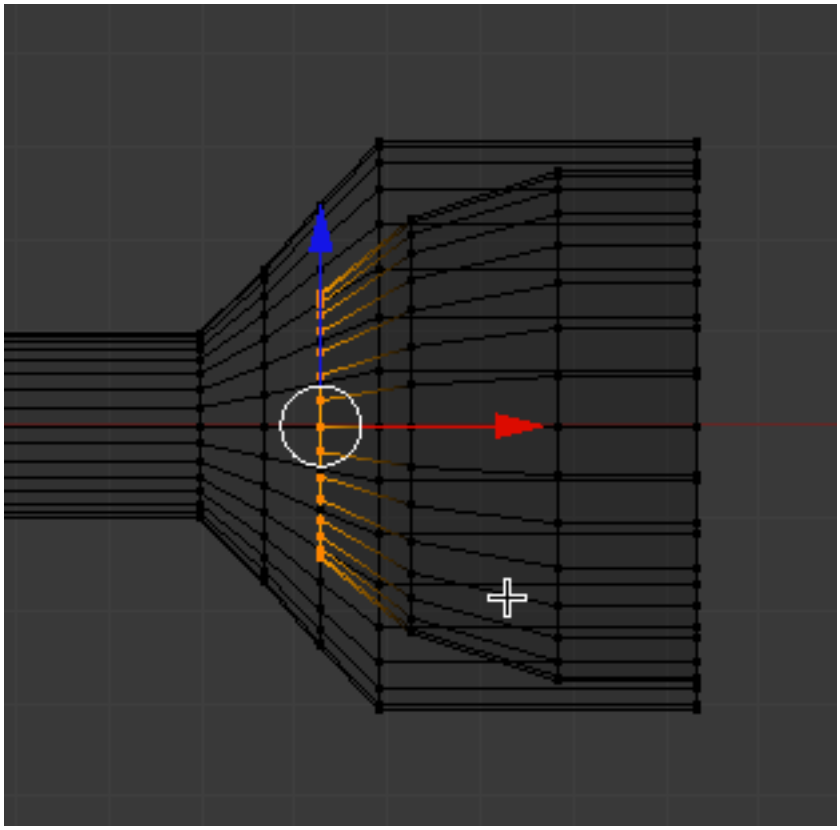
Go to front view. Press the EKEY (extrude) and extrude the vertices back into the object along the X-axis as shown below.



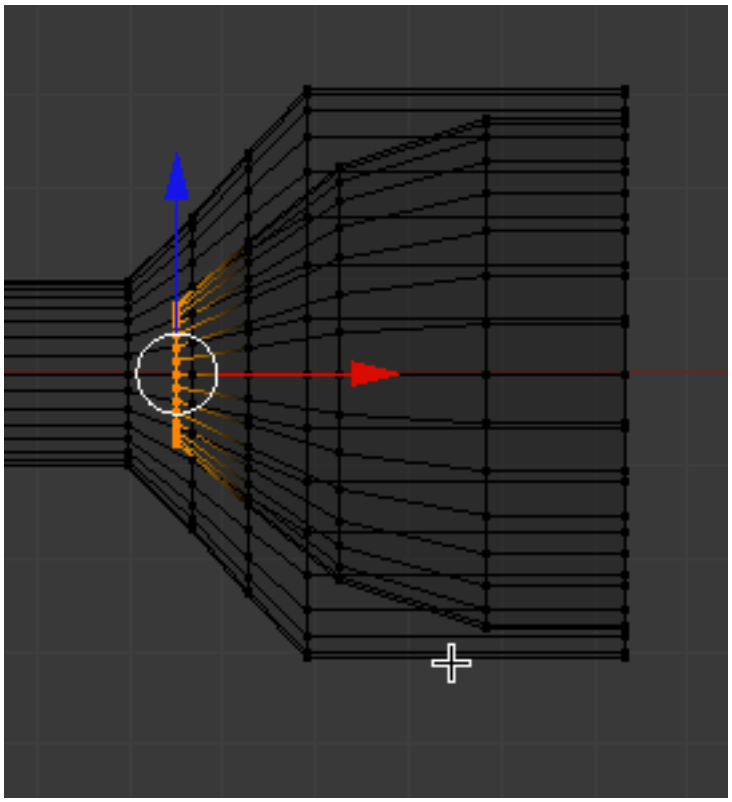
Press the EKEY and extrude the vertices to the left again along the X-axis a bit and scale them down as shown below.



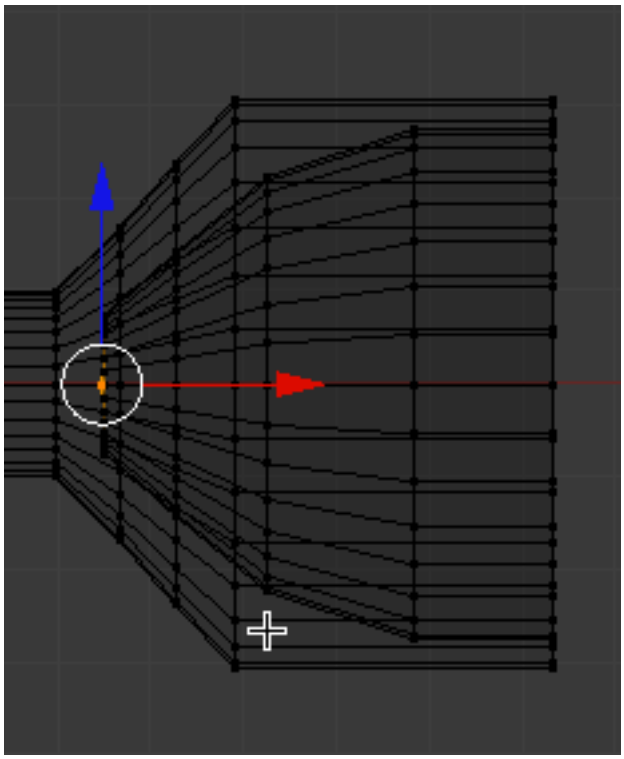
Extrude again along the X-axis and scale down as shown below.



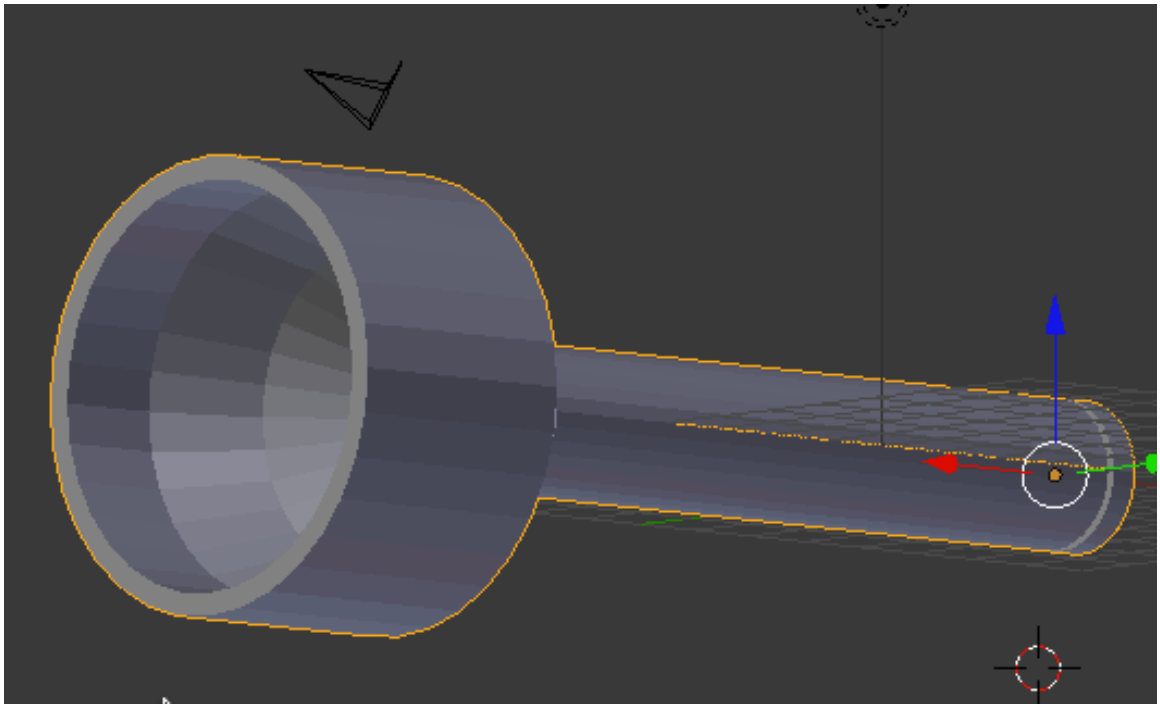
Extrude again and scale down as shown below.



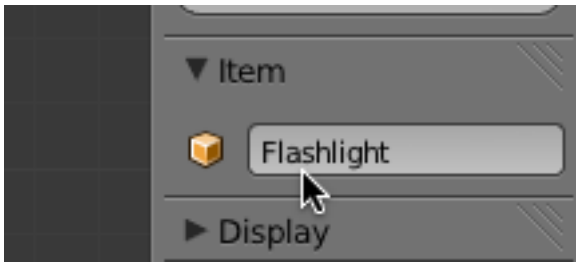
Press the EKEY (extrude) then left-click to set. Then press CTRL-V (vertex menu) and select Merge then Collapse.



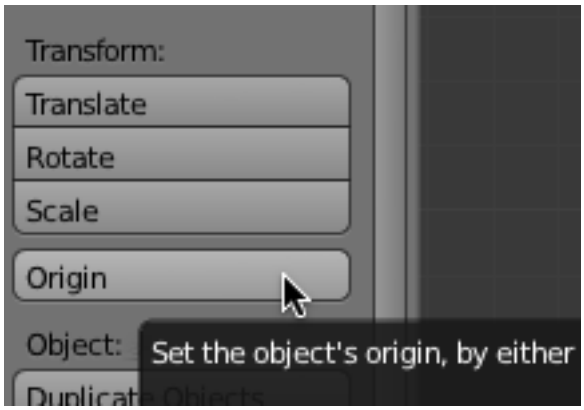
Deselect the vertices. TAB out of edit mode. Press the ZKEY (solid shading mode) and rotate your display so you can see the object more dimensionally.



In the properties panel, name this object “Flashlight”.



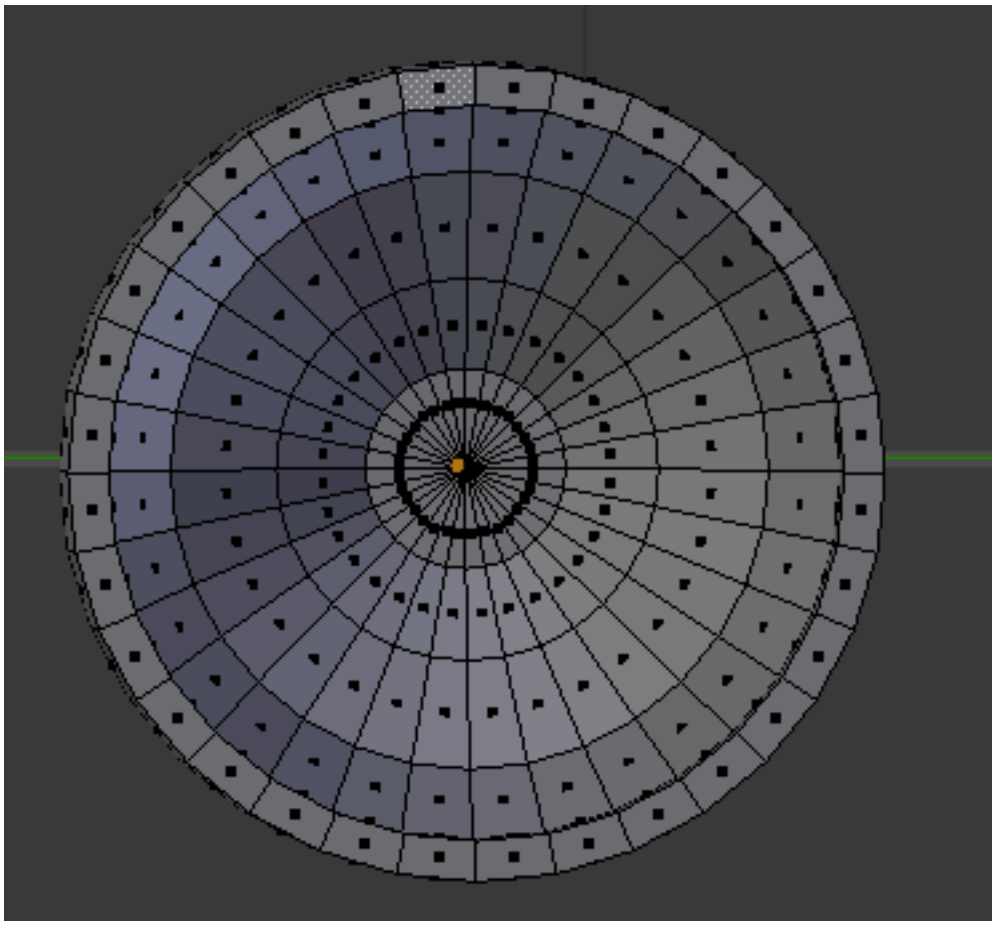
With the Flashlight object selected. Press the Origin button in the left tool panel and select Origin to Geometry. This will place the center point of the Flashlight object to the center of the object.



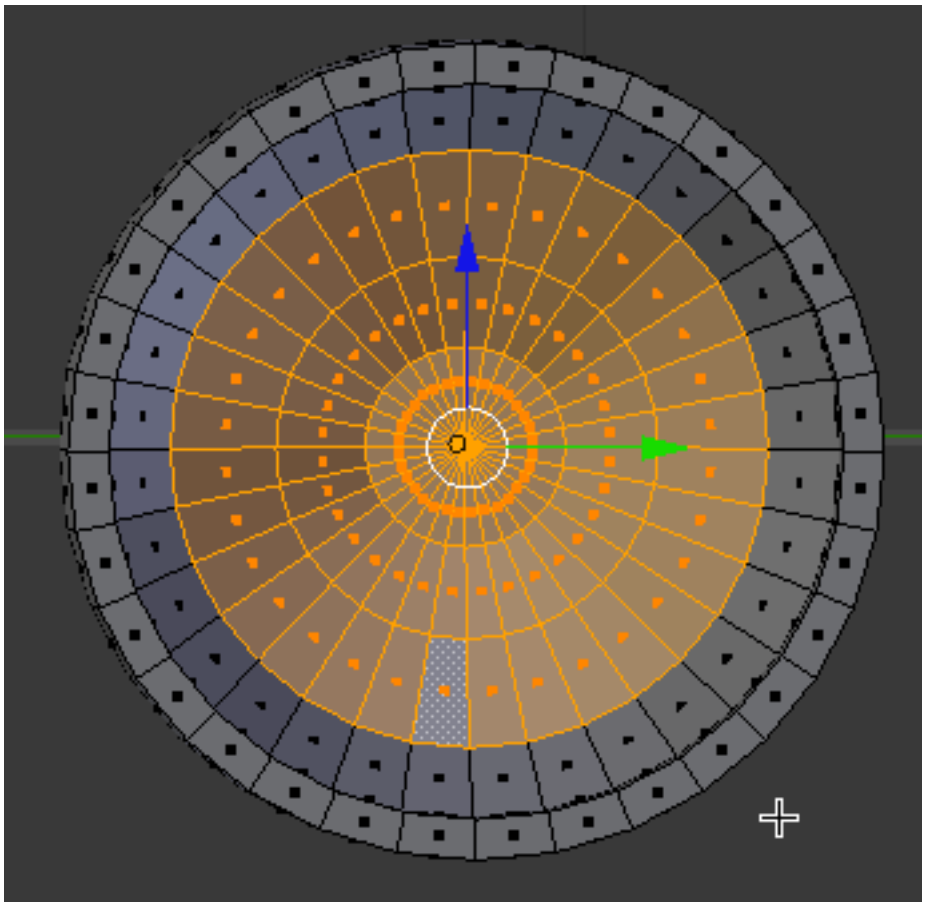
Save your Blend file.

We will now create some Vertex Groups that we will use for smoothing and/or adding materials.

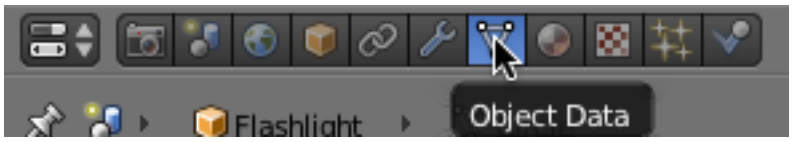
Make sure you are in solid shading mode. Go to Face Select Mode (CTRL-TAB). Rotate your display so you can see into the front end of the flashlight object as shown below.



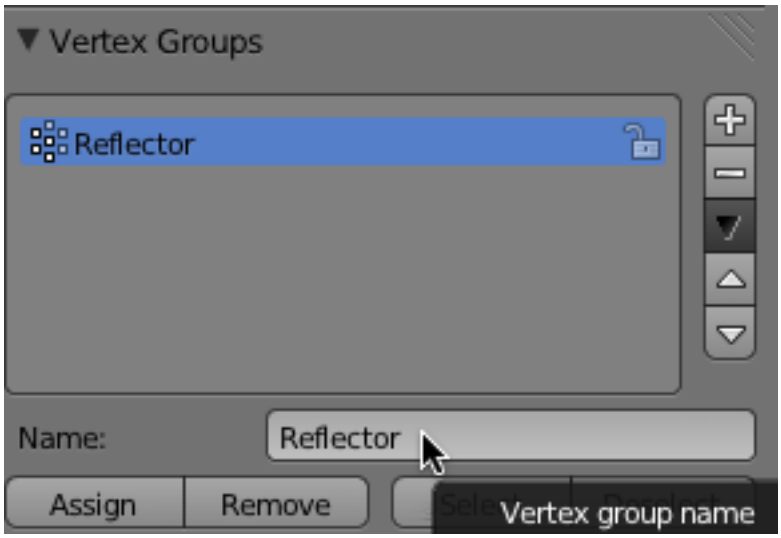
Box select the inner 3 rings of faces as shown below.



Go to the Object Data Editor.



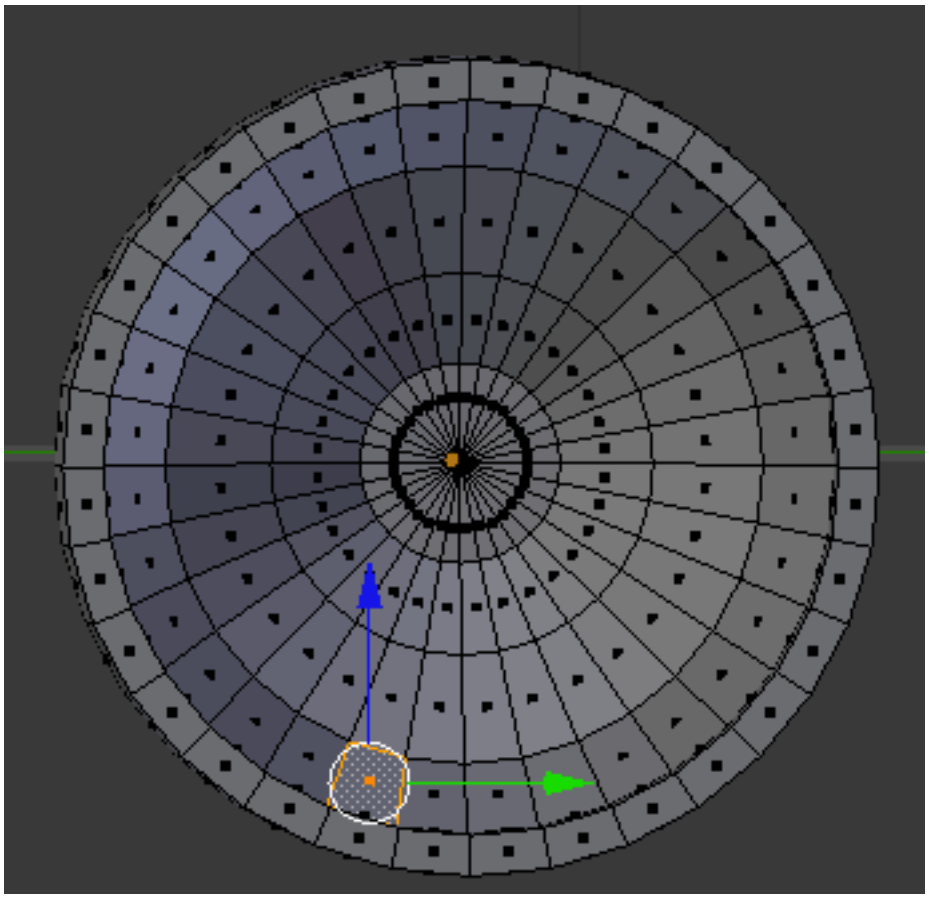
In the Vertex Groups panel, click on the Plus button (+) and add a new Vertex Group. Name this group “Reflector”.



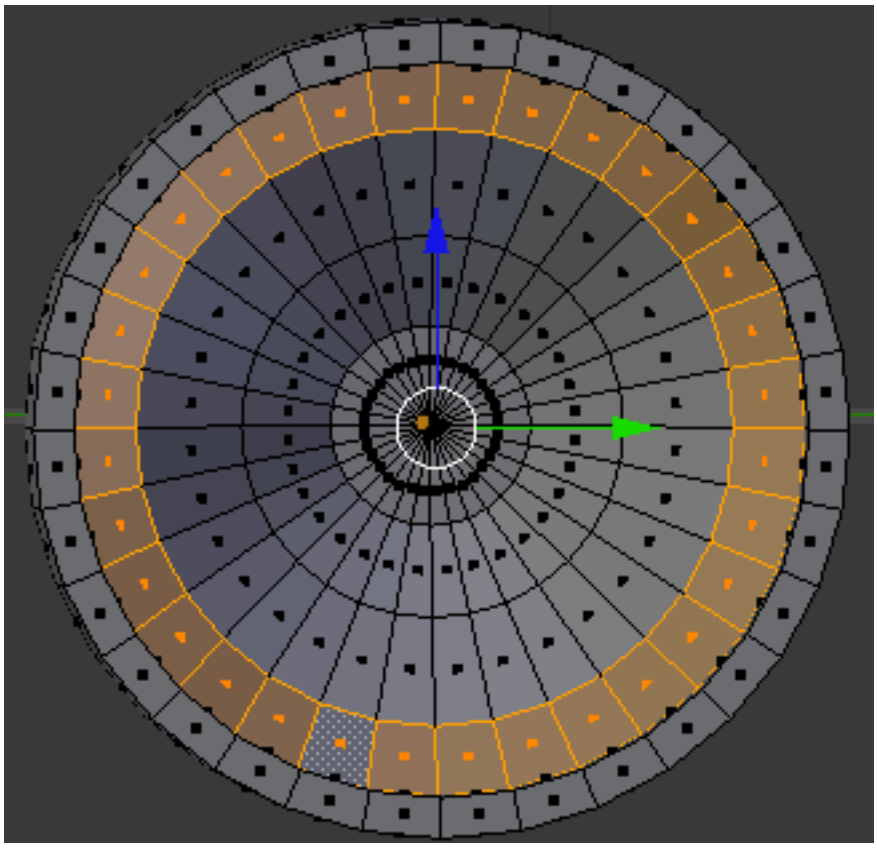
With the faces selected, press the Assign button. This will assign those faces to the Vertex Group. Press the Deselect button. Notice that the faces are no longer selected. Press the Select button. The faces are re-selected.

We can, at any time, go to the object data editor and select this particular set of faces.

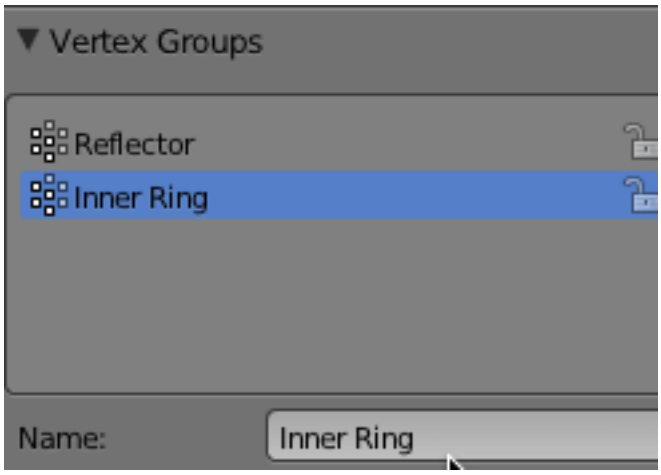
Press the Deselect button. Select one of the next ring of faces as shown below.



Hold down your SHIFT-ALT keys and select the same face again. This will select the ring of faces as shown below.



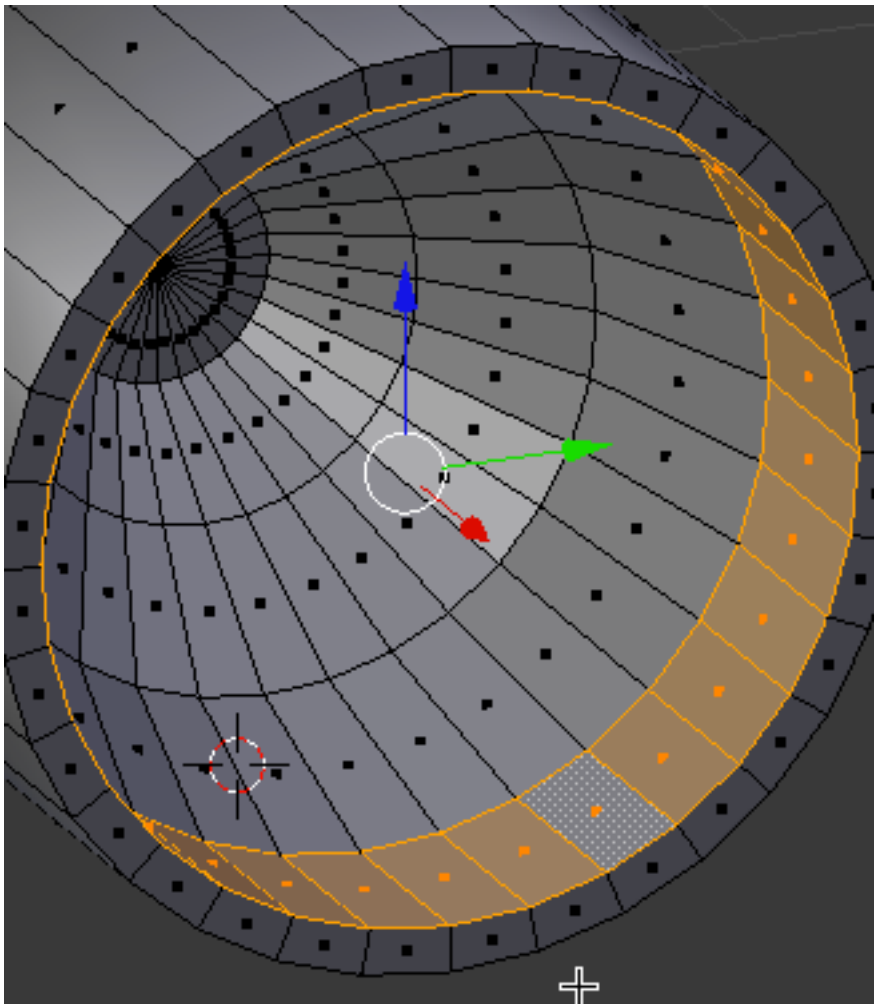
Go to the Object Data Editor. Press the Plus button and make a new Vertex Group. Name this vertex group “Inner Ring”.



With the faces selected, press the Assign button. This will assign those faces to the Vertex Group. Press the Deselect button. Notice that the faces are no longer selected. Press the Select button. The faces are re-selected.

Deselect the faces.

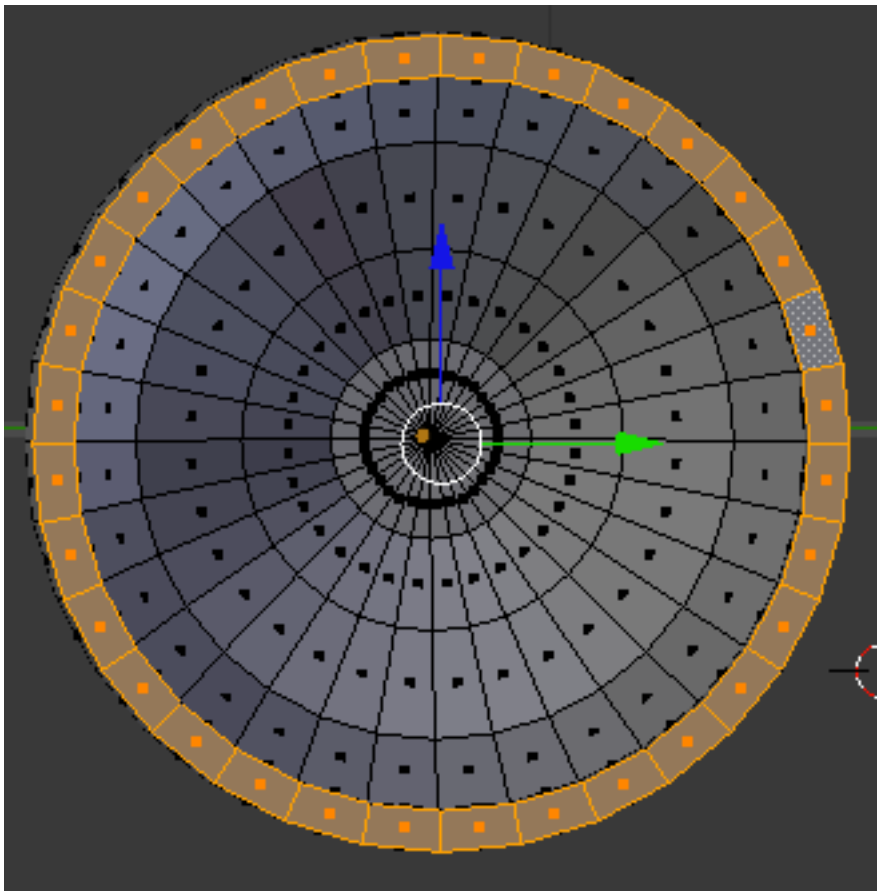
Select one of the faces in the next ring (you will have to rotate your display a little bit to see the ring). SHIFT-ALT select again to select the whole ring of faces as shown below.



Go to the Object Data Editor. Press the Plus button and make a new Vertex Group. Name this vertex group “Head Rim”.

With the faces selected, press the Assign button. This will assign those faces to the Vertex Group. Press the Deselect button. Notice that the faces are no longer selected. Press the Select button. The faces are re-selected. - Deselect the faces.

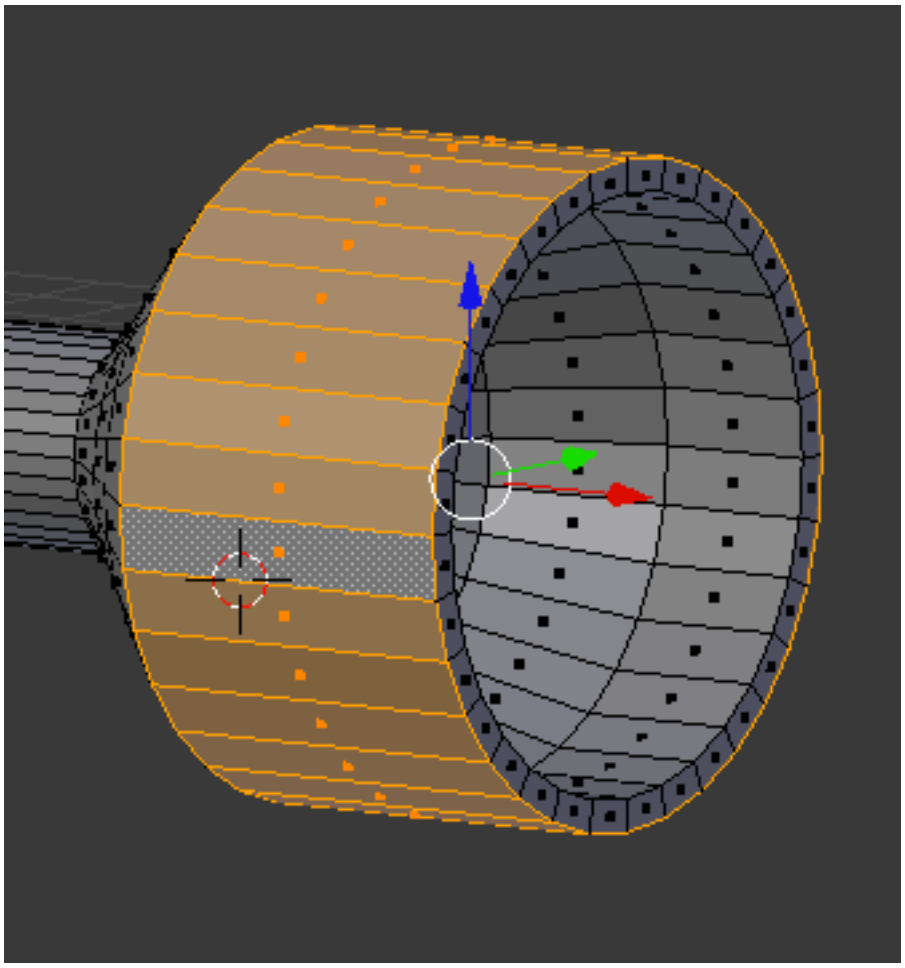
Holding down your SHIFT KEY, select all the next ring of faces (you cannot ring select these).



Go to the Object Data Editor. Press the Plus button and make a new Vertex Group. Name this vertex group “Head Face”.

With the faces selected, press the Assign button. This will assign those faces to the Vertex Group. Press the Deselect button. Notice that the faces are no longer selected. Press the Select button. The faces are re-selected. - Deselect the faces.

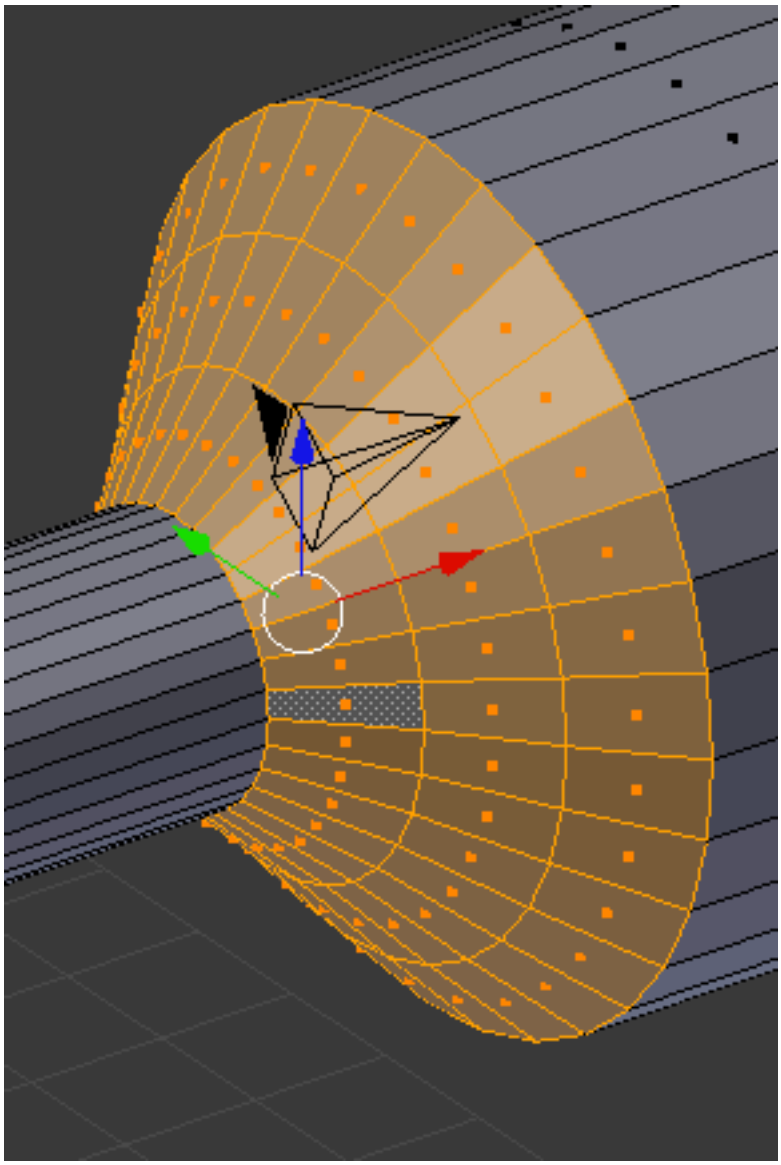
Go to a slightly dimensional view. Select one of the next set of faces. SHIFT-ALT select again the ring of faces as shown below



Go to the Object Data Editor. Press the Plus button and make a new Vertex Group. Name this vertex group “Flashlight Head”.

With the faces selected, press the Assign button. This will assign those faces to the Vertex Group. Press the Deselect button. Notice that the faces are no longer selected. Press the Select button. The faces are re-selected. - Deselect the faces.

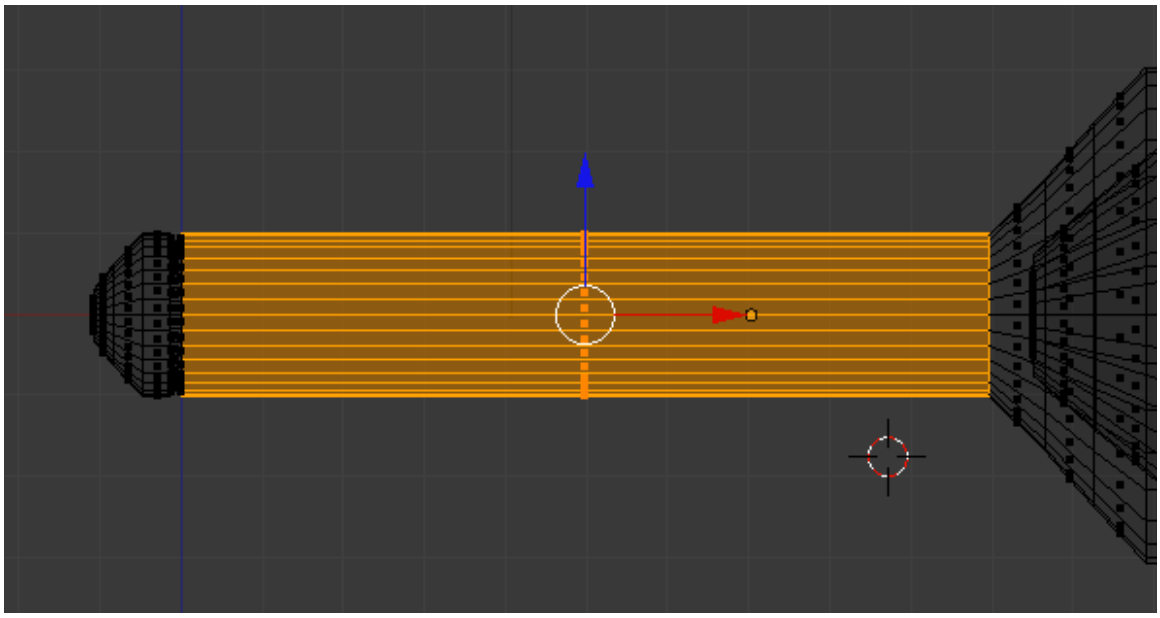
Select on e of the next set of faces. SHIFT-ALT to select the Ring – HOLD YOUR SHIFT KEY DOWN and add a face from the next ring. SHIFT-ALT to add the whole ring. HOLD YOUR SHIFT KEY DOWN and add a face from the next ring. SHIFT-ALT to add the whole ring as shown below



Go to the Object Data Editor. Press the Plus button and make a new Vertex Group. Name this vertex group “Flare”.

With the faces selected, press the Assign button. This will assign those faces to the Vertex Group. Press the Deselect button. Notice that the faces are no longer selected. Press the Select button. The faces are re-selected. - Deselect the faces.

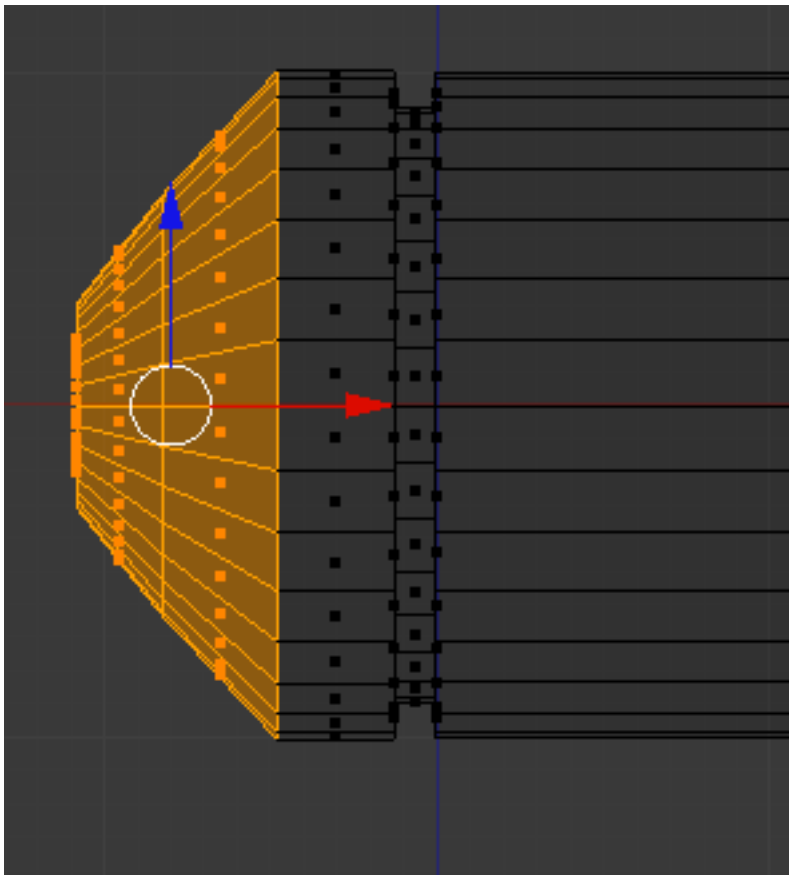
Press the ZKEY to go into wireframe mode. Go to front view. Box select the next set of vertices as shown below.



Go to the Object Data Editor. Press the Plus button and make a new Vertex Group. Name this vertex group “Barrel”.

With the faces selected, press the Assign button. This will assign those faces to the Vertex Group. Press the Deselect button. Notice that the faces are no longer selected. Press the Select button. The faces are re-selected. - Deselect the faces

(Still in wireframe mode) Box select the last 3 sets of faces on the left as shown below.

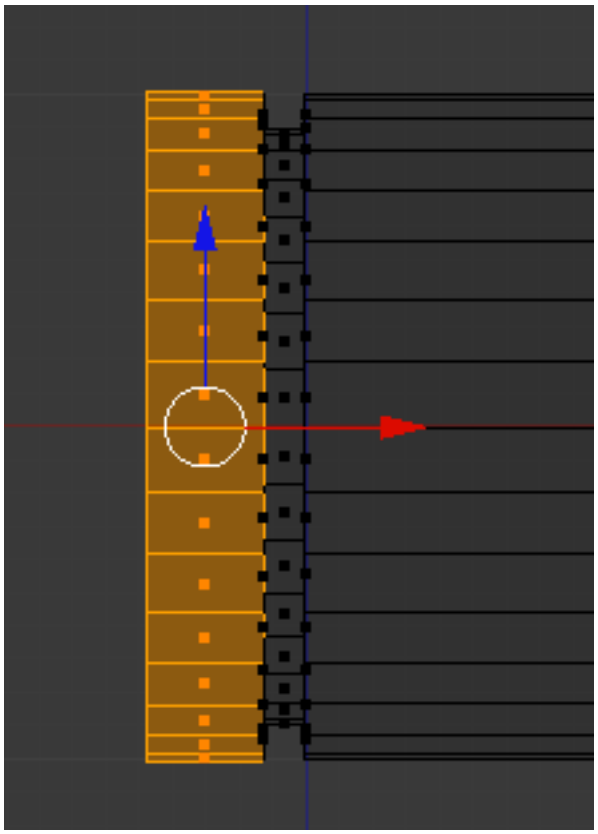


Go to the Object Data Editor. Press the Plus button and make a new Vertex Group. Name this vertex group “End Cap”.

With the faces selected, press the Assign button. This will assign those faces to the Vertex Group. Press the Deselect button. Notice that the faces are no longer selected. Press the Select button. The faces are re-selected.

WITH THE END CAP FACES SELECTED, PRESS THE HKEY. This will temporarily hide the faces.

Box select the next set of faces as shown below.

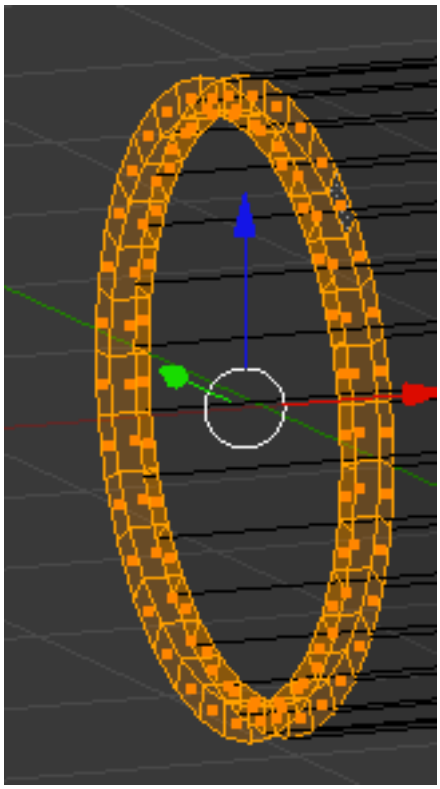


Go to the Object Data Editor. Press the Plus button and make a new Vertex Group. Name this vertex group “Cap Rim”.

With the faces selected, press the Assign button. This will assign those faces to the Vertex Group. Press the Deselect button. Notice that the faces are no longer selected. Press the Select button. The faces are re-selected.

WITH THE CAP RIM FACES SELECTED, PRESS THE HKEY. This will temporarily hide the faces.

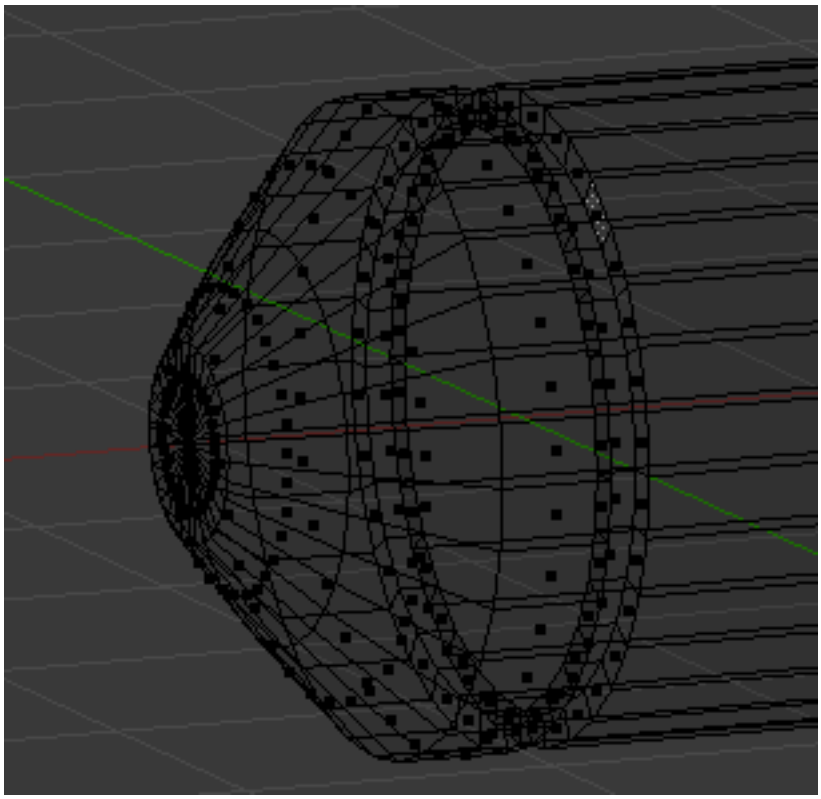
Box select the remaining sets of faces as shown below.



Go to the Object Data Editor. Press the Plus button and make a new Vertex Group. Name this vertex group “Slot”.

With the faces selected, press the Assign button. This will assign those faces to the Vertex Group. Press the Deselect button. Notice that the faces are no longer selected. Press the Select button. The faces are re-selected. – Press Deselect.

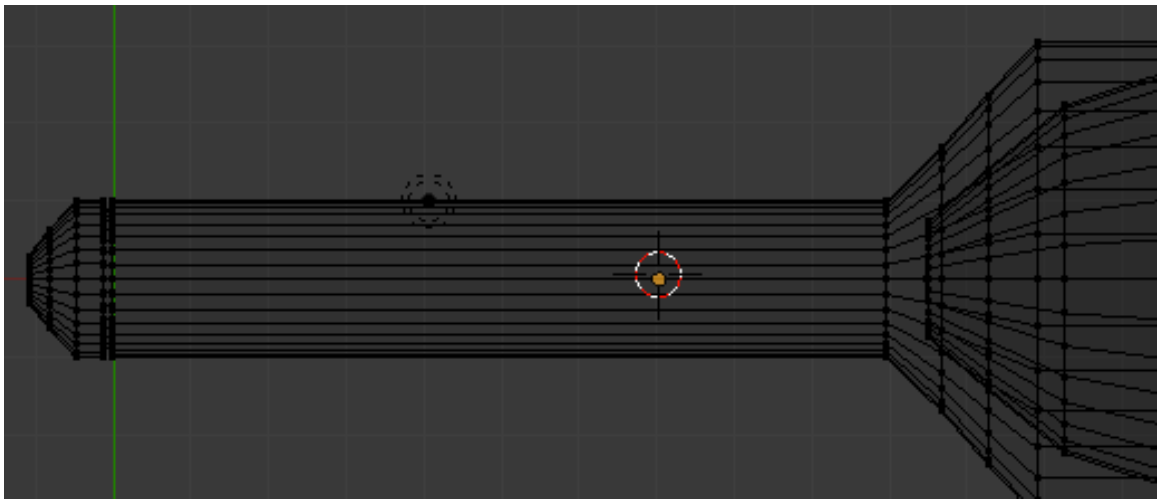
Place your cursor inside the 3D Viewport window and press ALT-H. This will unhide the hidden faces.



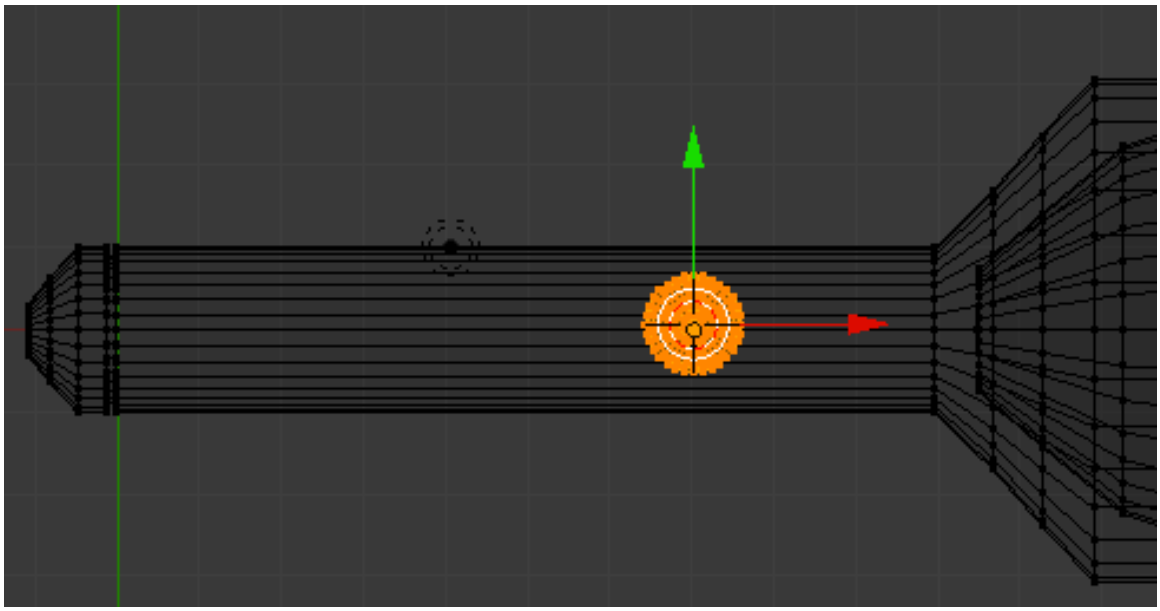
Save your Blend file.

We have a few more bits to add to the Flashlight. Go to top view. Go to Vertex Select Mode (CTRL-TAB).

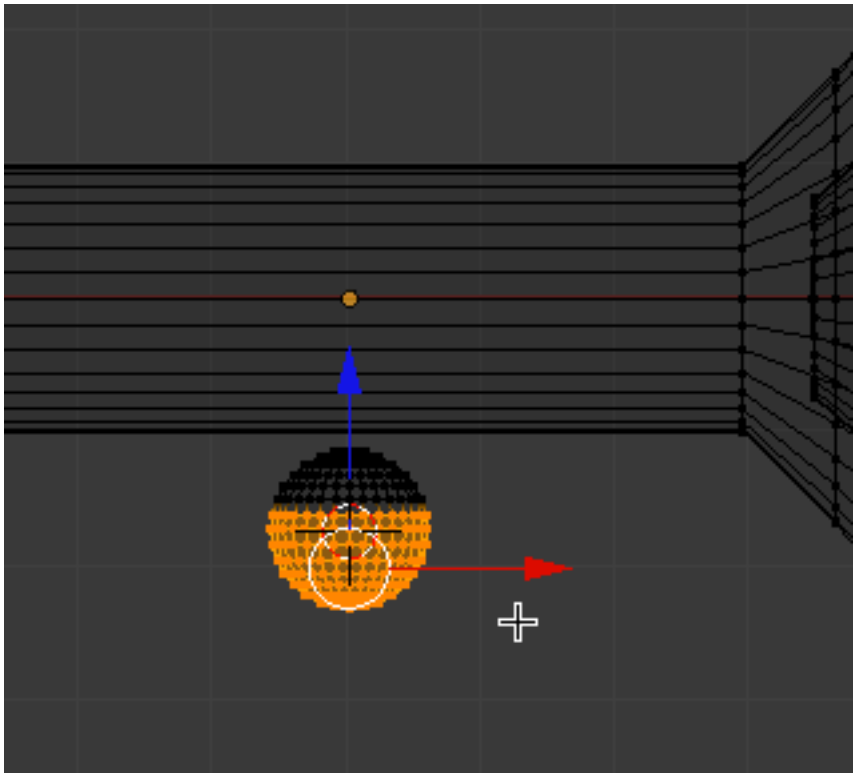
Make sure the Flashlight object is still selected and in edit mode. Place your 3D cursor in the middle of the flashlight barrel as shown below.



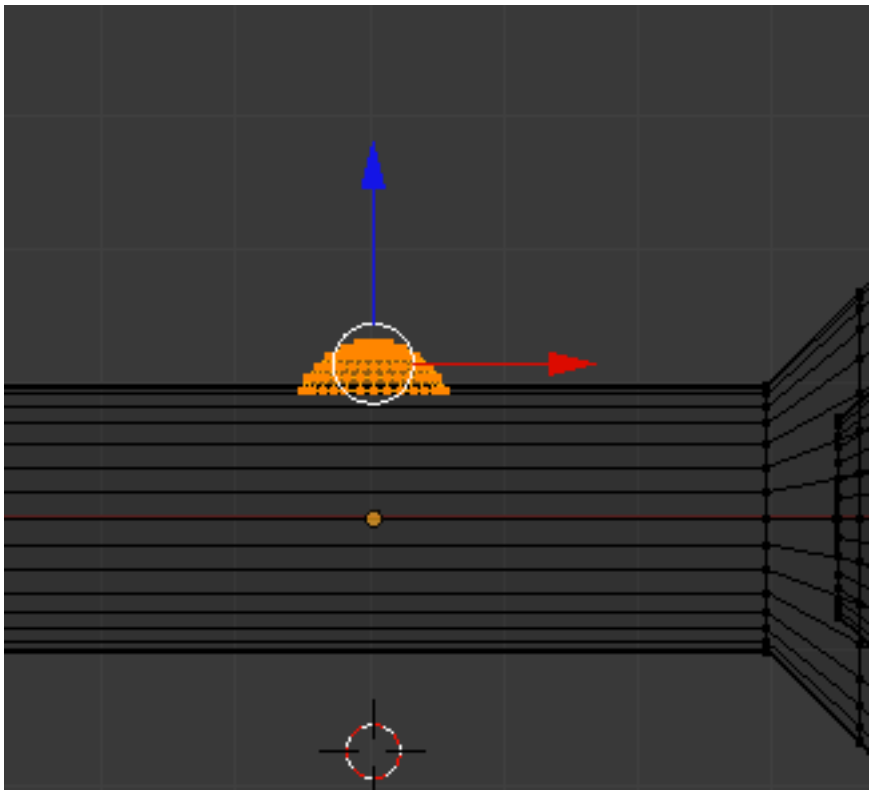
Press SHIFT-A and add a UV Sphere. Scale the sphere down as shown below.



Go to front view. Deselect the vertices and re-select the bottom vertices as shown below.



Press the XKEY and delete the vertices. Select the remaining vertices and move them up as shown below.

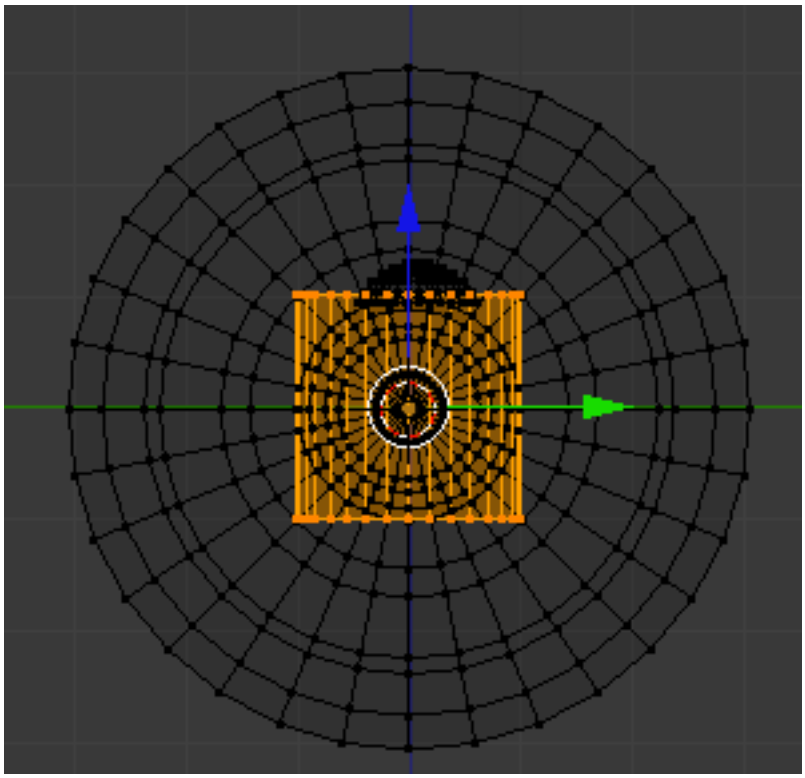


Note that since we added the UV sphere while in edit mode, the vertices become part of the Flashlight object.

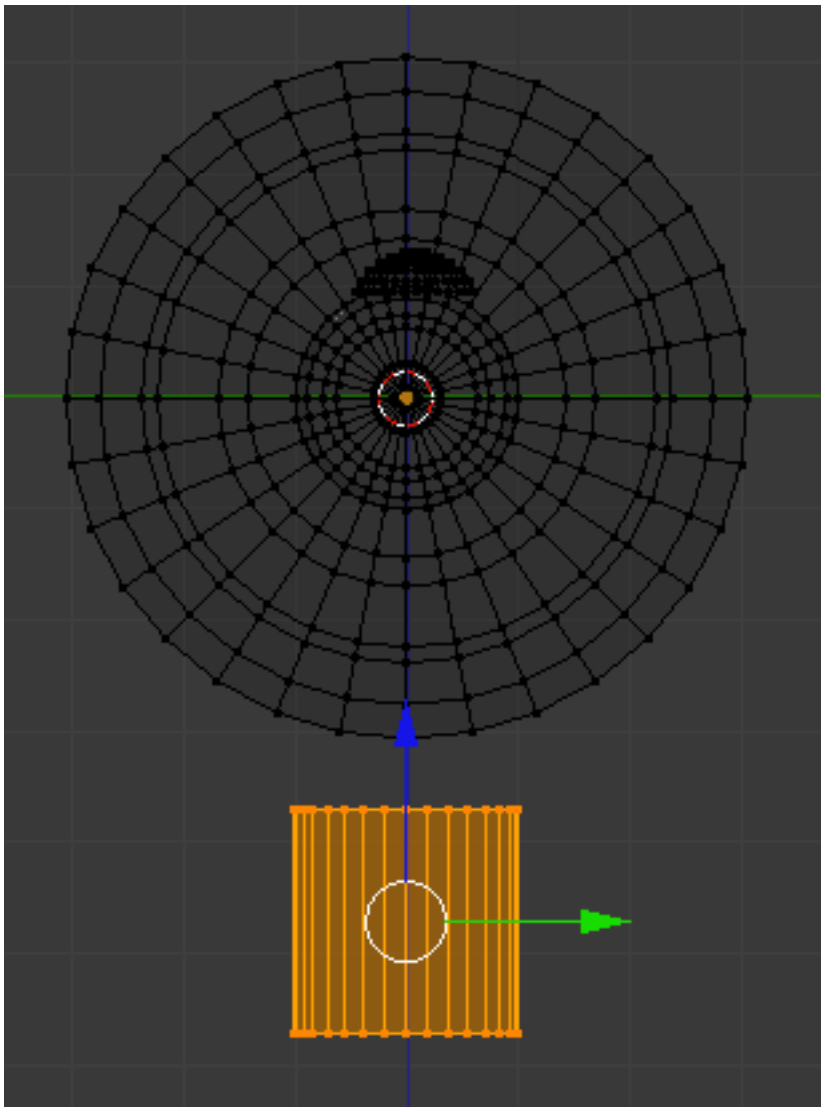
With the vertices still selected, go to the Object Data Editor. Press the Plus button and make a new Vertex Group. Name this vertex group “Button”.

With the faces selected, press the Assign button. This will assign those faces to the Vertex Group. Press the Deselect button. Notice that the faces are no longer selected. Press the Select button. The faces are re-selected. – Press Deselect.

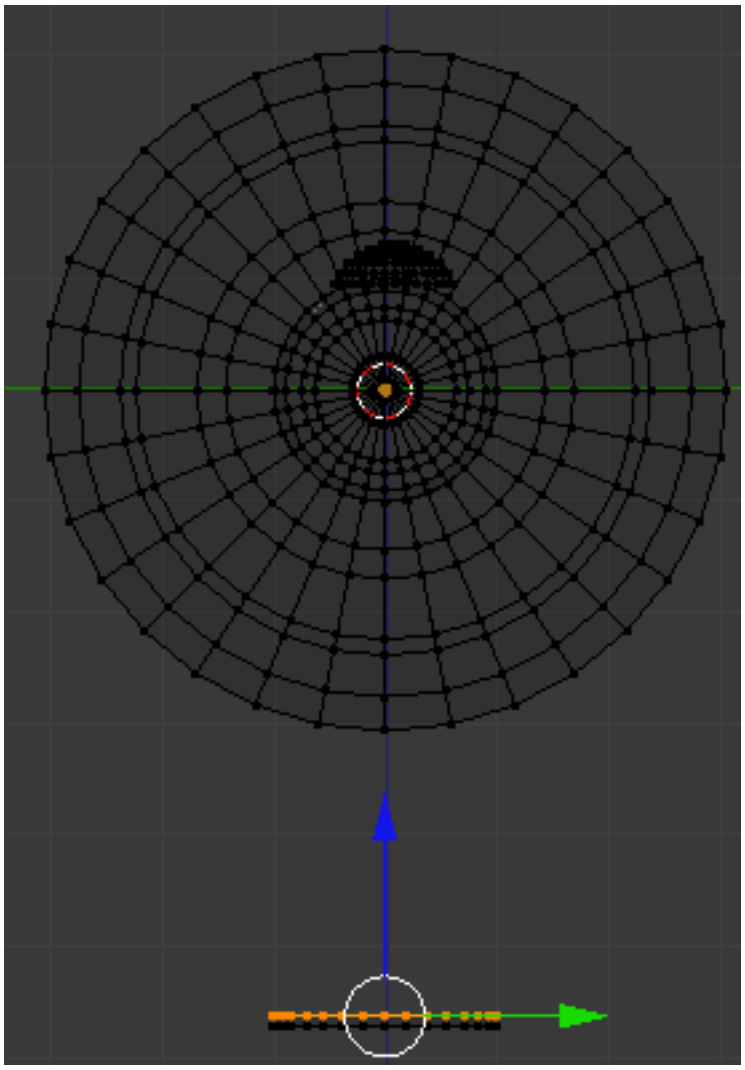
Go to Side view. Place your cursor in the center of the flashlight object. **While still in edit mode,** press SHIFT-A and add a cylinder.



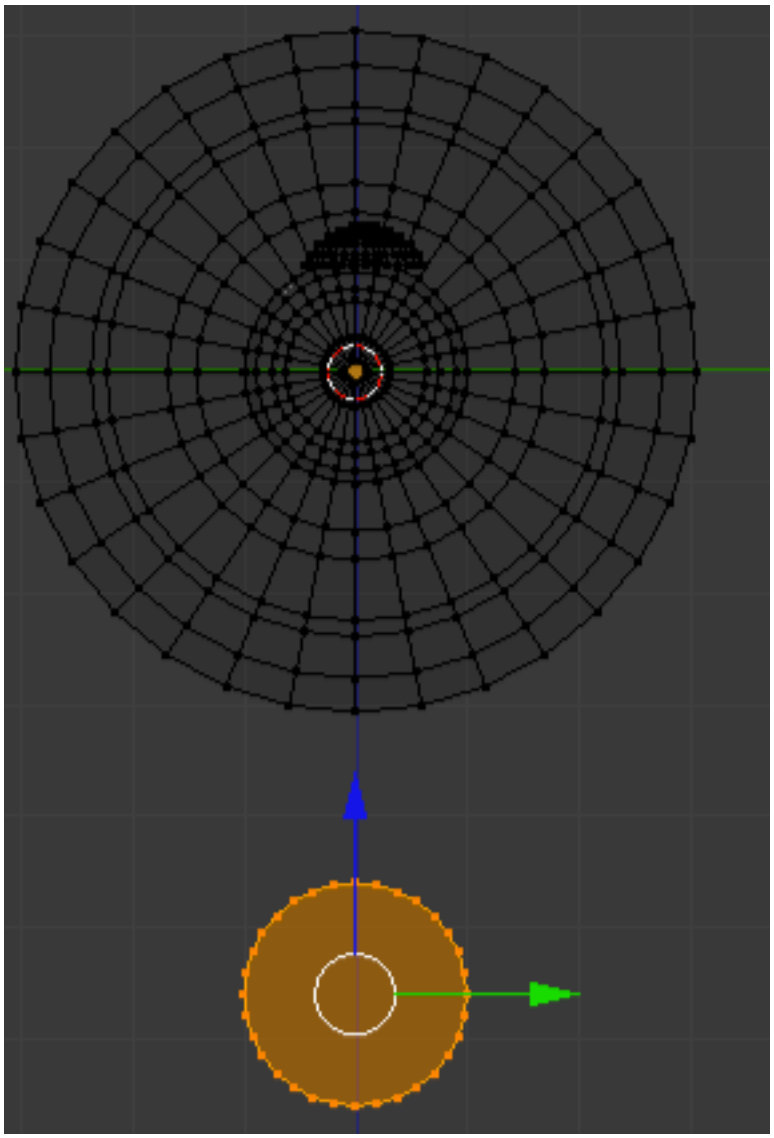
Move the cylinder to below the flashlight object.



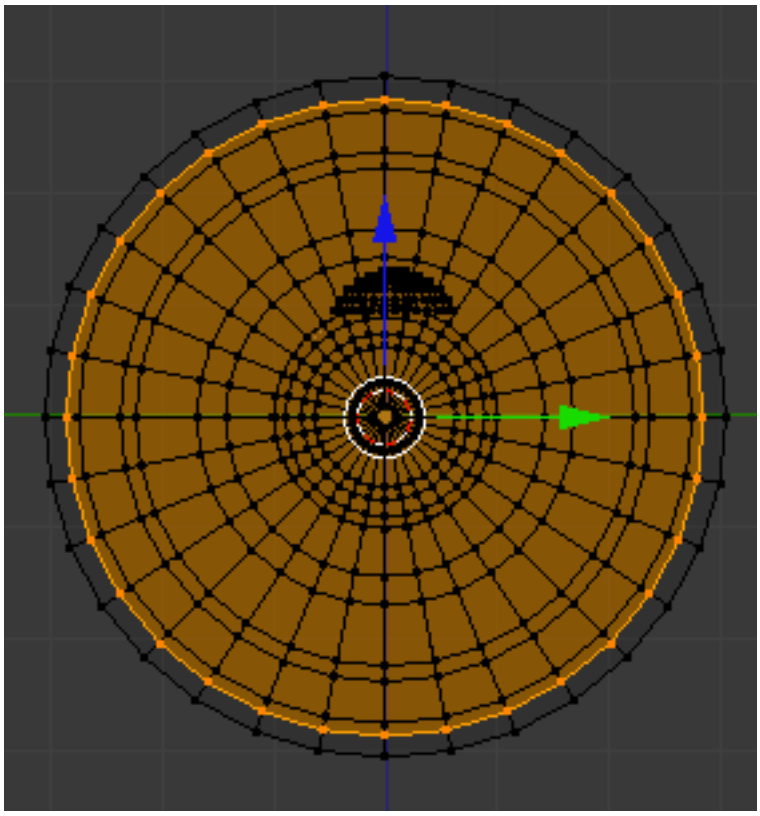
Deselect the vertices. Re-select the top vertices and move the down as shown below. (Note: VERY THIN)



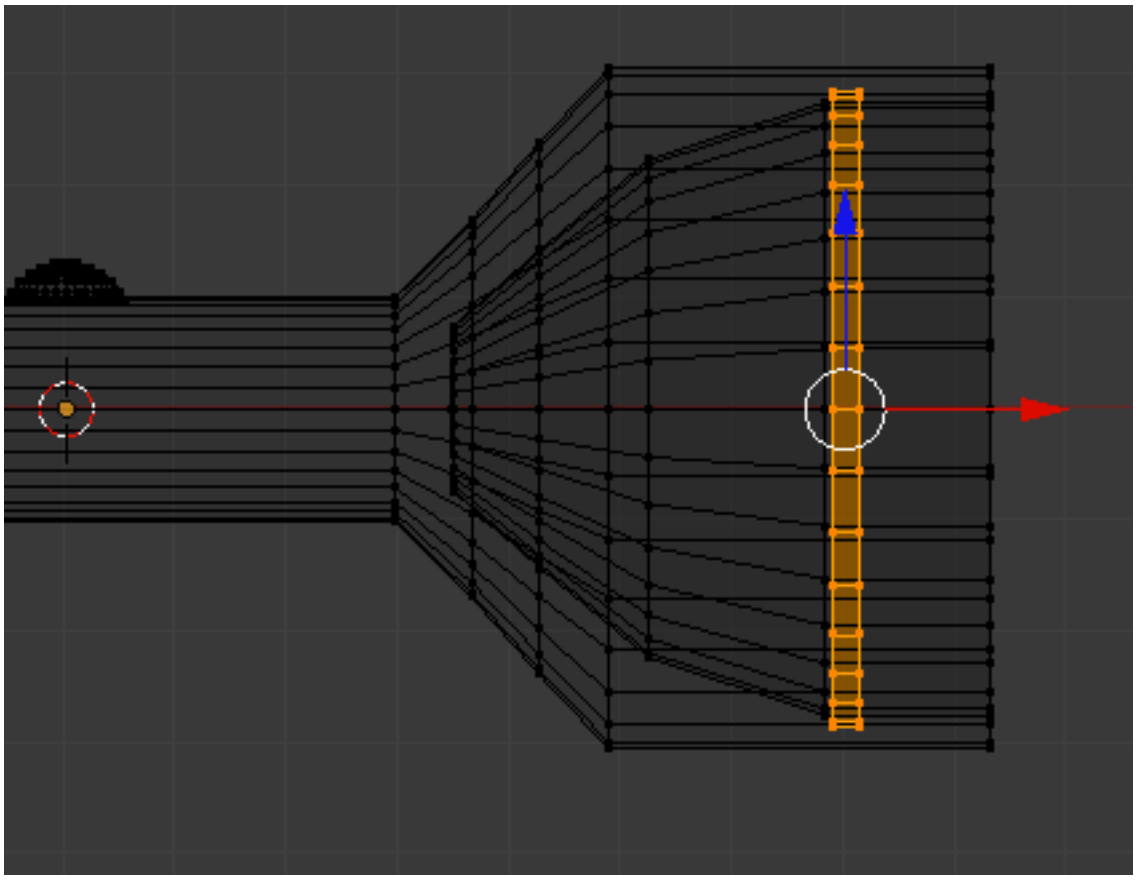
Select all of the cylinder vertices. Press the RKEY followed by the YKEY followed by 90 then left-click. This will rotate the vertices around the Y-axis 90 degrees.



Move the vertices back up to the center of the flashlight, press the SKEY and scale them up as shown below.



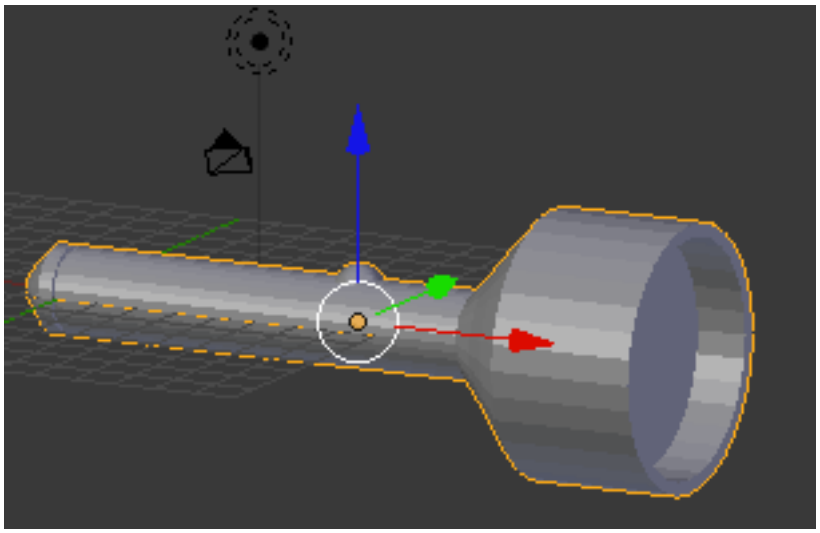
Go to front view. Move the cylinder vertices to the right as shown below.



With the vertices still selected, go to the Object Data Editor. Press the Plus button and make a new Vertex Group. Name this vertex group “Lens”.

With the faces selected, press the Assign button. This will assign those faces to the Vertex Group. Press the Deselect button. Notice that the faces are no longer selected. Press the Select button. The faces are re-selected. – Press Deselect.

TAB out of edit mode. Deselect the flashlight. Go to solid shading mode (ZKEY). Rotate your display to see the Flashlight dimensionally.



Save your Blend file.

Smoothing:

With the Flashlight object selected, TAB into edit mode and go to the Object Data editor.

Select the End Cap Vertex Group. Click Select. In the tool panel on the left click on the Smooth button.

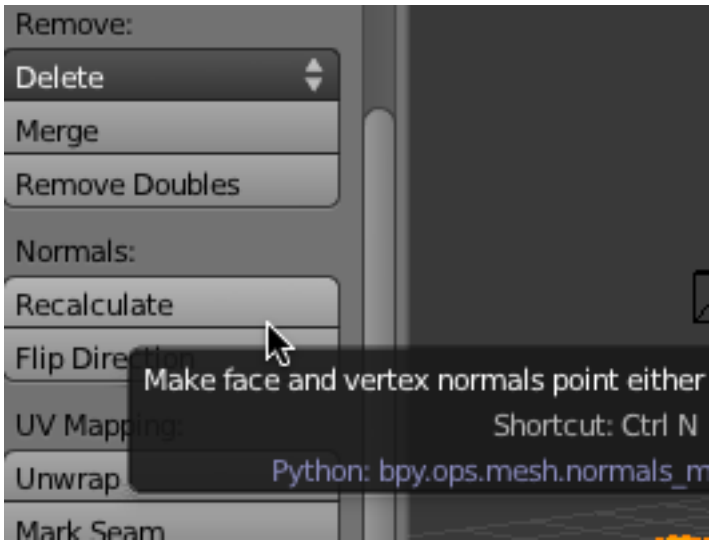
Click Deselect.

Select the Cap Rim Vertex Group. Press Select. Press Smooth. Press Deselect.
Select the Barrel Vertex Group. Press Select. Press Smooth. Press Deselect.
Select the Flare Vertex Group. Press Select. Press Smooth. Press Deselect.
Select the Button Vertex Group. Press Select. Press Smooth. Press Deselect.
Select the Flashlight Head Vertex Group. Press Select. Press Smooth. Press Deselect.
Select the Head Rim Vertex Group. Press Select. Press Smooth. Press Deselect.

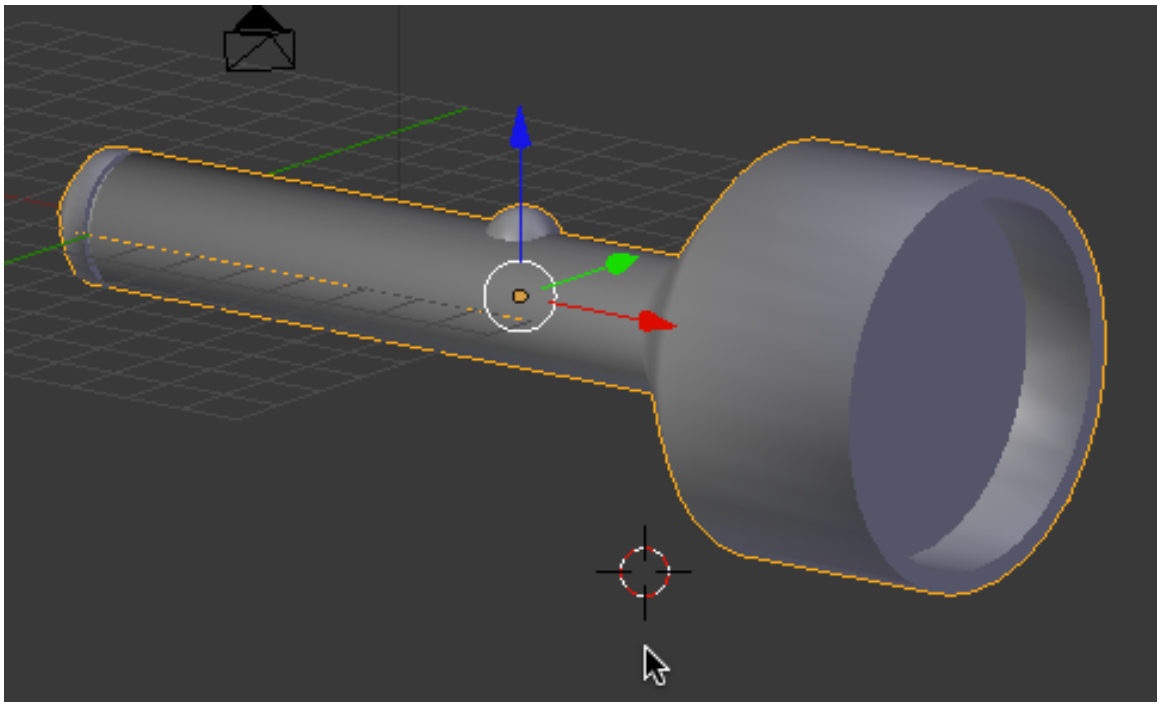
Recalculate Normals.

When you use the extrusion tool to create a model it is possible that during the process some of the face normals are turned around. This causes dark streaks in the rendering. To

avoid this problem, select all of the vertices (AKEY). The press the Recalculate Normals button in the tool panel on the left.



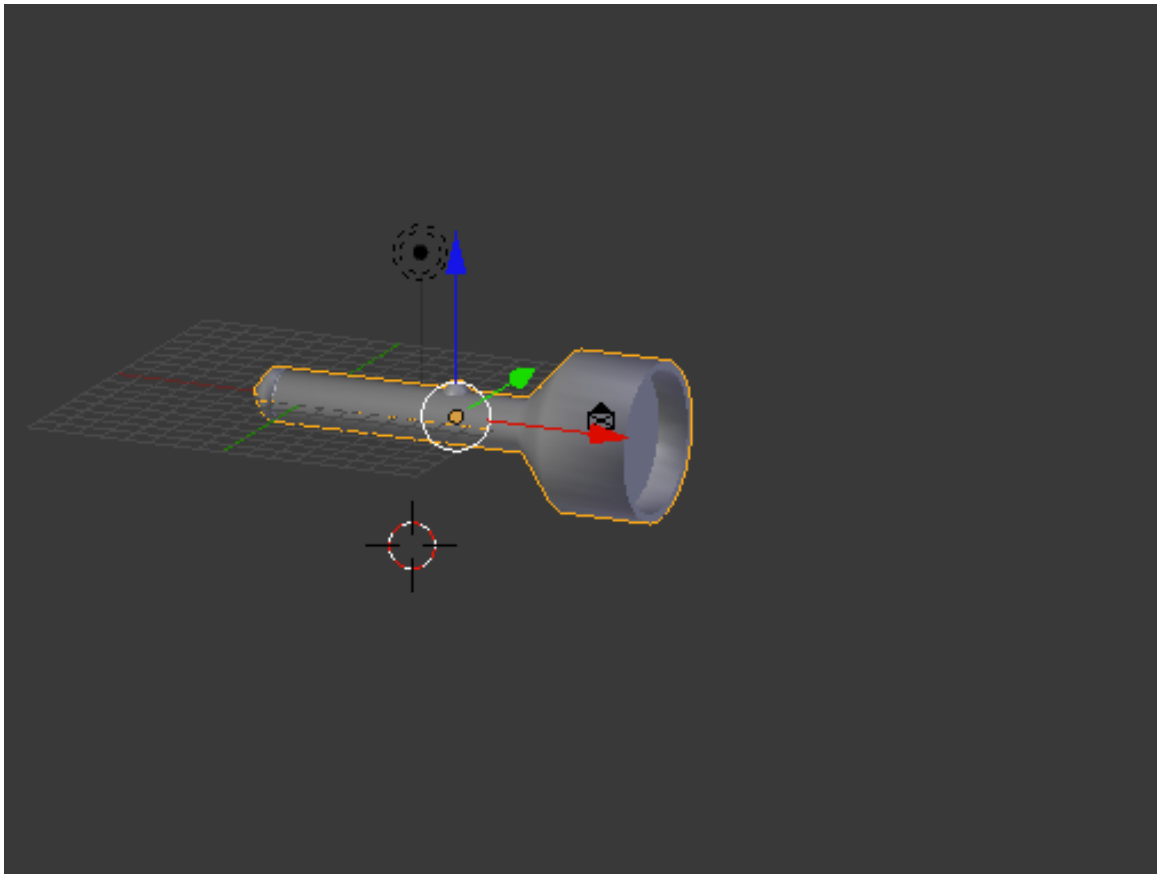
Deselect the vertices. TAB out of edit mode.



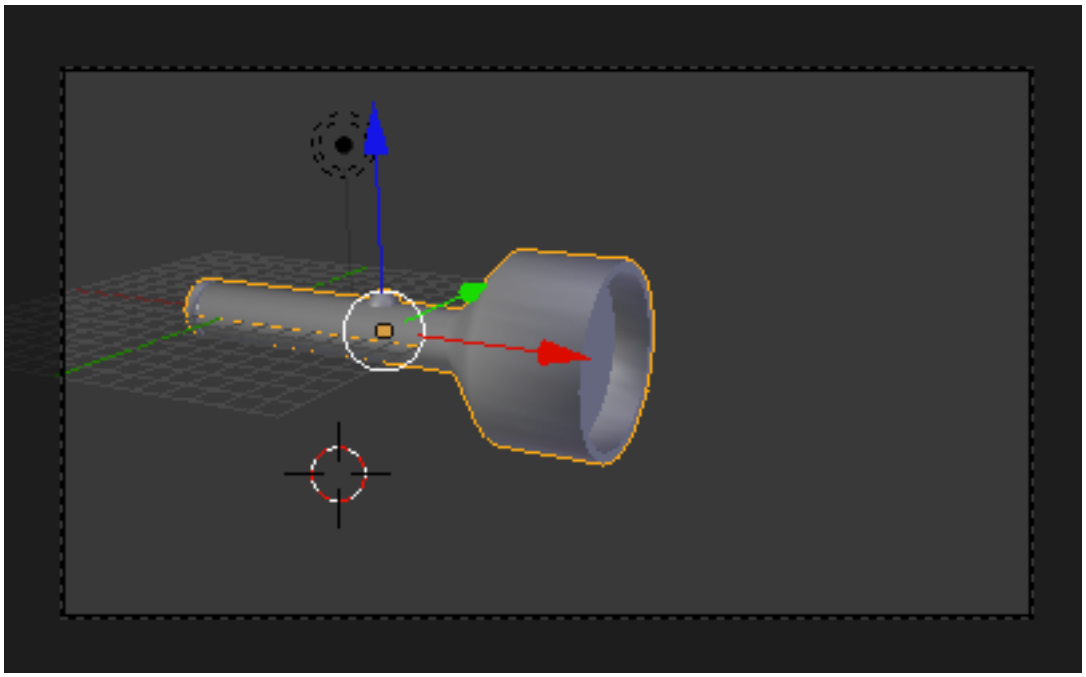
Save your Blend file.

Camera and Lighting:

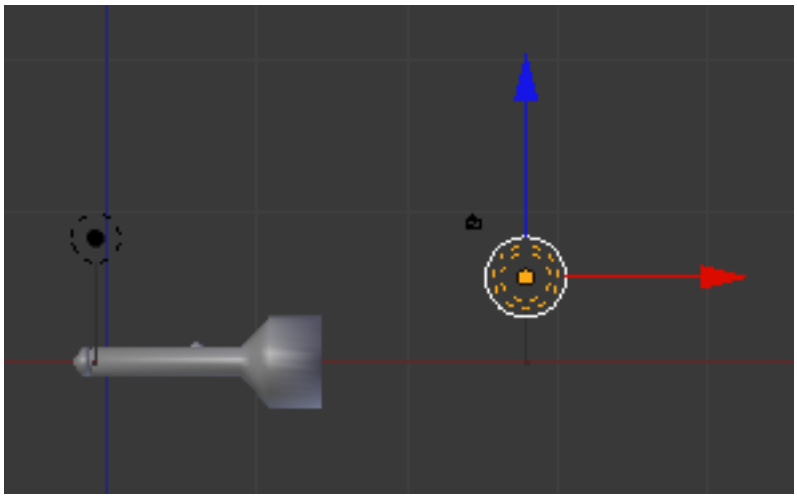
Go to perspective view (NUMPAD-5). Rotate your display so that the flashlight object is in a nice view (somewhat to the left) yet we can see the lens. Select the Flashlight object. Something like shown below.



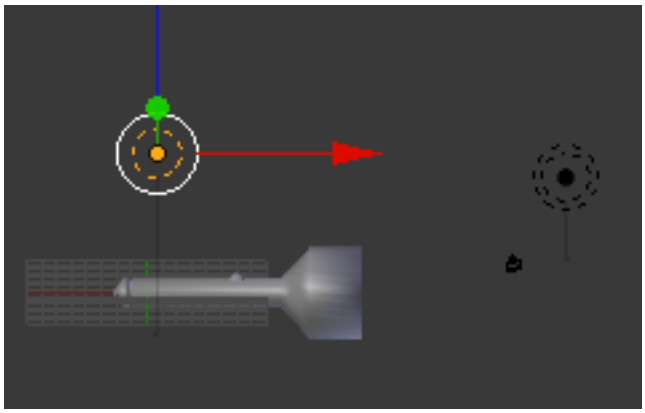
Press CTRL-ALT-Numpad-0 (align camera). This will align the camera to your view. Note: you may have to go back and forth adjusting. Note you can move the flashlight object while in camera view. The final camera view should look something like below (the flashlight is a little to the left because we will add a volumetric light beam to the rendering).



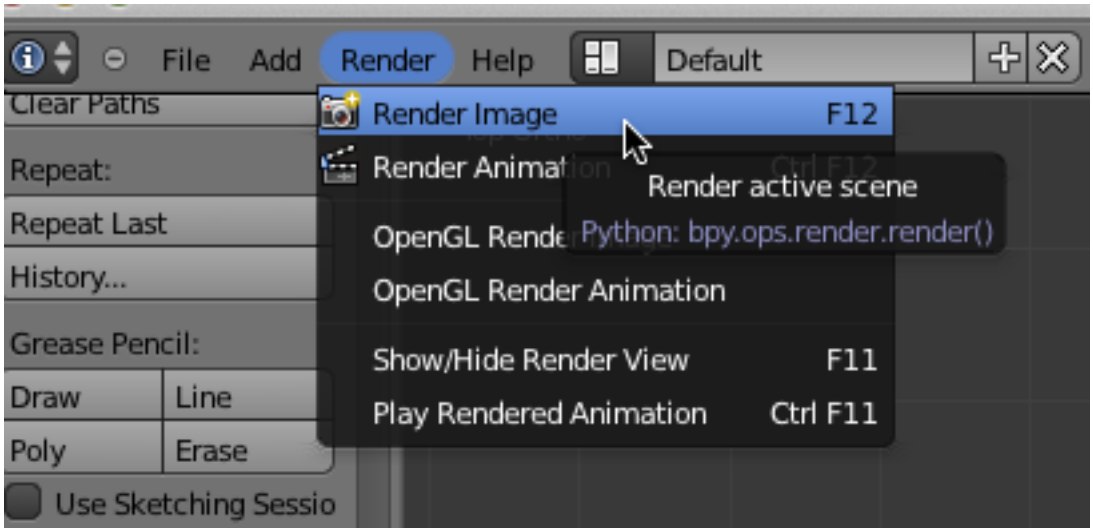
Go to front view. Position the default Blender point lamp and add an additional point lamp (SHIFT-A) as shown below.



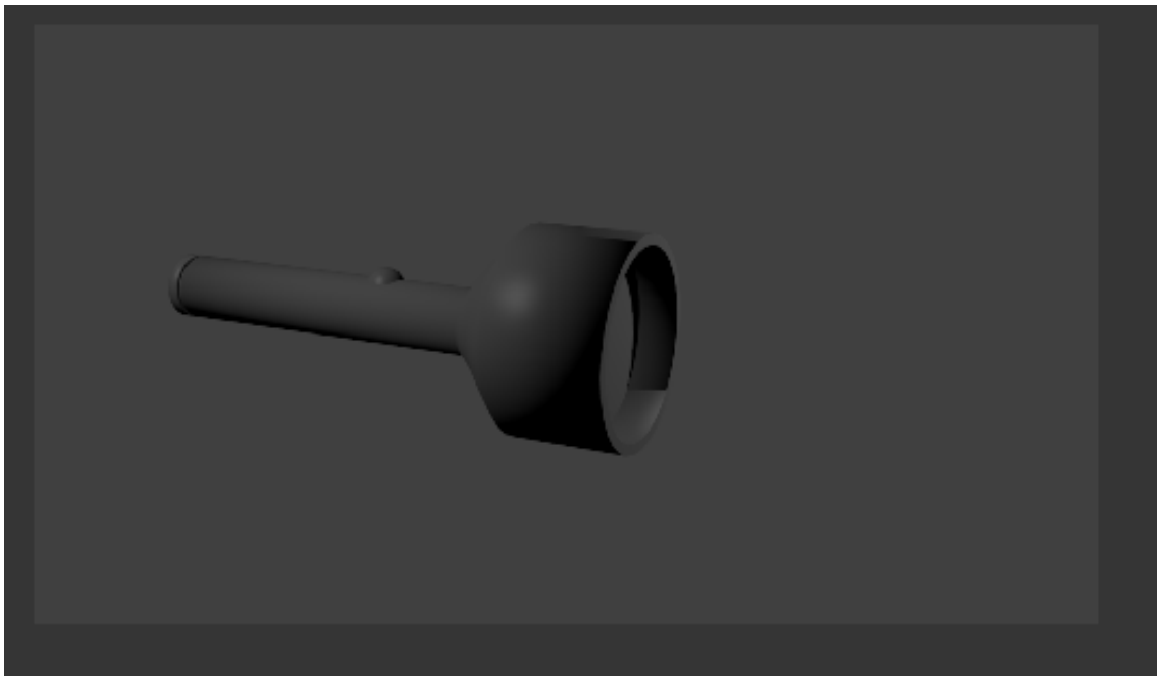
Go to top view. Position the 2 Point lamps as shown below.



On the top menu of the 3D Viewport window select Render / Render Image.



This will render the scene.

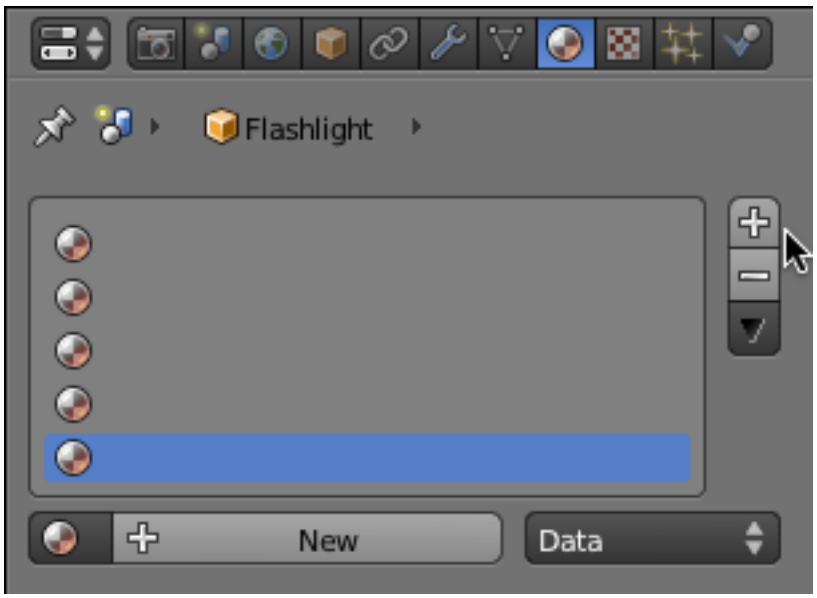


Press ESC (Escape) to return to the 3D viewport.

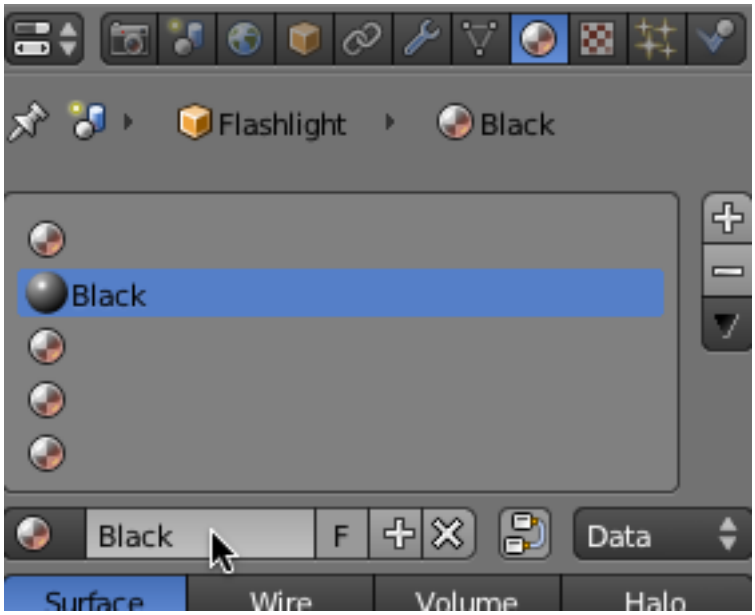
Save your Blend file.

Materials:

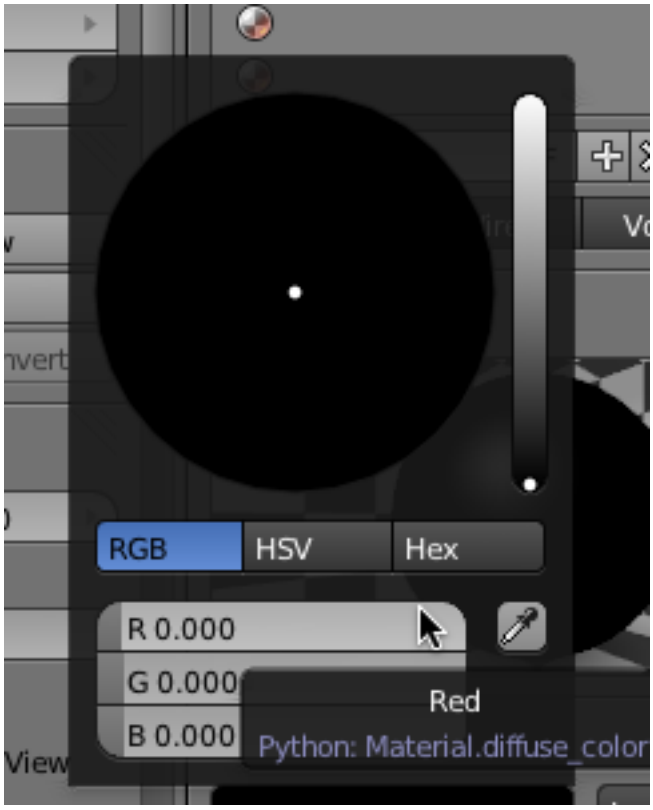
Select the flashlight object. Go to the Materials Editor. **Press the Plus button 5 times creating 5 material channels.**



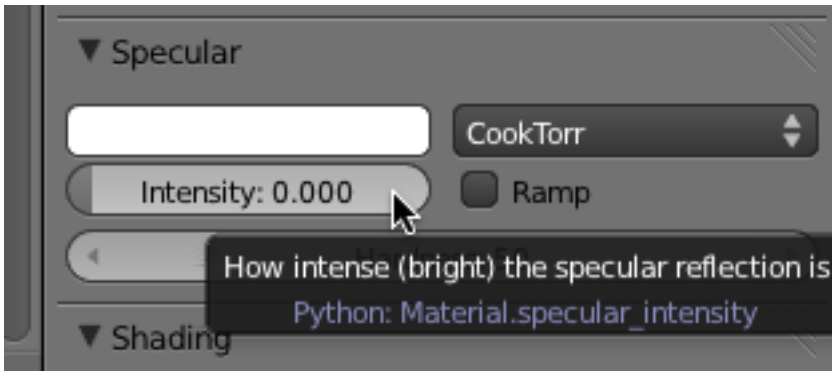
The first material channel is by default reserved for the whole mesh. We will not use that channel. Select the second material channel. Click NEW and name this Material Channel “Black”.



Click the Diffuse color swatch and set the RG and B sliders to 0 making a black color.



We want this black material to be matt so set the specular intensity slider to 0.



TAB into edit mode. Go to the Object Data Editor. Select the End Cap Vertex Group and press the Select button. This select the faces assigned to the group.

Go back to the Material Editor. Note that we now have 3 new buttons (Assign / Select / Deselect).

Press the Assign button. This will assign the vertex group to the black material channel.

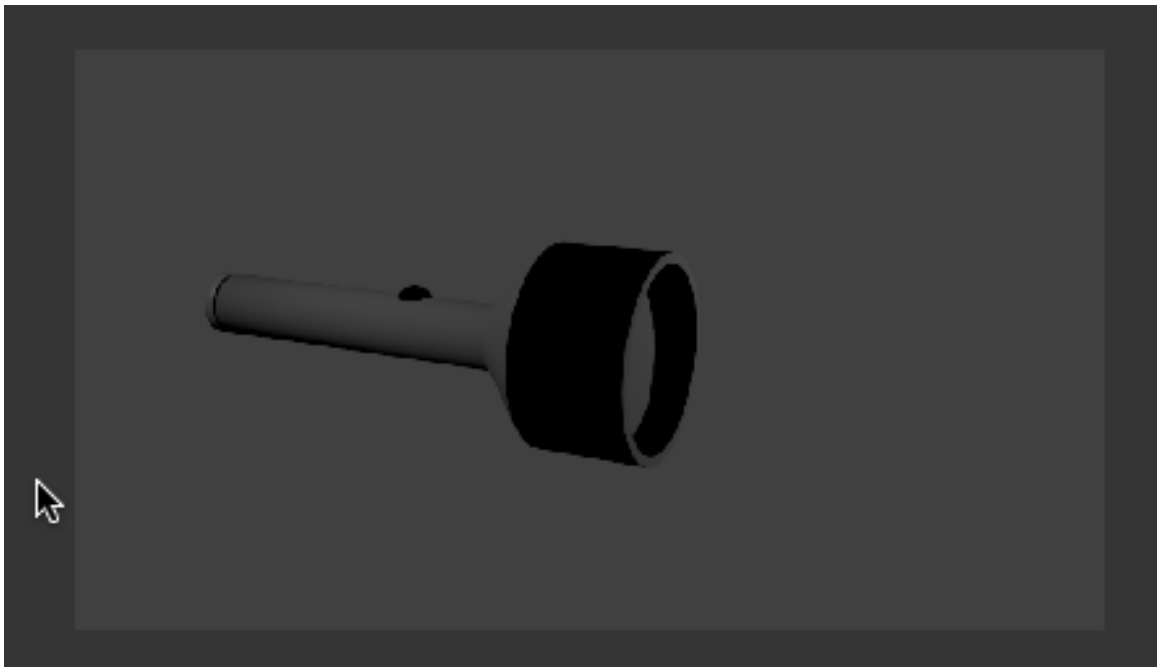
Press Deselect. Go back to the Object Data Editor. Select the Slot Vertex Group. Go back to the Material Editor. Press Assign, then Deselect.

Go back to the Object Data Editor. Select the Button Vertex Group. Go back to the Material Editor. Press Assign, then Deselect.

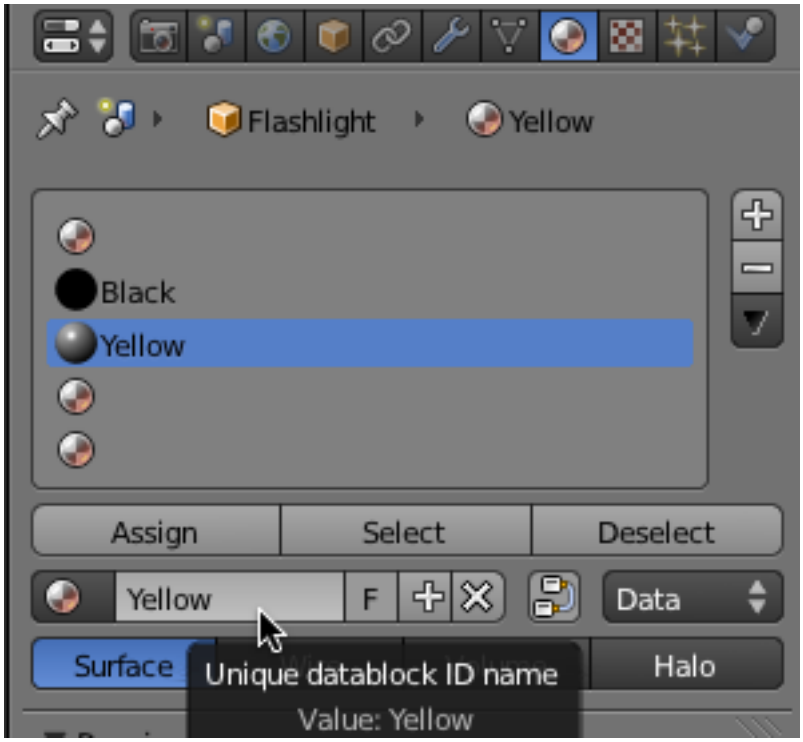
Go back to the Object Data Editor. Select the Flashlight Head Vertex Group. Go back to the Material Editor. Press Assign, then Deselect.

Go back to the Object Data Editor. Select the Head Rim Vertex Group. Go back to the Material Editor. Press Assign, then Deselect.

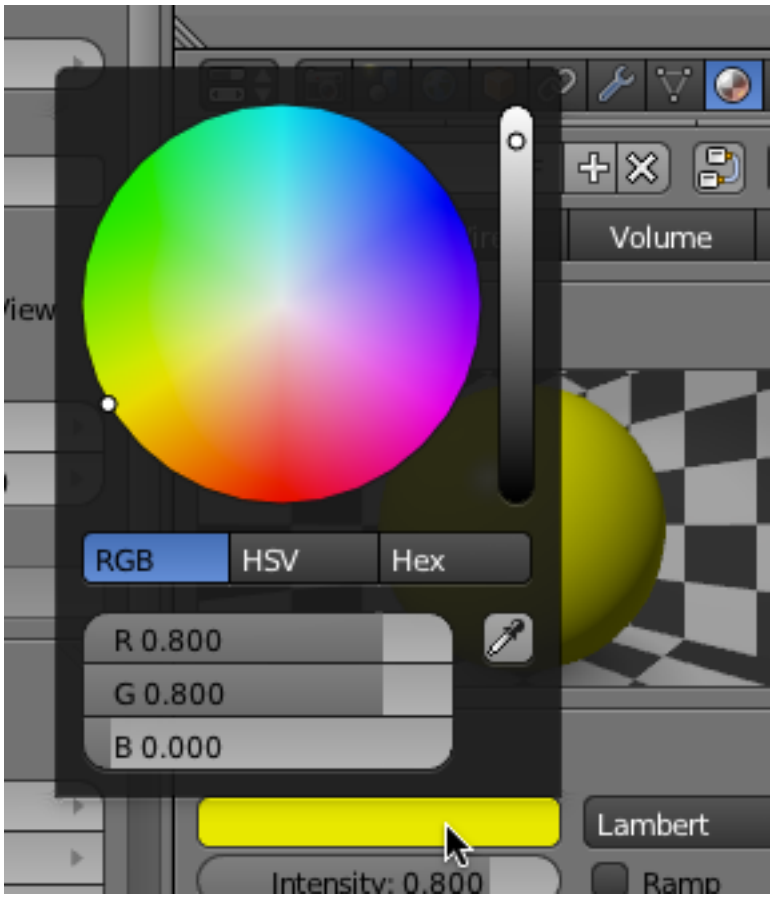
Render the scene.



Go to the material editor. Select the third material channel. Click the new button and name this material Yellow.



Click on the Diffuse color swatch. Set the R and G sliders to .8 and the B slider to 0 making a yellow color.



We want the yellow color to have a more plastic feel so set the Hardness (in the specular panel) to 212.

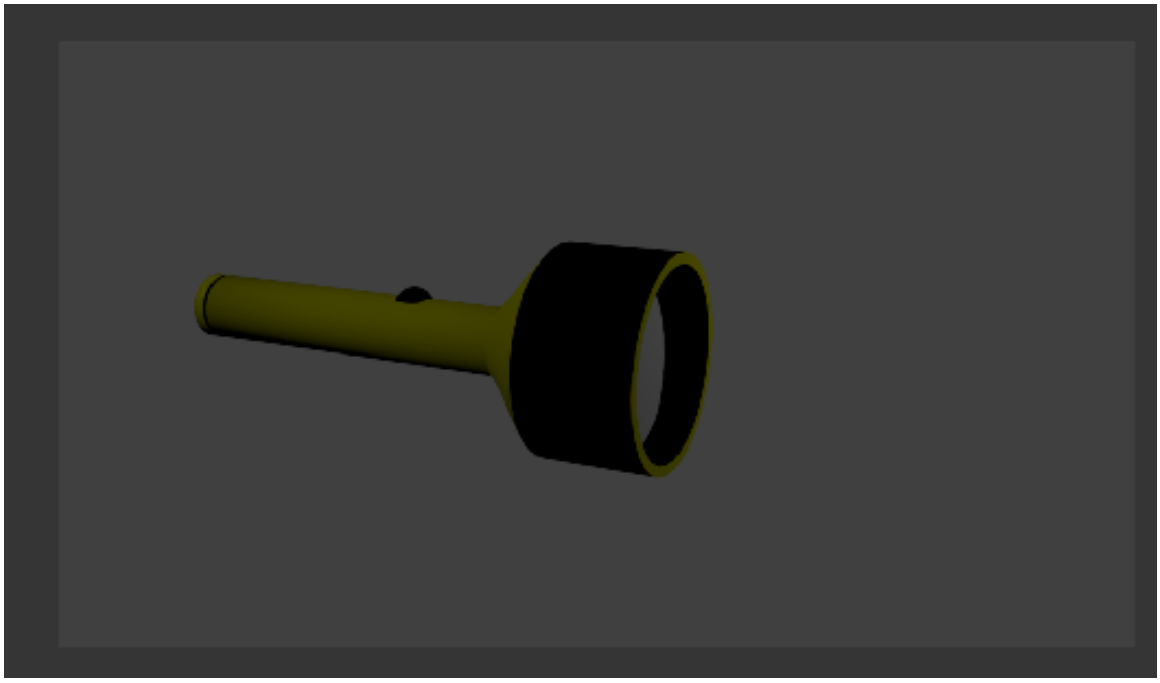
Go back to the Object Data Editor. Select the Cap Rim Vertex Group. Go back to the Material Editor. Press Assign, then Deselect.

Go back to the Object Data Editor. Select the Barrel Vertex Group. Go back to the Material Editor. Press Assign, then Deselect.

Go back to the Object Data Editor. Select the Flare Vertex Group. Go back to the Material Editor. Press Assign, then Deselect.

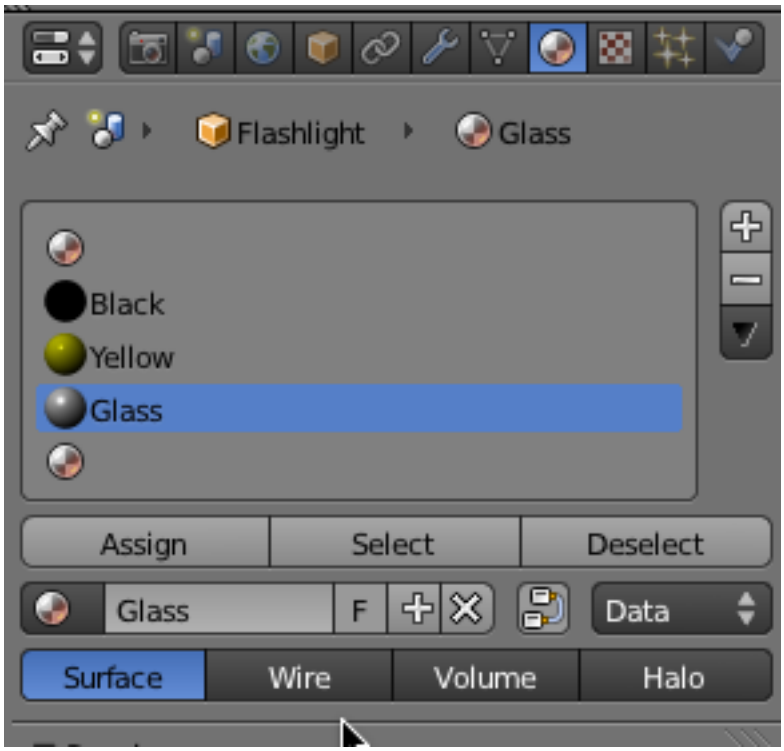
Go back to the Object Data Editor. Select the Head Face Vertex Group. Go back to the Material Editor. Press Assign, then Deselect.

Render the Scene.

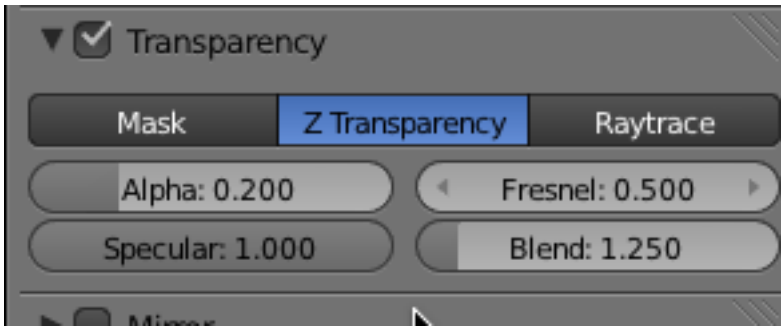


Save your Blend file.

Go to the material editor. Select the fourth material channel. Click the new button and name this material Glass.

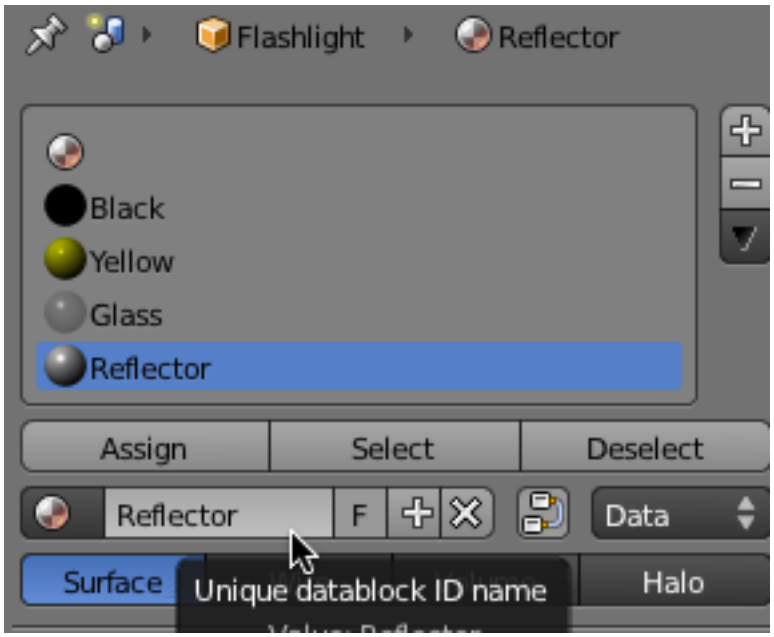


Checkmark the Transparency checkbox. Set the Alpha to .2 and the Fresnel to .5

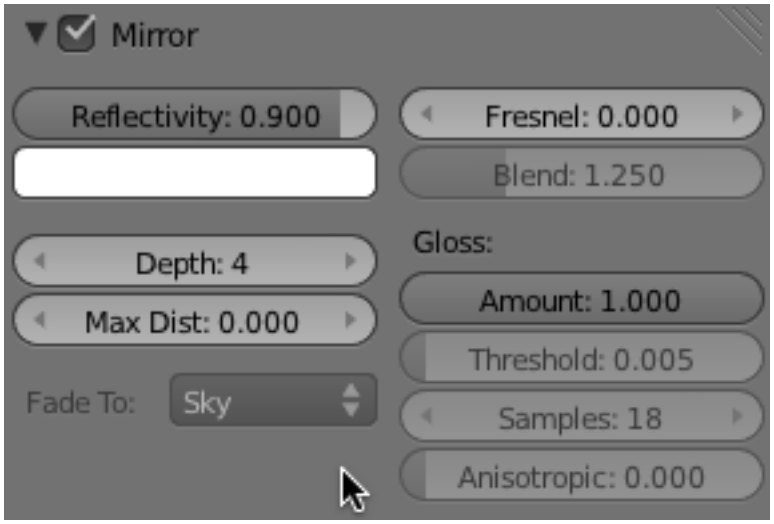


Go back to the Object Data Editor. Select the Lens Vertex Group. Go back to the Material Editor. Press Assign, then Deselect.

Select the fifth material channel. Click the new button and name this material Reflector.



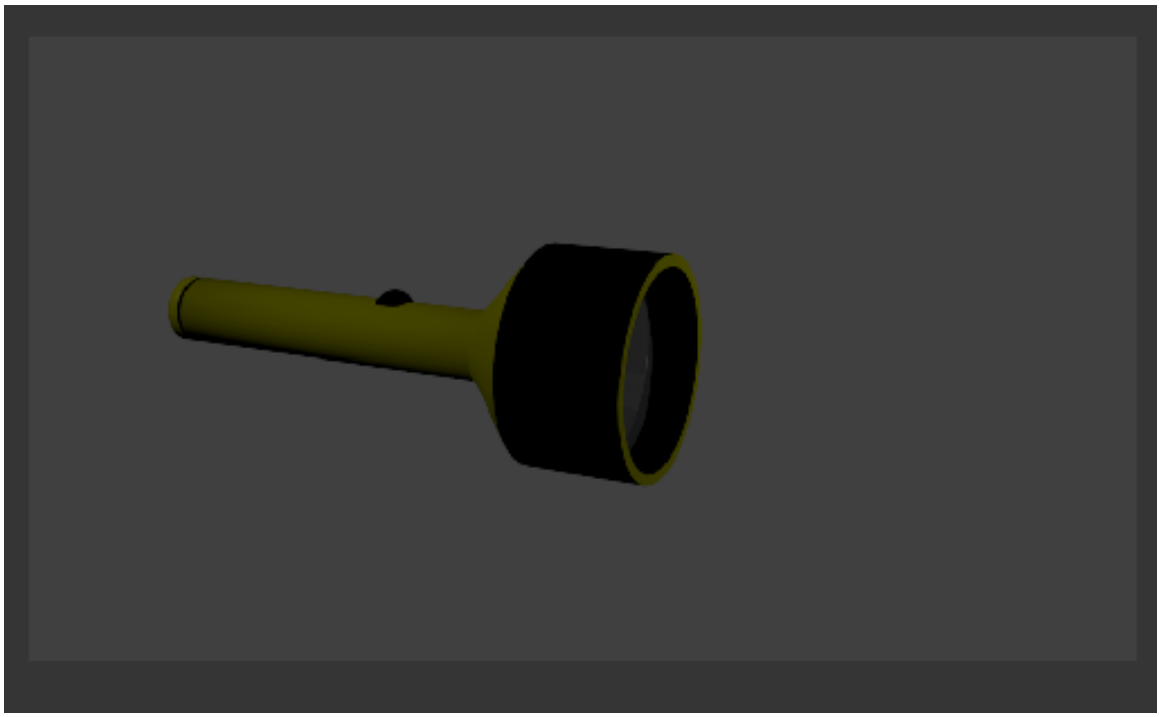
Checkmark the Mirror checkbox. Set the Reflectivity to .9 and the Depth to 4



Go back to the Object Data Editor. Select the Reflector Vertex Group. Go back to the Material Editor. Press Assign, then Deselect.

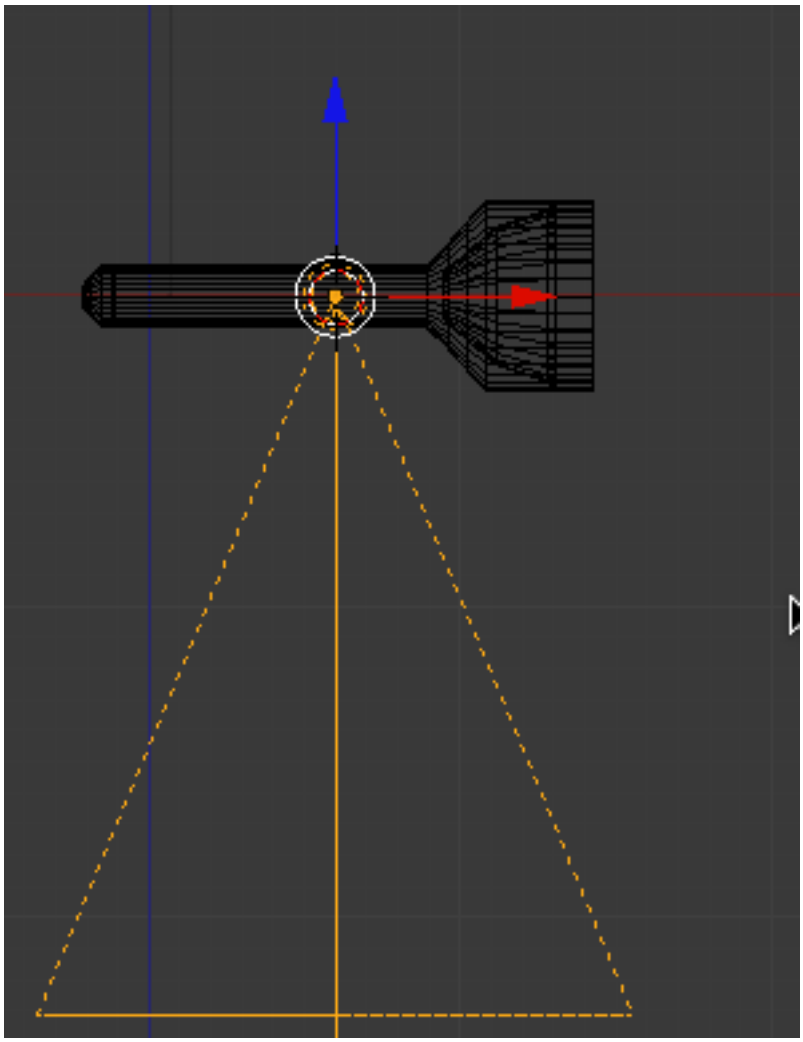
Go back to the Object Data Editor. Select the Inner Ring Vertex Group. Go back to the Material Editor. Press Assign, then Deselect.

Render the scene

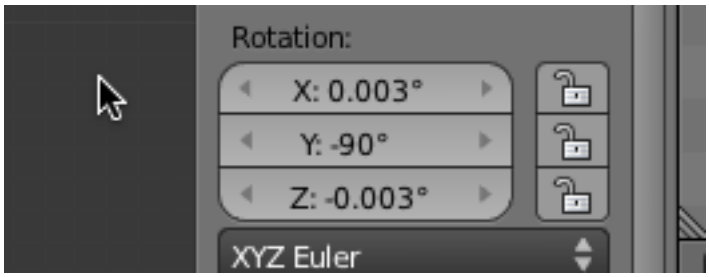


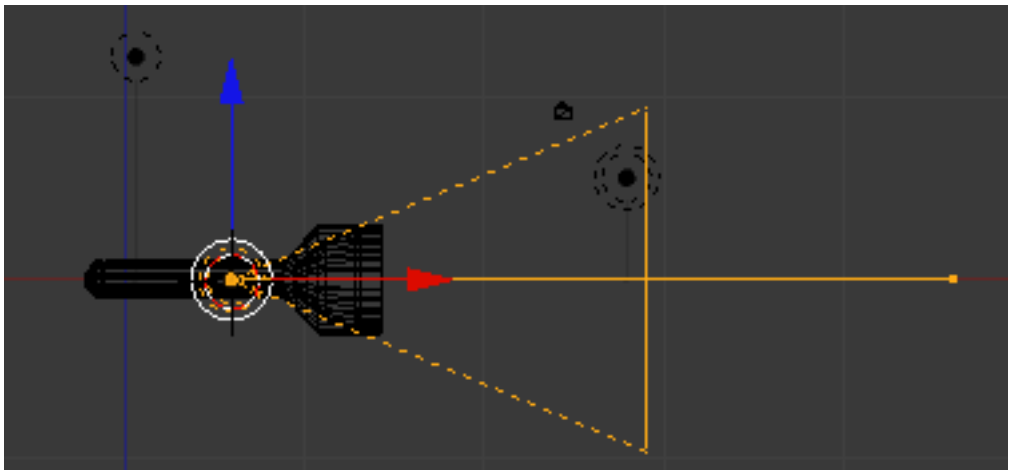
TAB out of edit mode. Save your Blend file.

Go to Front view. Go to wireframe mode (ZKEY). Deselect the flashlight object. Place your 3D cursor in the cent of the flashlight object. Press SHIFT-A and add a Spot Lamp.

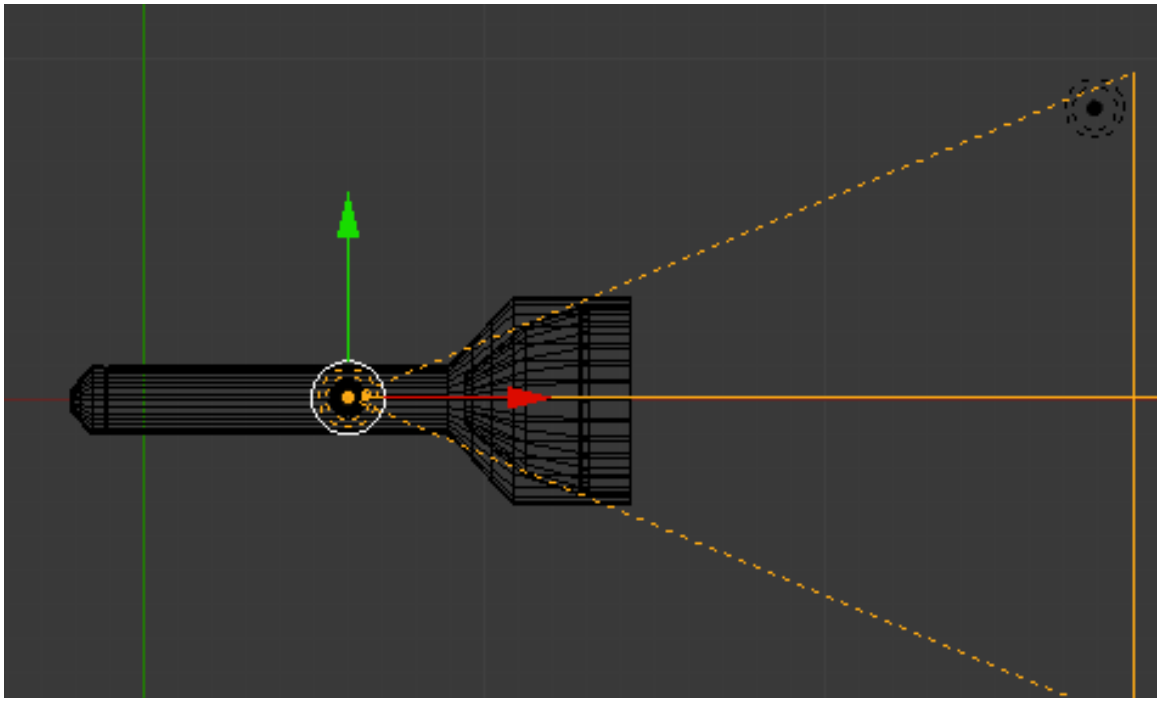


Rotate the Spot lamp -90 degrees around the Y axis so it is pointing out of the flashlight object as shown below.



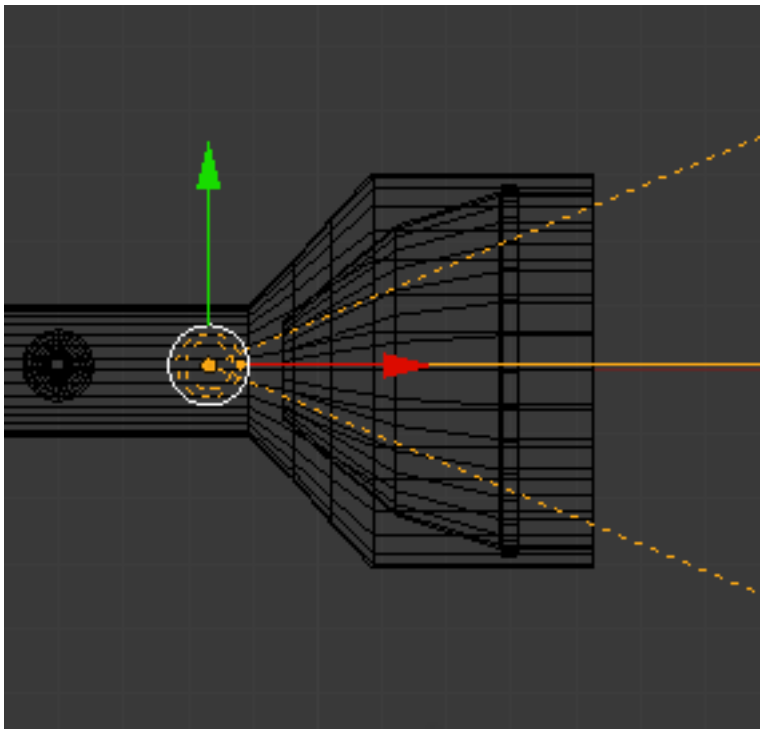


Go to top view. Move the Spot lamp to the center of the flashlight as shown below.

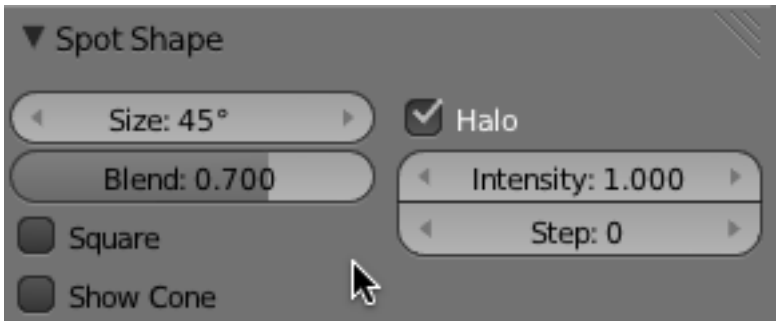


With the Spot lamp selected, go to the Object Data editor.

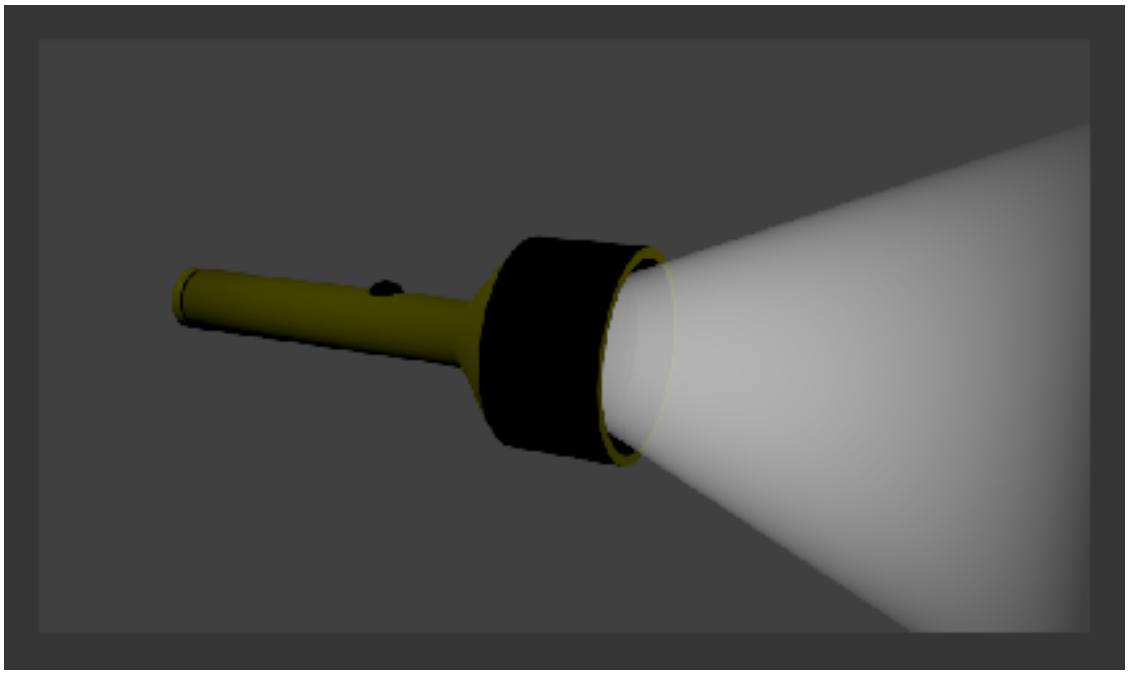
Move the Spot lamp to the right a bit so that the beam is smaller than the flashlight head as shown below.



In the Spot Shape panel, checkmark Halo and set the Blend slider to .7



Deselect the Spot lamp object. Render the scene.



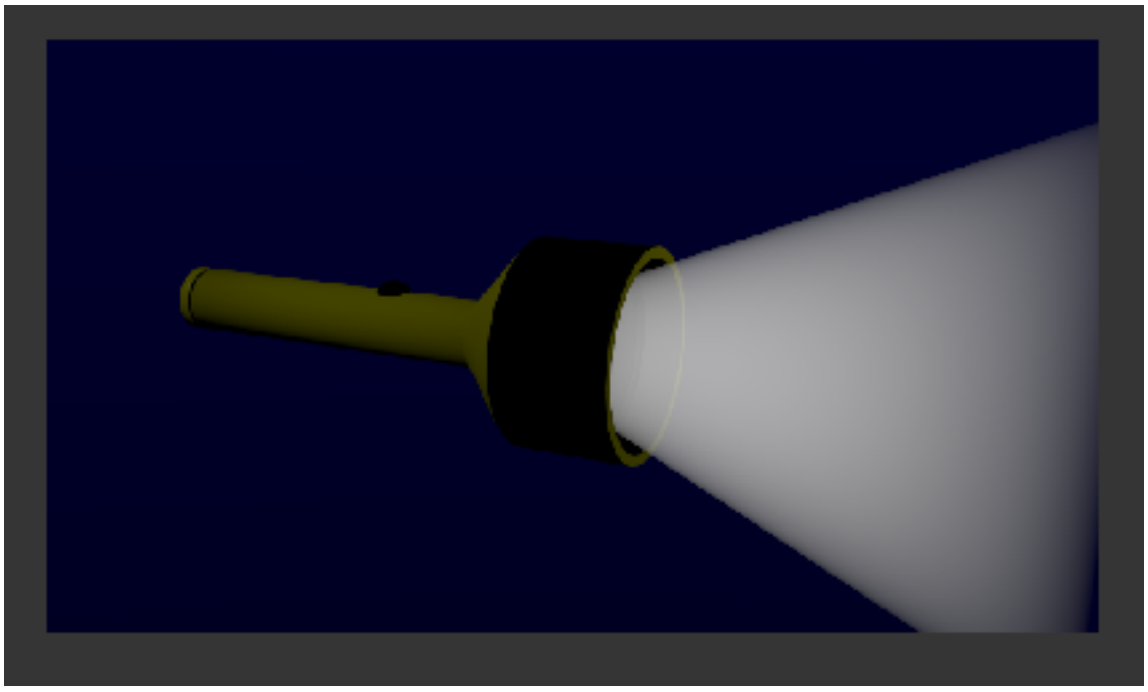
Go to the World editor.

Checkmark “Blend Sky”.

Click on the Horizon color swatch and set the R and G sliders to 0 and set the B slider to .01

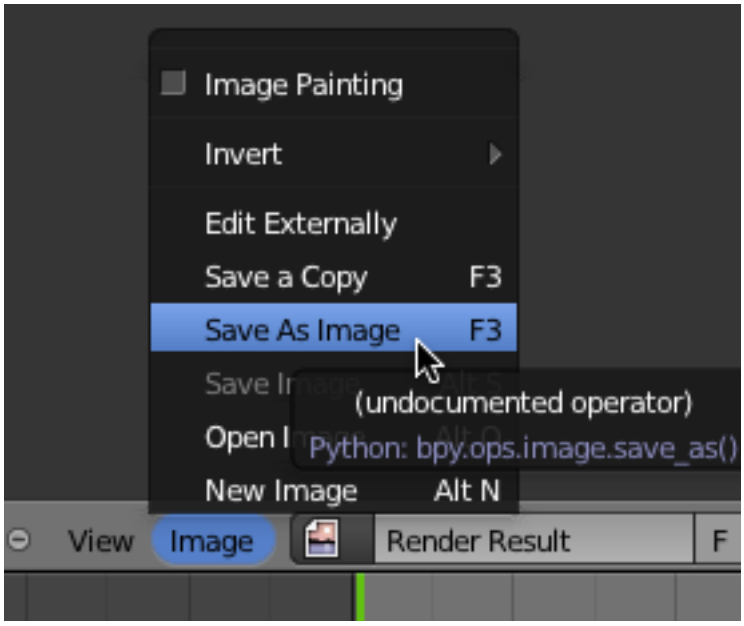
Click the Zenith color swatch and set the R and G sliders to 0 and set the B slider to .03

Render the Scene.

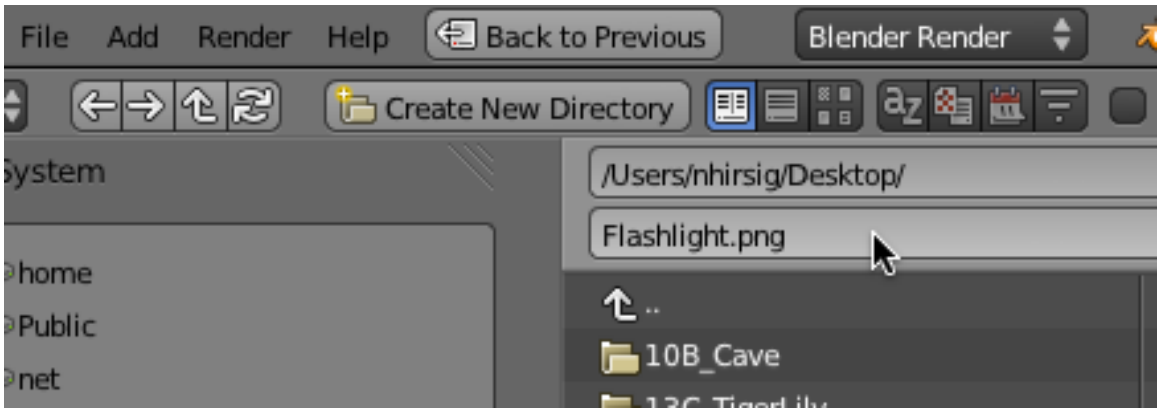


Save your Blend file.

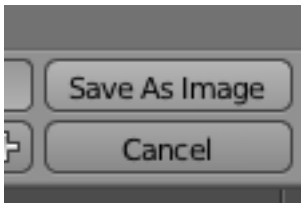
You can save an image file to your computer of this rendering. In the bottom menu of the UV Image Editor press Image / Save As Image



This displays Blender's File page. Decide where you want the file to be placed (I choose my desktop) and name the file Flashlight.png.



Press the Save As Image button.



This will save an image file of the rendering and place it wherever you have chosen.

A completed blend file of this tutorial named “Flashlight_Complete.blend” can be downloaded HERE.