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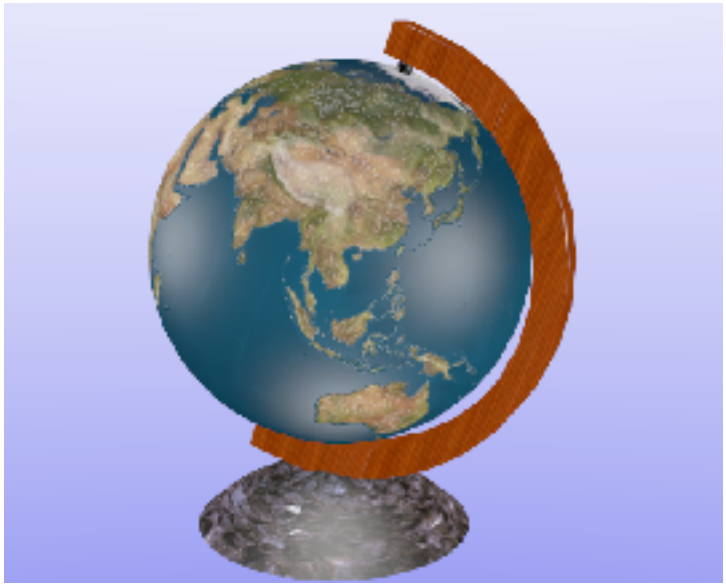
(May 2012)

Globe

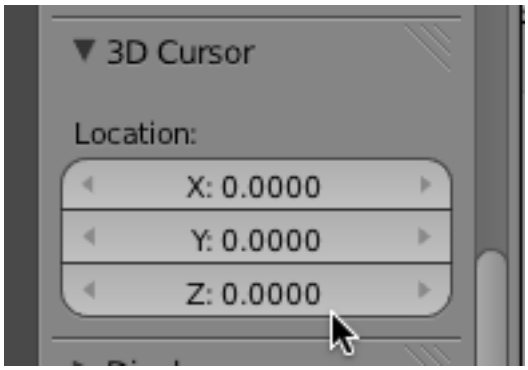


In this tutorial, we will model a simple globe, add a bump map and a regular texture map and animate the globe's rotation.

Open Blender. Select the default cube object and delete it (XKEY).

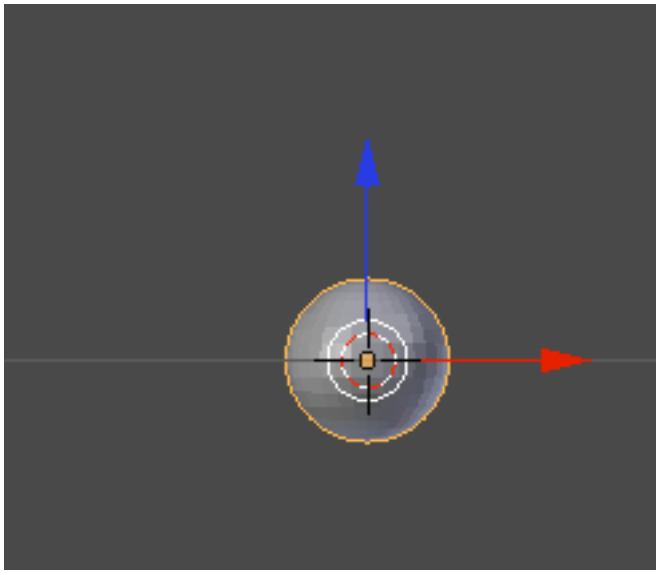
Press the NKEY (Notation) to display the properties panel on the right (if it isn't already displayed).

In the properties panel set your 3D cursor location to X, Y, and Z = 0

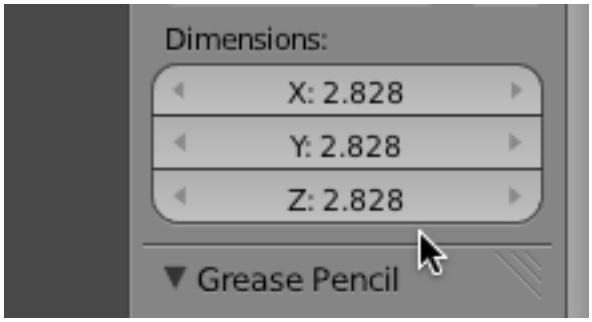


Go to Front view. Press NUMPAD-5 to go to Orthographic projection mode (if you are in perspective mode)

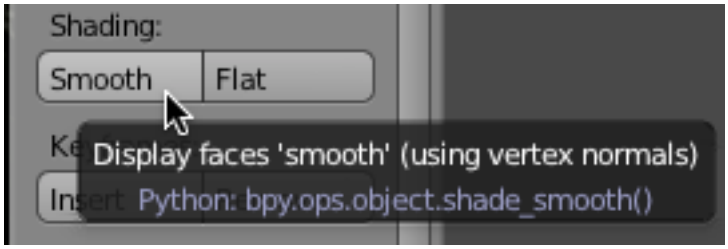
Press SHIFT-A and add a UV Sphere object.

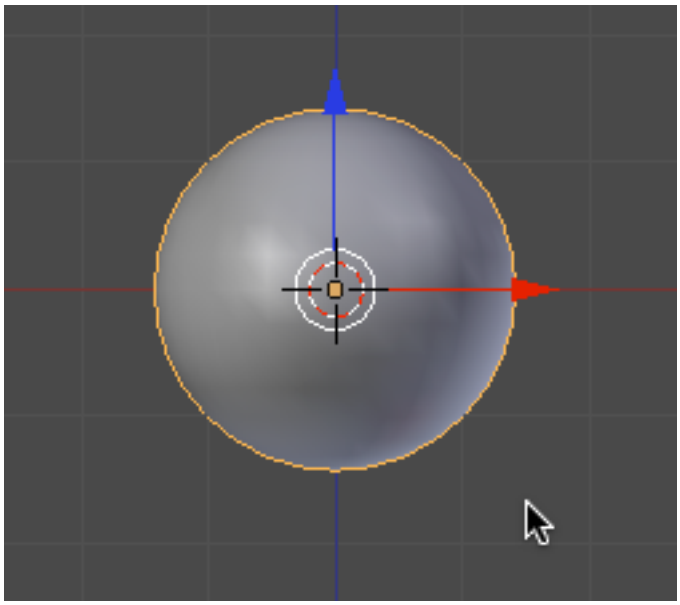


In the properties panel set the Dimensions to X, Y, and Z = 2.828

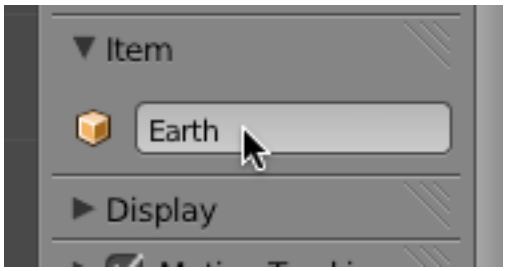


In the Tools panel on the left, press the Smooth button. This will smooth out the sphere's facets.

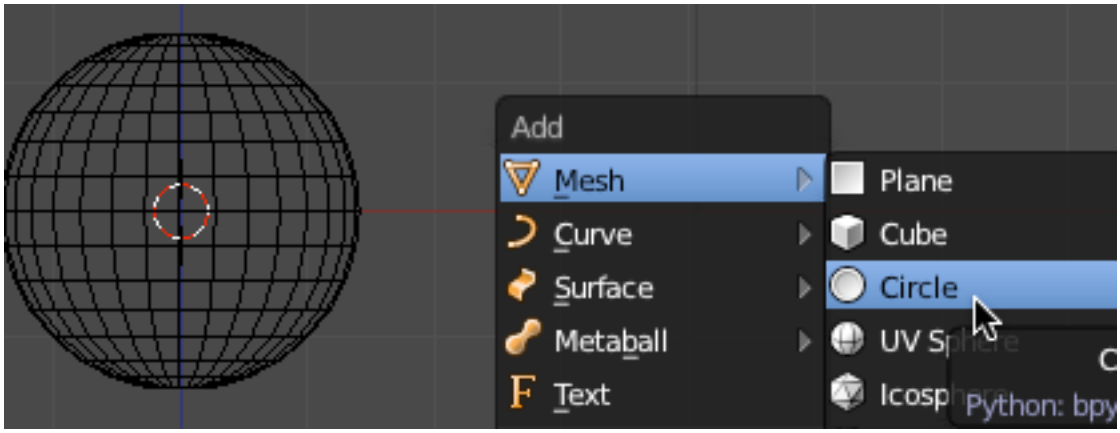




In the right properties panel, name this object “Earth”.

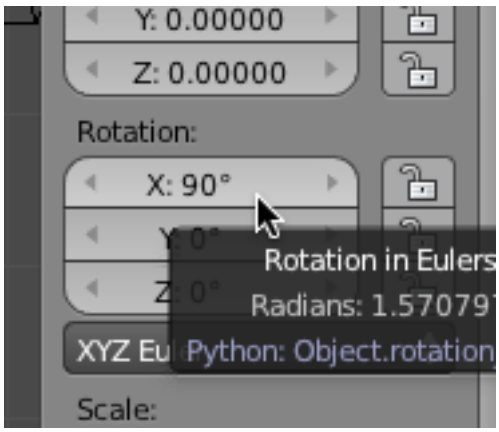


Still in front view. Go to wireframe mode (ZKEY). Make sure your 3D Cursor is still at location X,Y,Z = 0. Deselect the Earth object. Press SHIFT-A and add a circle object.

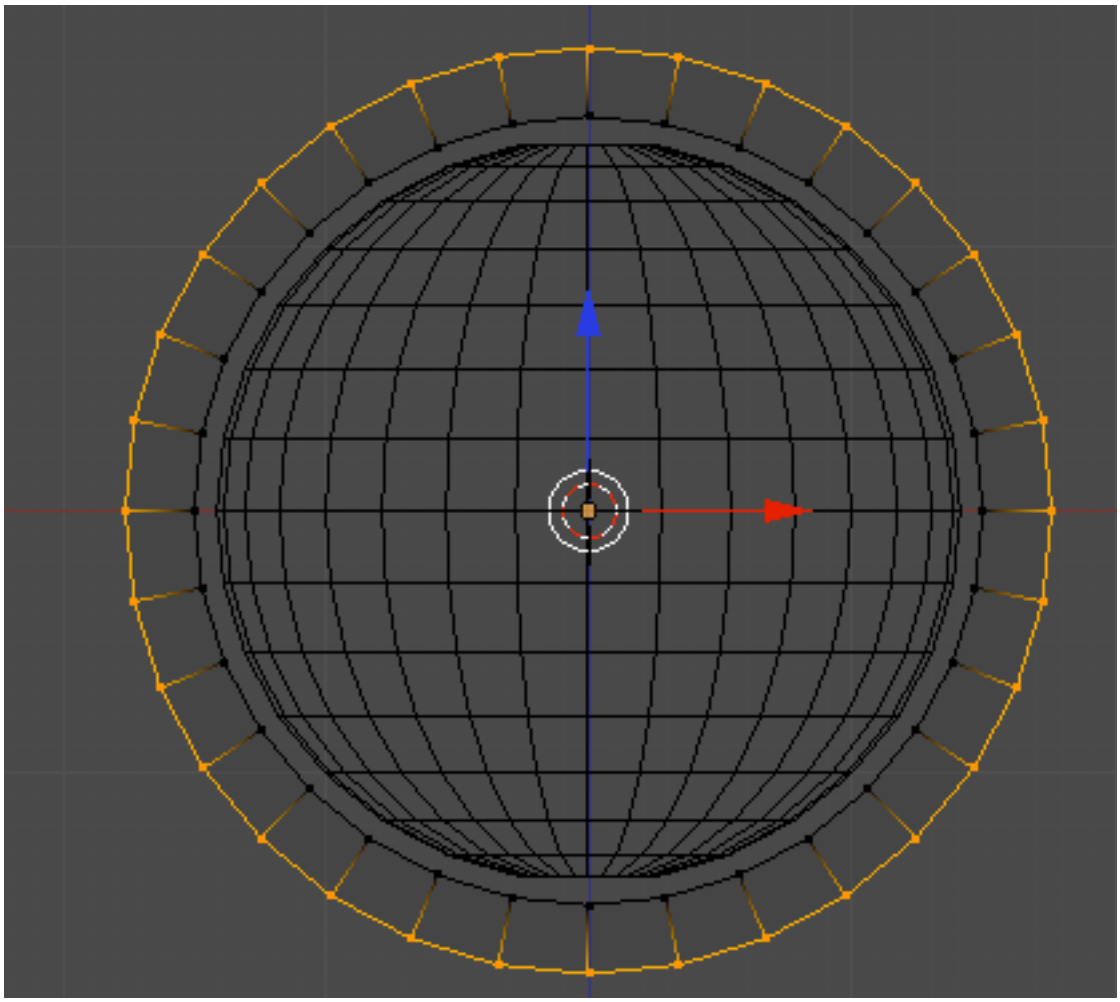


In the properties panel set the X,Y, and Z Scale to 1.5

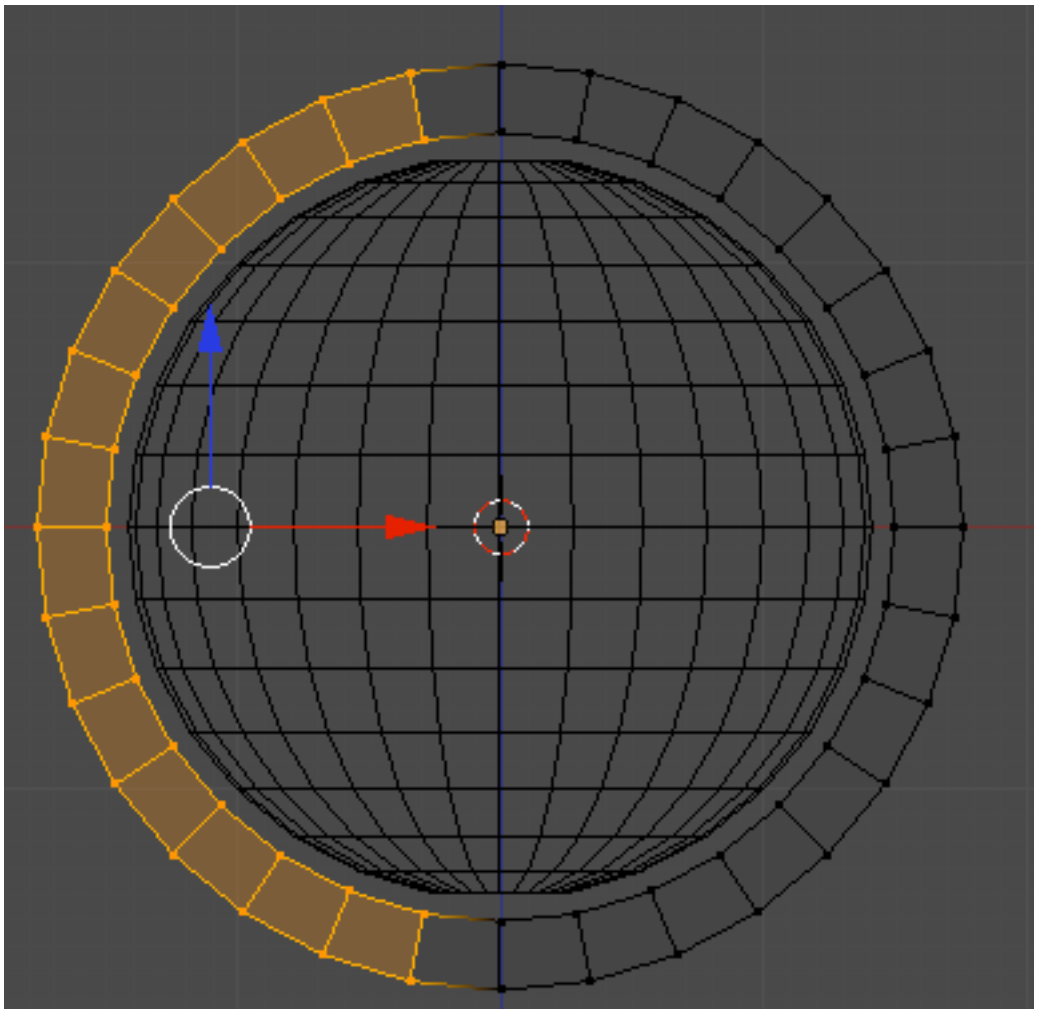
Set the X Rotation to 90.



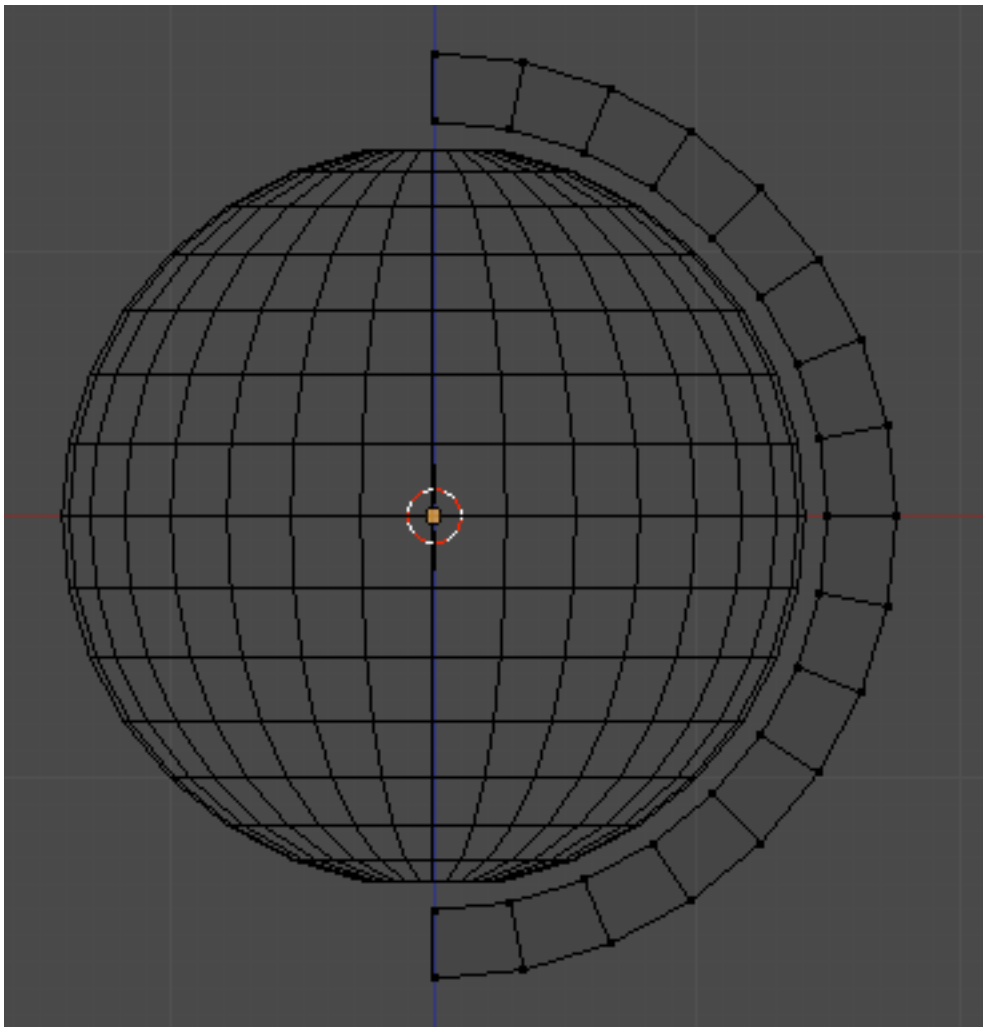
TAB into edit mode. With all of the vertices selected, Press the EKEY (extrude) followed by the SKEY (Scale) and extrude / scale the vertices out a bit as shown below.



Deselect the vertices (AKEY). Box select the vertices on the left as shown below.

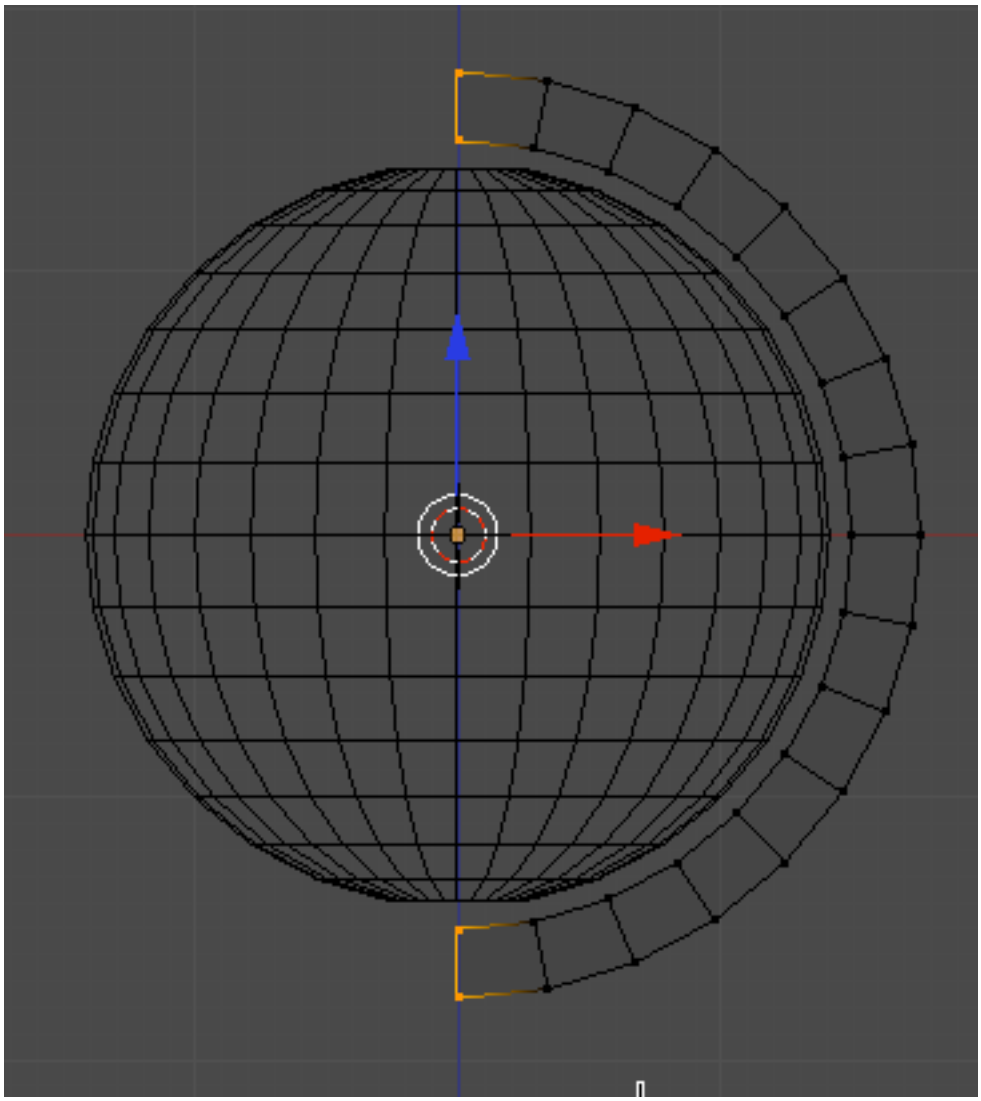


Press the XKEY and delete the vertices.

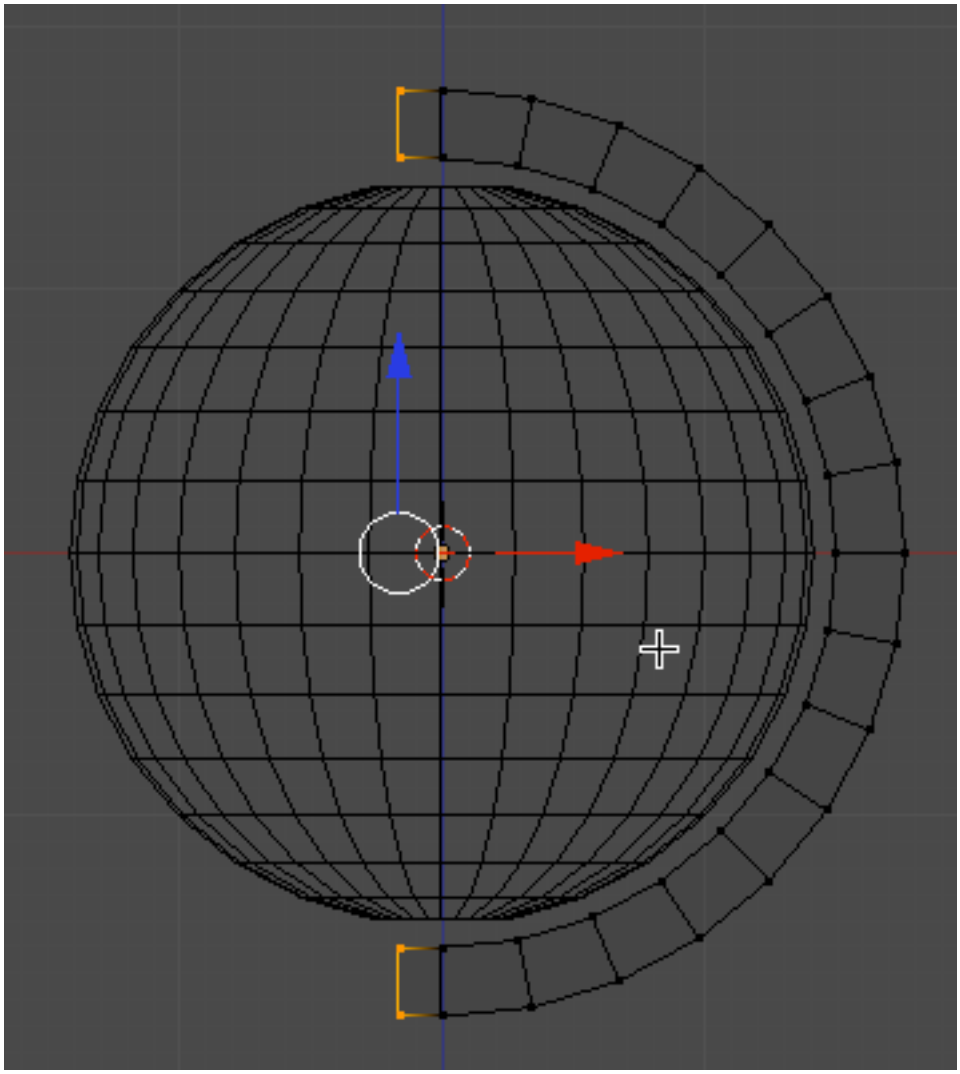


Select all of the vertices. (AKEY). Go to top view. Press the EKEY (Extrude) and extrude the vertices

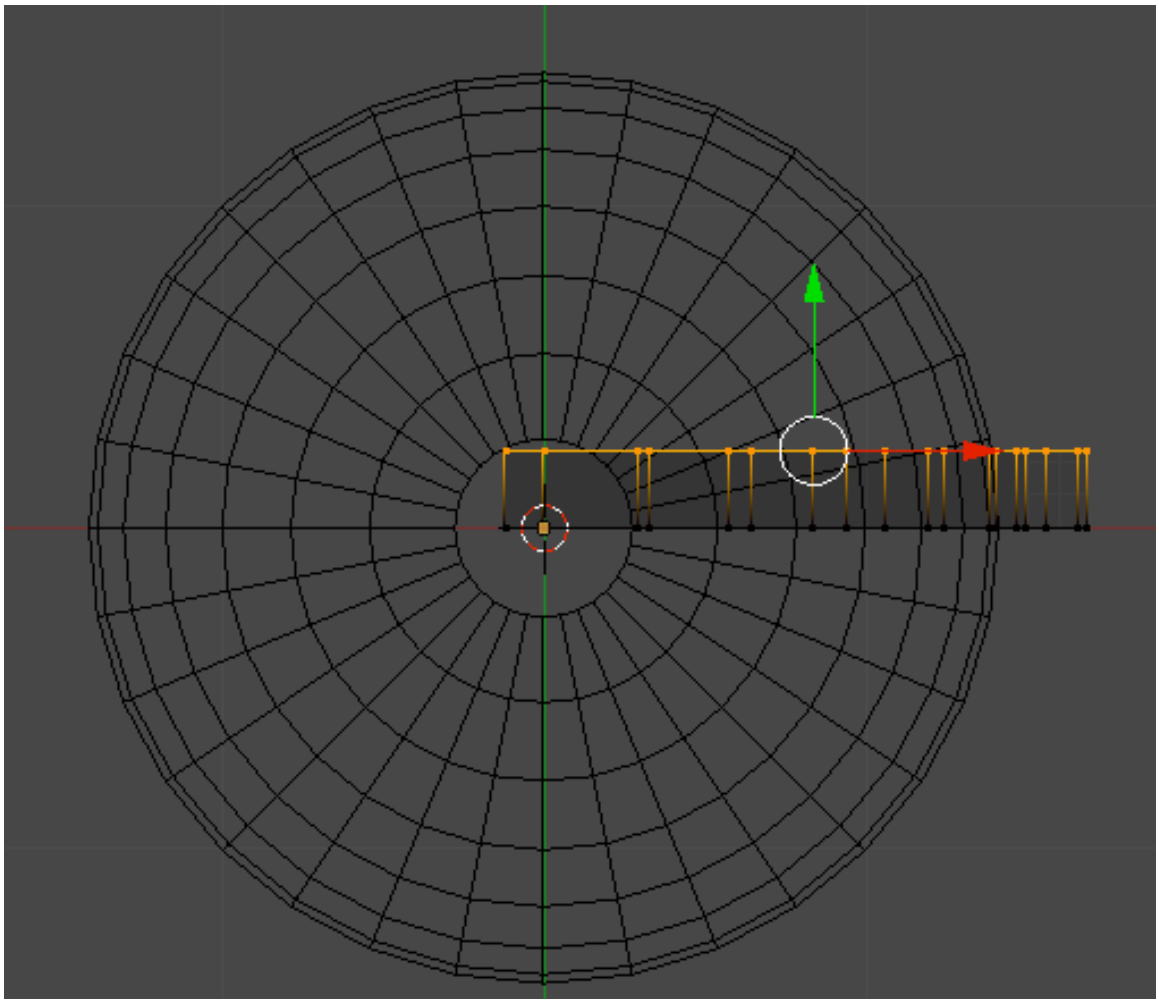
Box select the top two left and the bottom two left vertices as shown below.



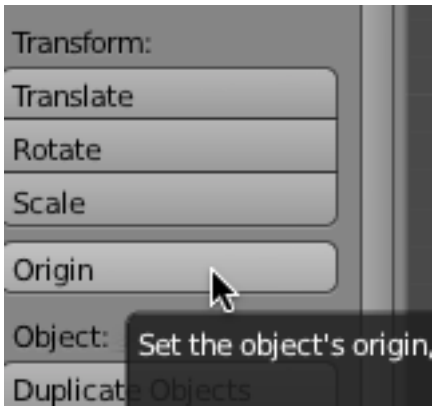
Press the EKEY (Extrude) followed by the XKEY and extrude them to the left along the X axis a bit as shown below.



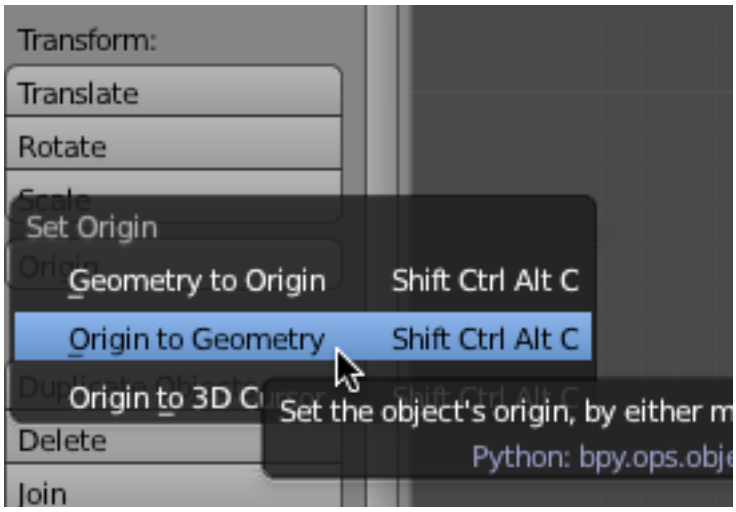
Select all of the vertices. Go to top view. Press the EKEY (Extrude) and extrude them up a bit along the Y axis as shown below.



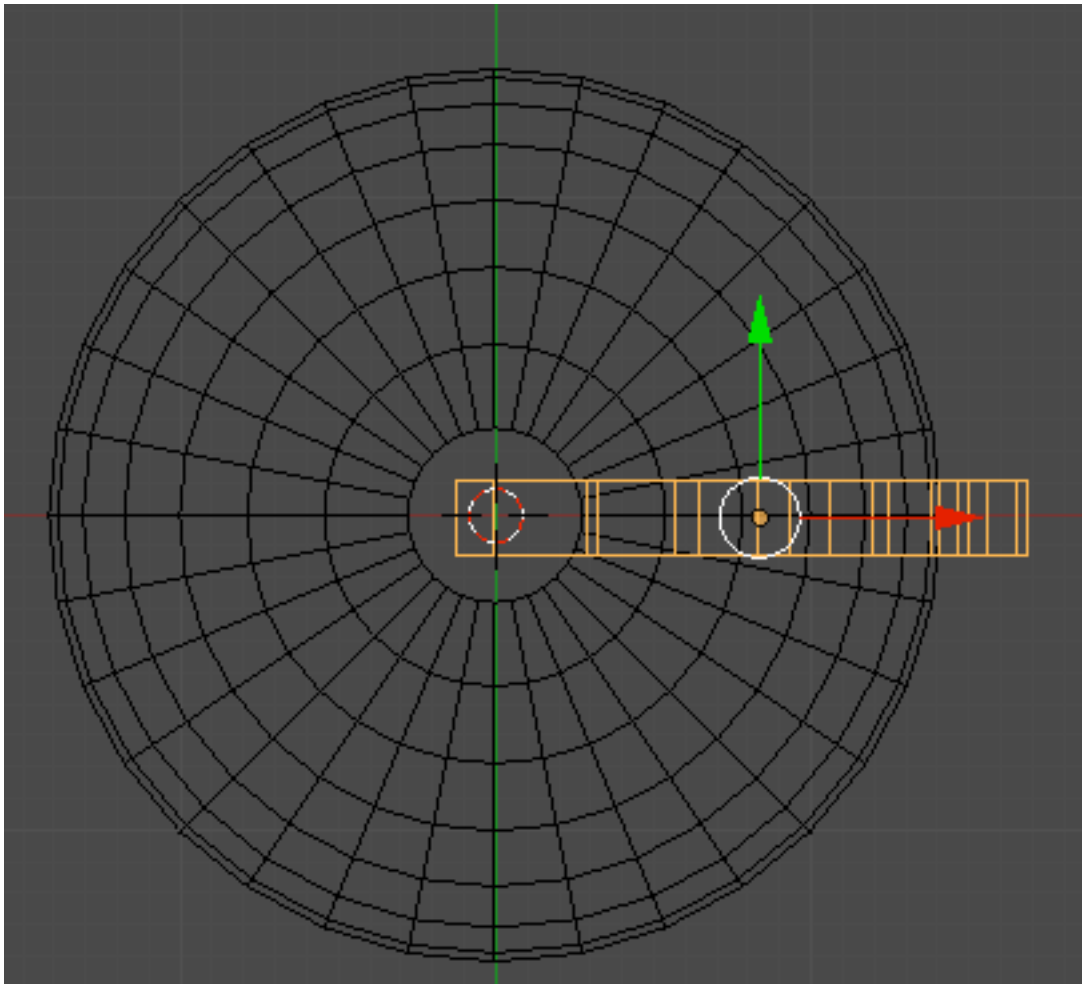
Deselect the vertices. TAB out of edit mode. In the tool panel on the left press the Origin button.



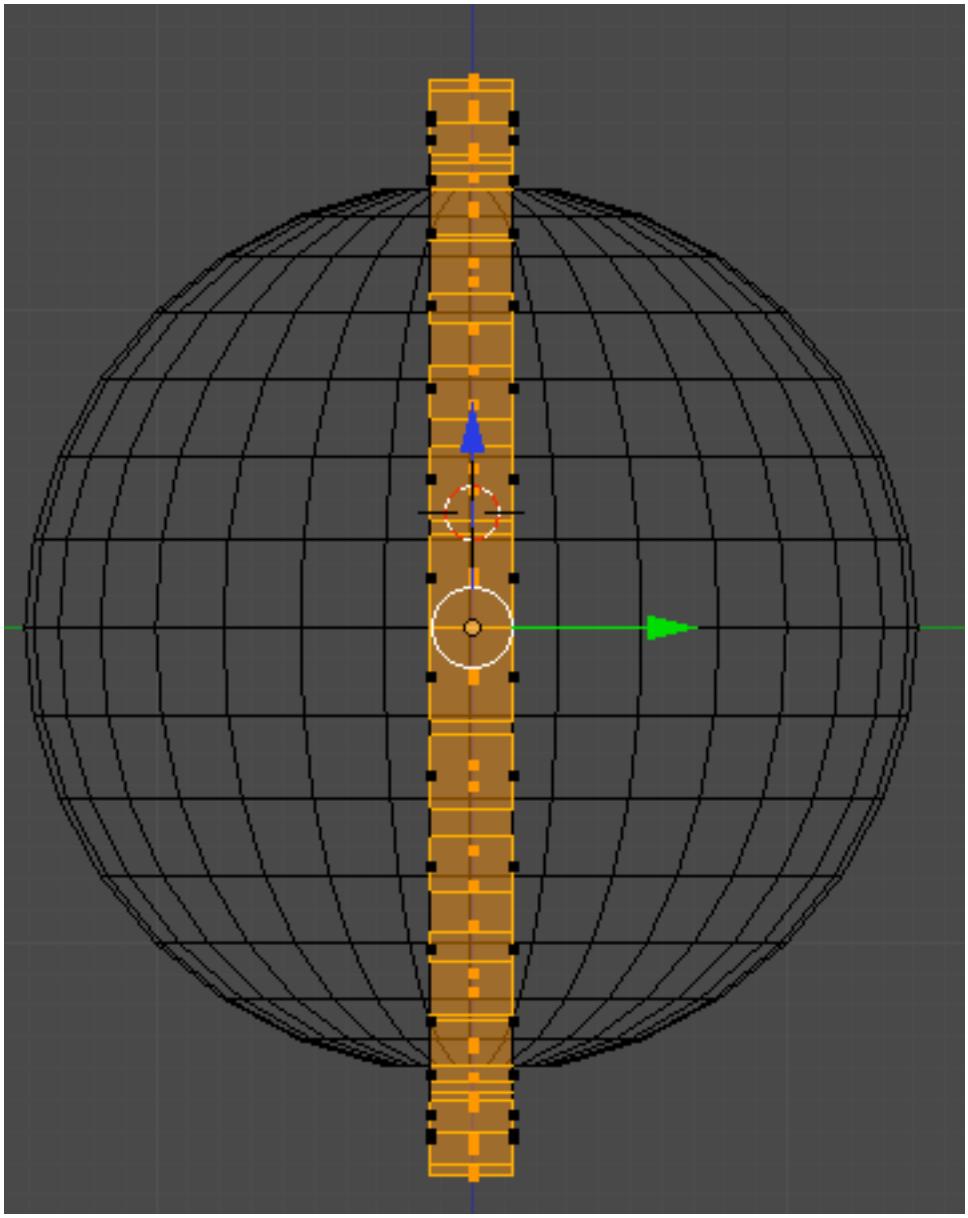
Select Origin to Geometry. This will center the origin point to the center of the object.



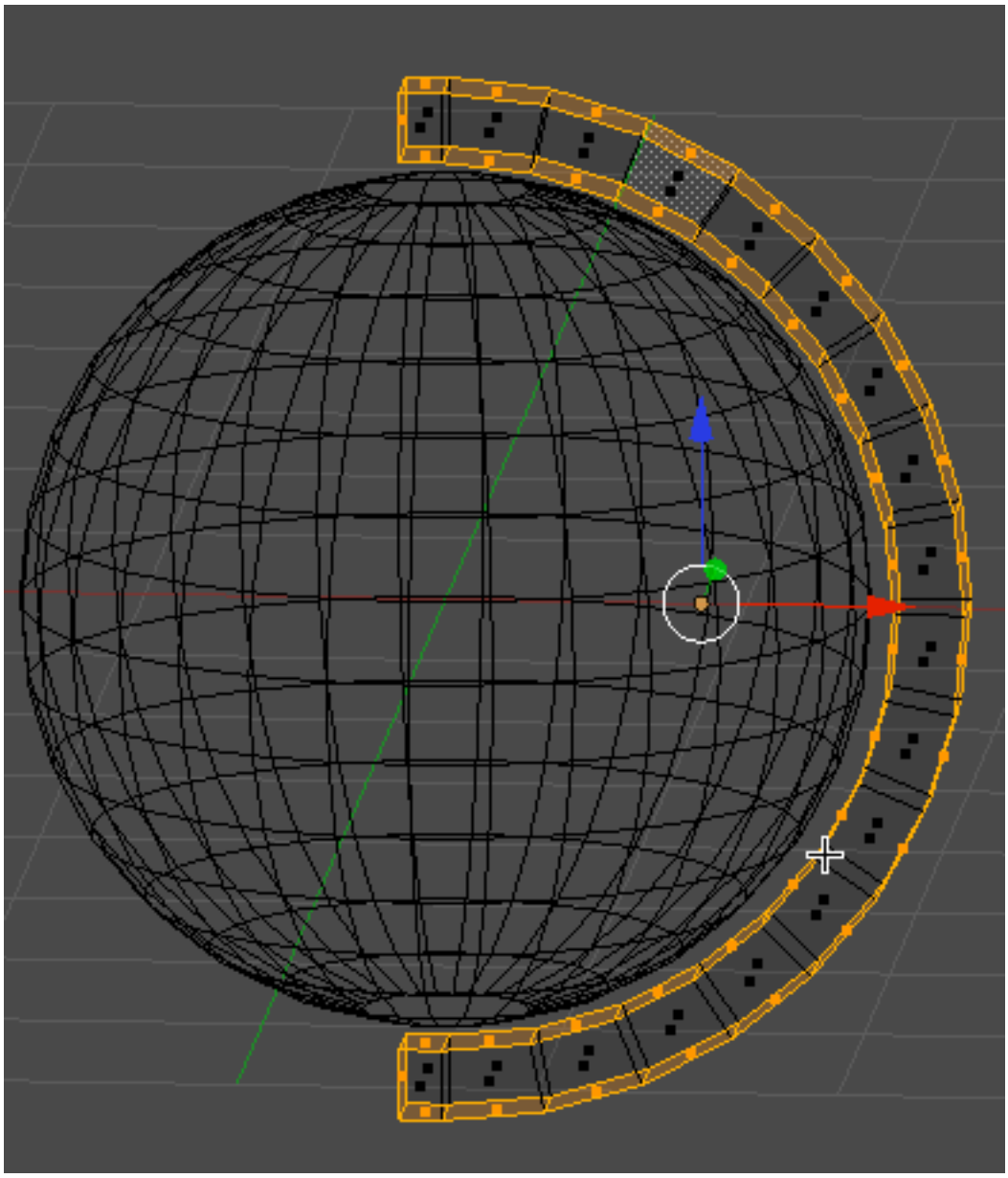
Still in Top view, move the circle object down a bit to center it on the Earth object.



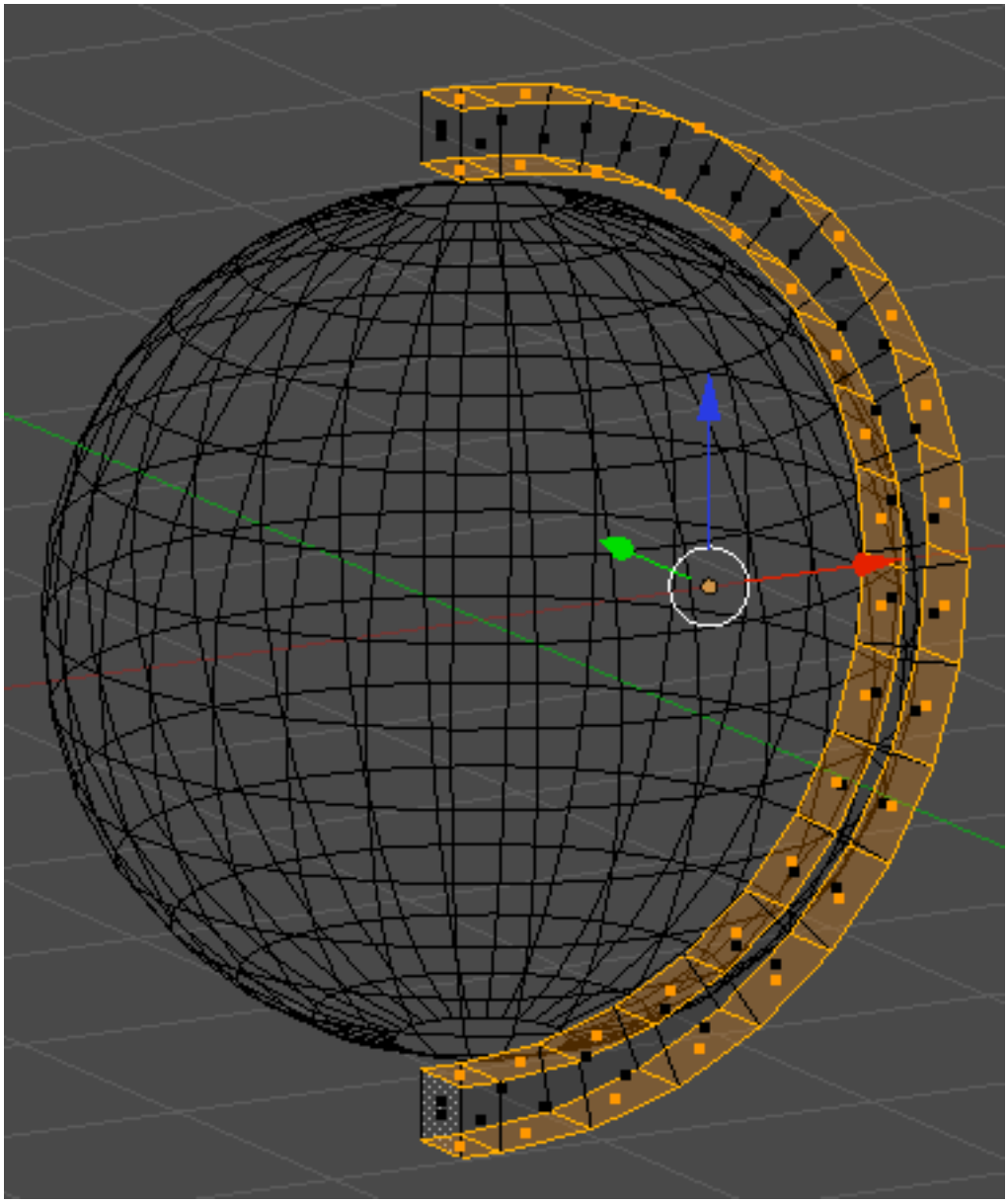
TAB into Edit mode. Go to side view (NUMPAD-3). Go to Face Select Mode (CTRL-TAB). Box select all of the center faces.



This selects all of the top and bottom faces of the curve object but not the side faces.



Rotate your display so you can see the left most faces. Hold your SHIFT KEY down and select the 2 left-most faces. This will remove them from the selection as shown below.

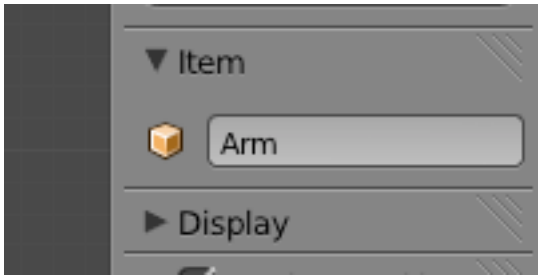


We now have just the inside and outside curve faces selected. In the tool panel on the left, UNDER SHADING, press the Smooth Button.

This will smooth out the inside and outside selected faces leaving the sides and end caps faceted.

Go back to vertex select (CTRL-TAB). TAB out of edit mode.

In the properties panel on the right, name this object “Arm”.

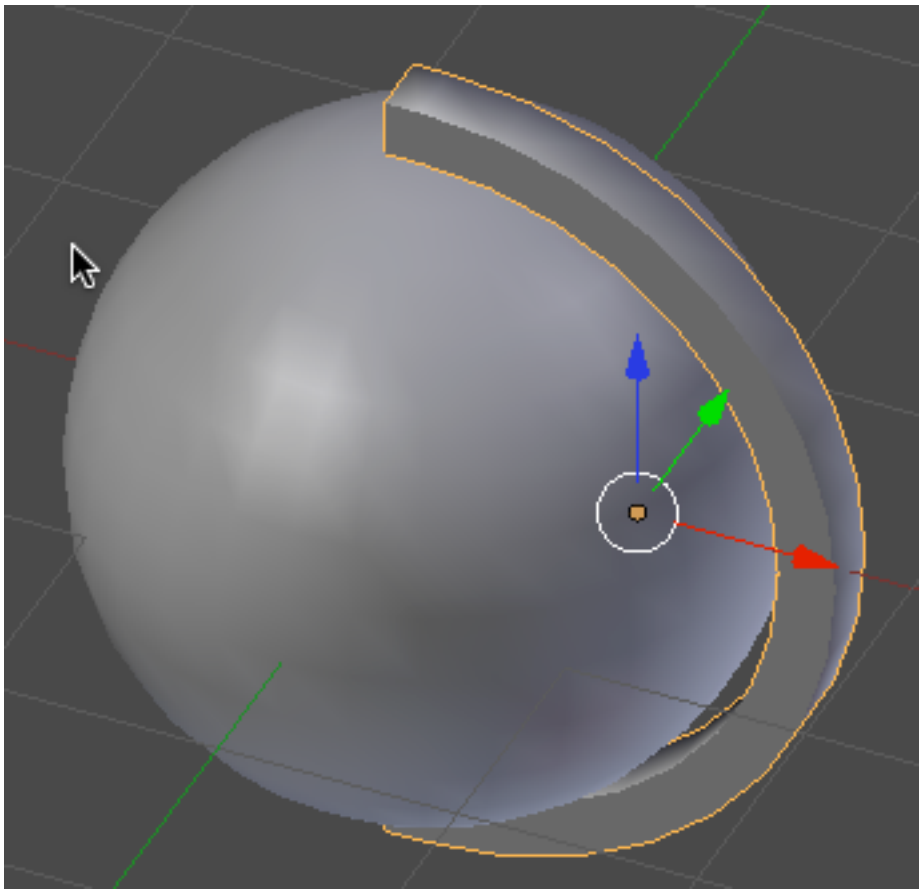


Press the ZKEY to go to solid shading mode and rotate your scene to see it more dimensionally.

Note that on my model, there are some dark streaks on the top of the arm object. This occurs sometime when extruding, especially when extruding along multiple axis as we have done.

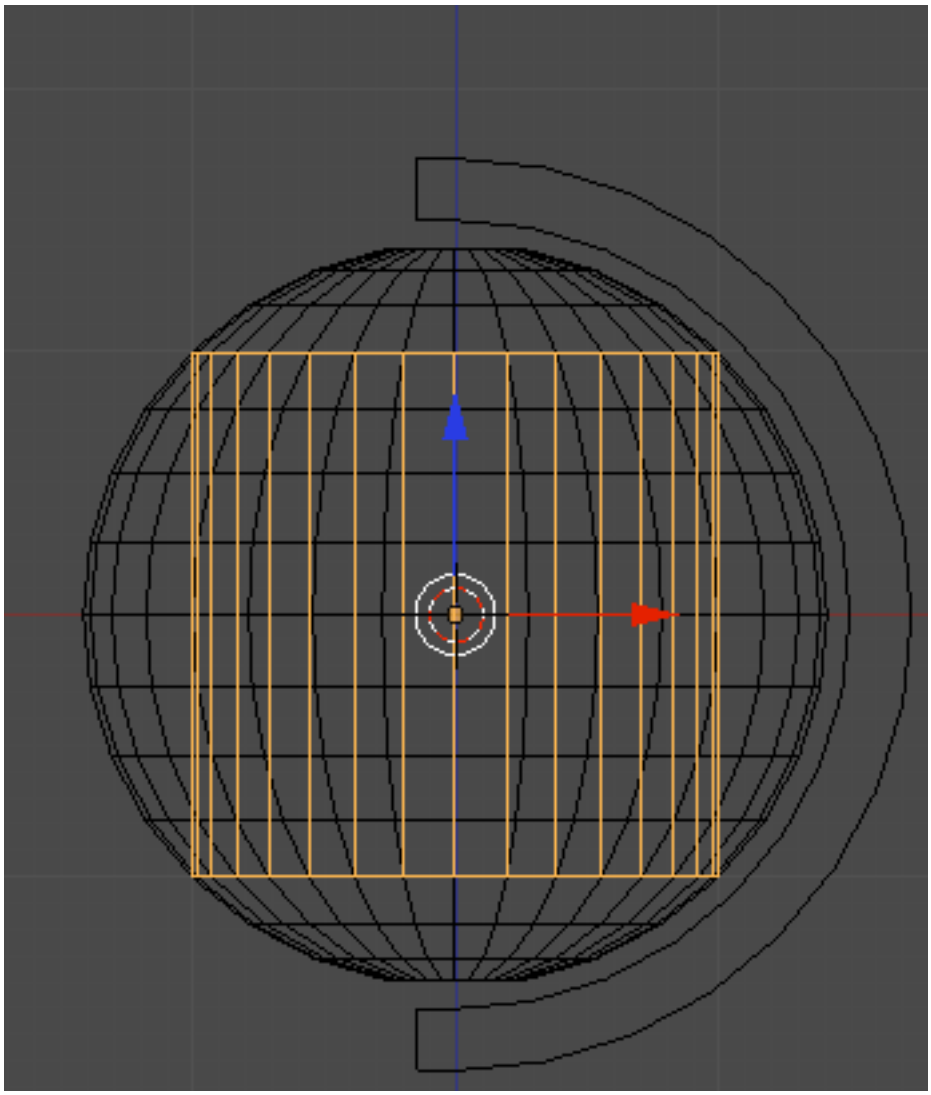
To solve this problem, TAB into edit mode and select all of the vertices of the arm object. In the tool panel on the left press the “Recalculate Normals” button.

This will recalculate the normal direction of the vertices and it should remove the dark streaking problem. TAB out of edit mode.

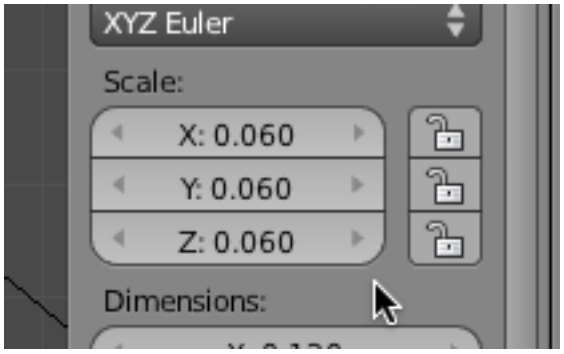


Save your Blend file.

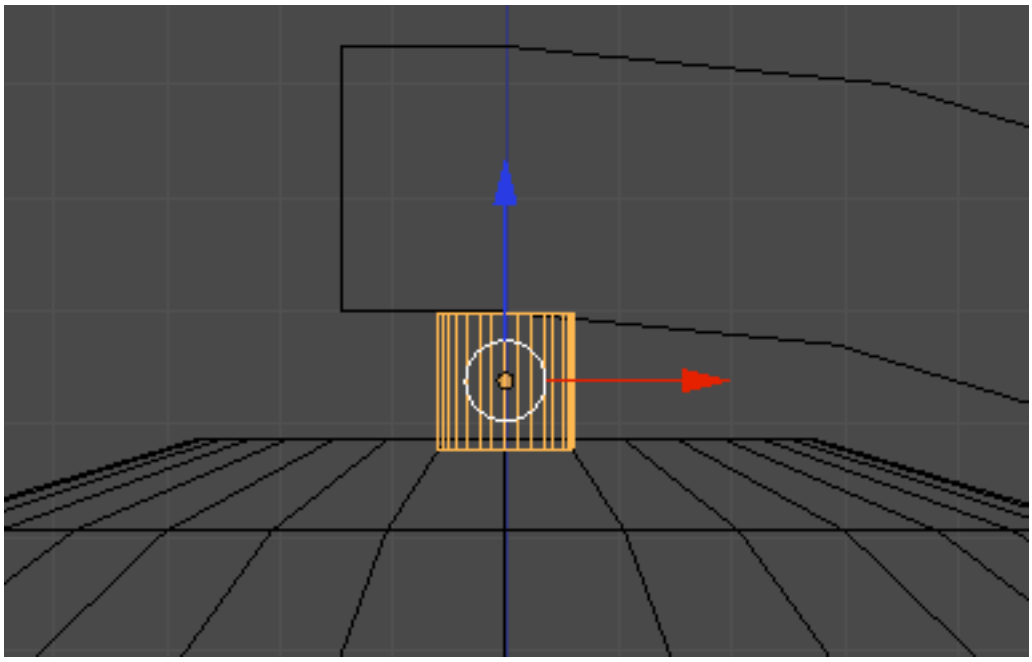
Go to wireframe (ZKEY). Go to front view. Deselect the objects. **With your 3D cursor still at location X,Y,Z = 0,** Press SHIFT-A and add a cylinder object.



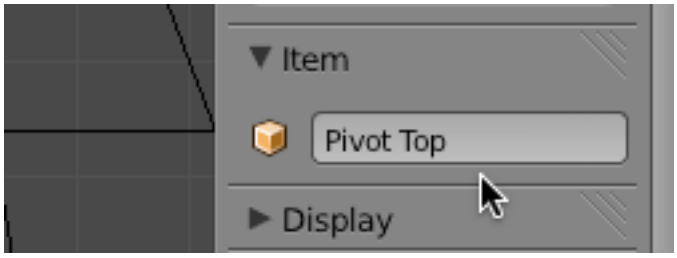
In the properties panel on the right, set the X,Y,and Z scale to .06



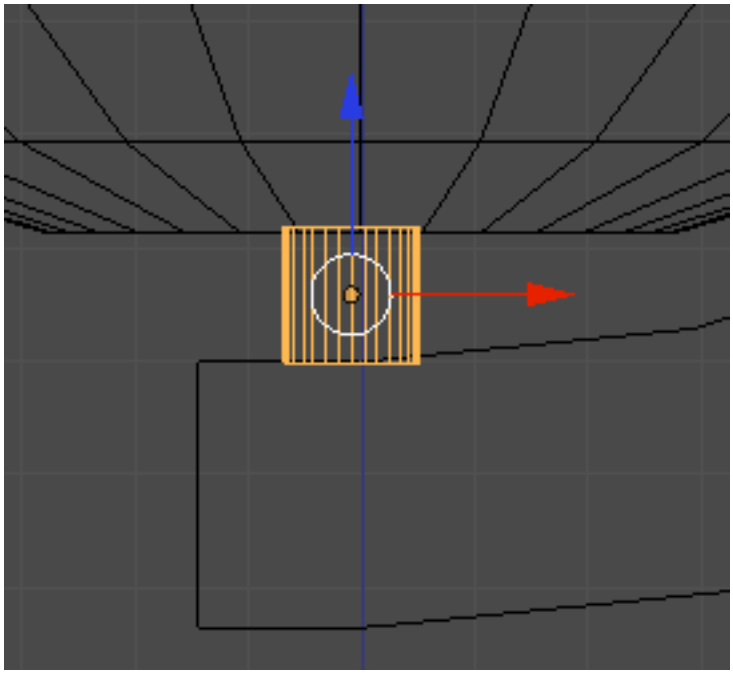
Move the cylinder object up along the Z axis and position it as shown below.



In the tool panel on the left, press the Smooth button. Name this object “Pivot Top”.



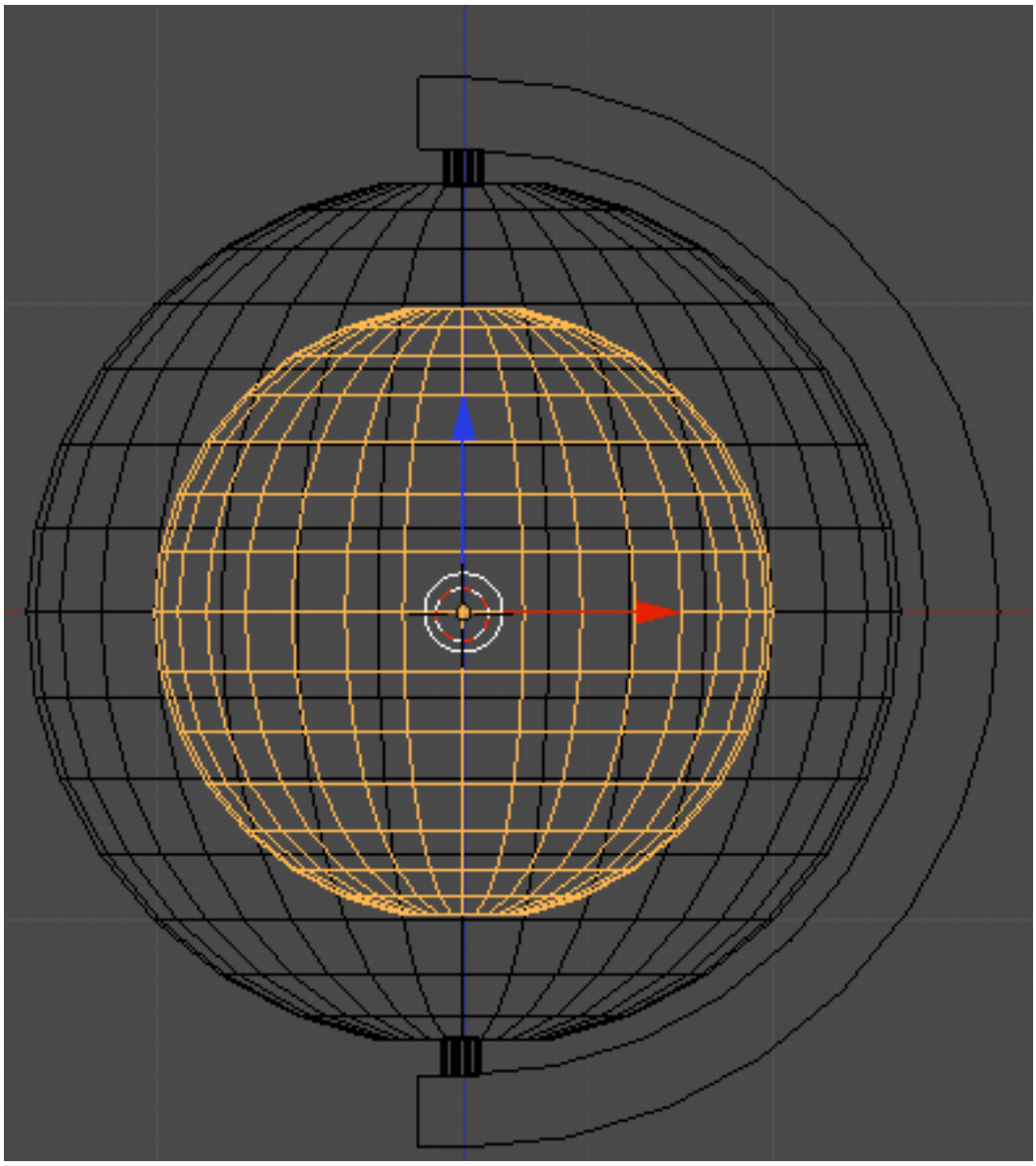
Press SGIFT-D (Duplicate). Left-click to confirm and move the duplicate Pivot object to the bottom of the earth object as shown below.



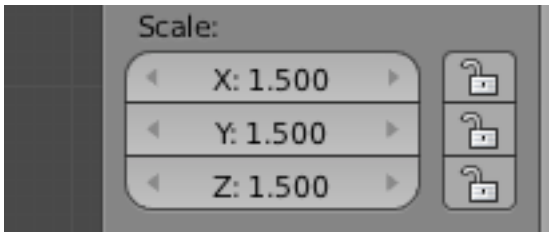
Name this object “Pivot Bottom”.

Save your Blend file.

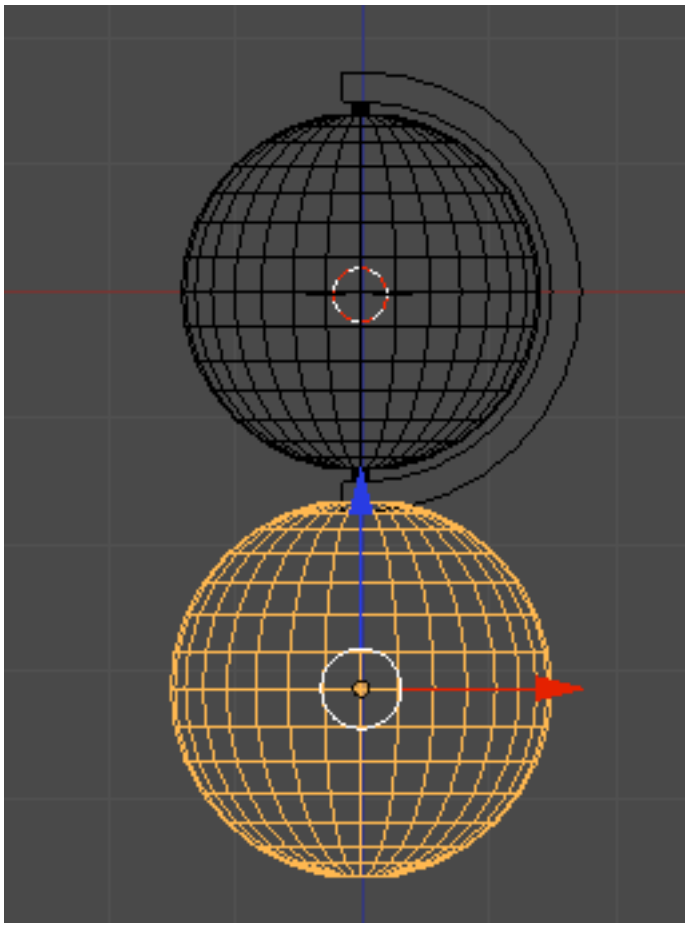
Deselect the objects. While still in front view and with your 3D cursor still at location X,Y,Z = 0, Press SHIF-A and add another UV Sphere object.



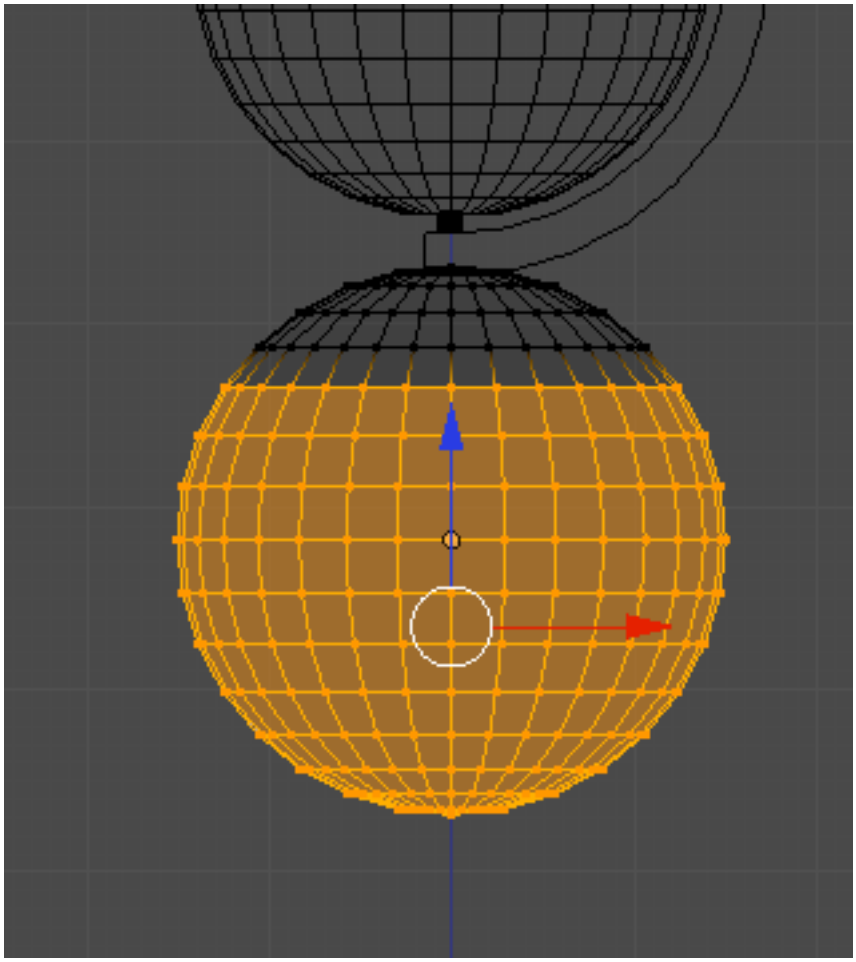
Set the scale to X,Y,Z = 1.5



Move the sphere object down along the Z axis as shown below.

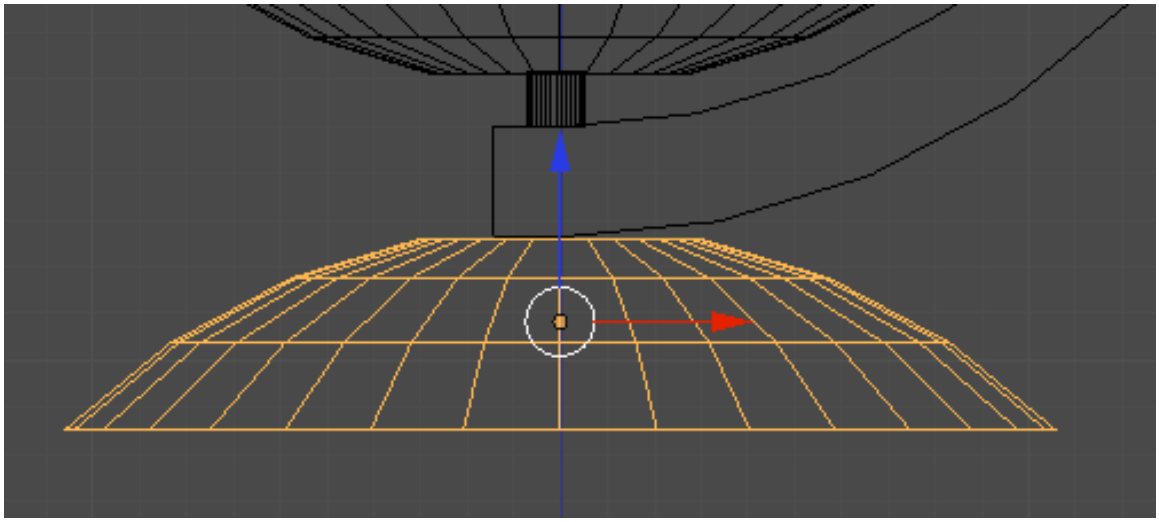


TAB into edit mode. Deselect the vertices. Select the lower sets of vertices as shown below.



Press the XKEY and delete the vertices. TAB out of edit mode. Press the Origin button in the toll panel on the left and set the origin to the Geometry.

Position the object as shown below.



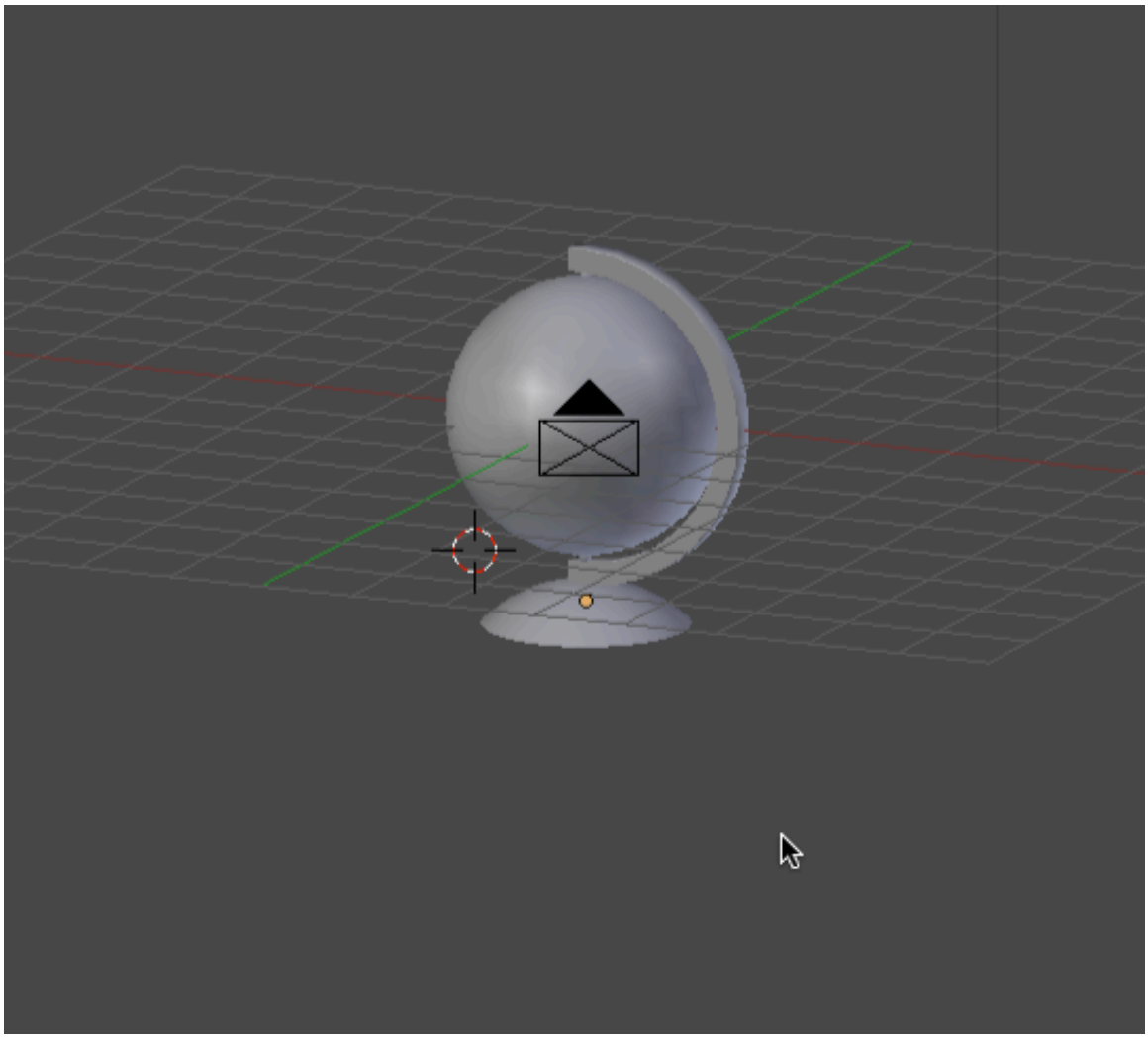
In the tool panel on the left press the Smooth button to smooth the faces of the object.

Name this object “Base”.

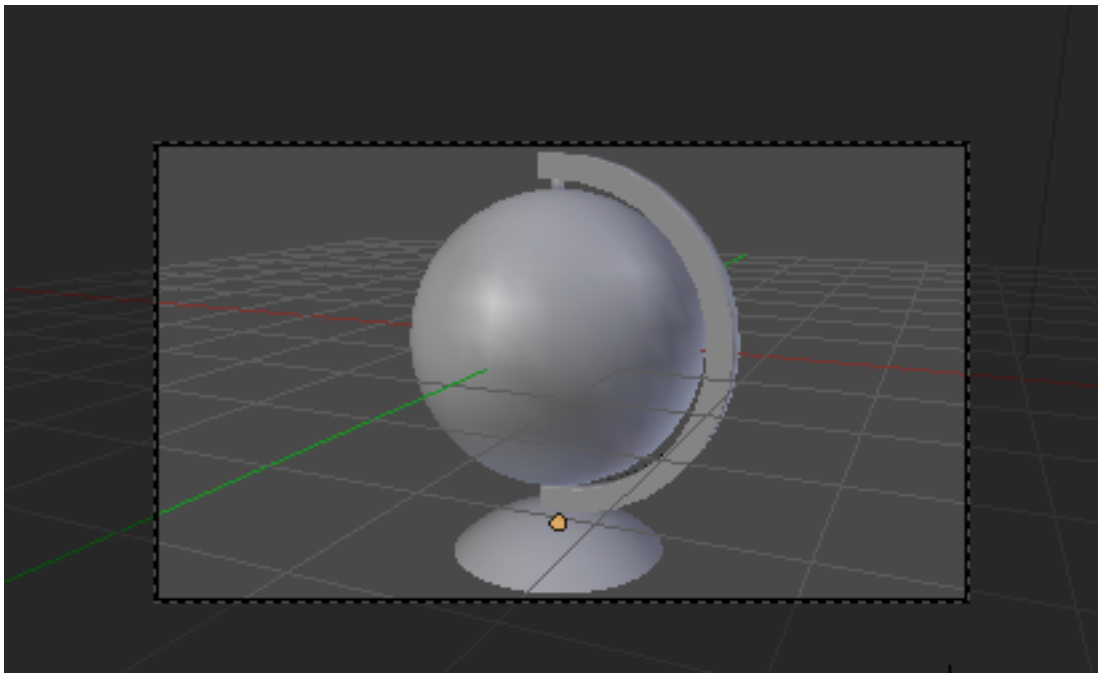
Save your Blend file.

Camera:

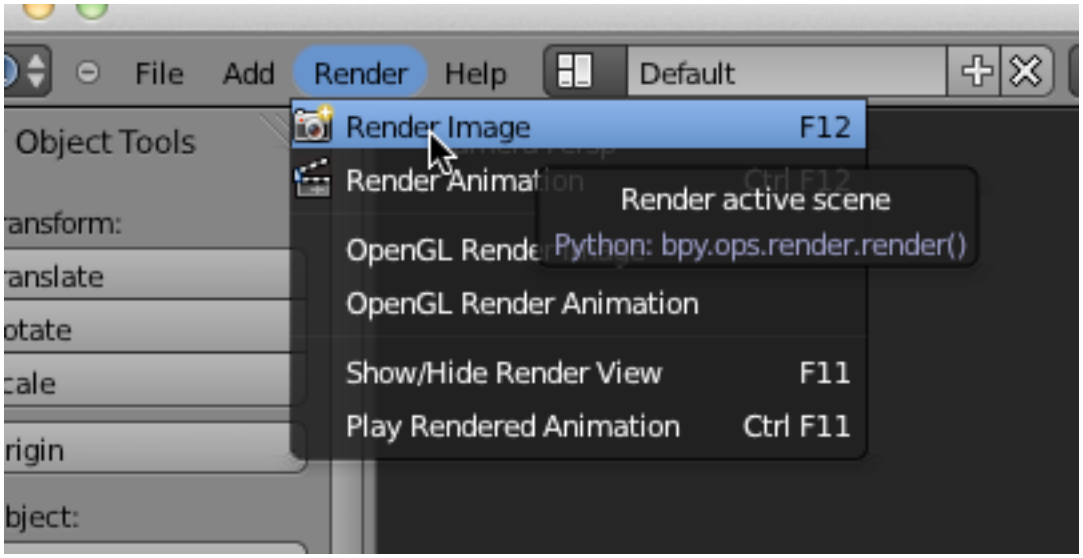
We will be adding some materials to the objects so we want to test render them in the camera view. Deselect the objects and ZKEY into solid shading mode. Rotate your 3D view port to see the scene dimensionally and centered in the viewport as shown below.



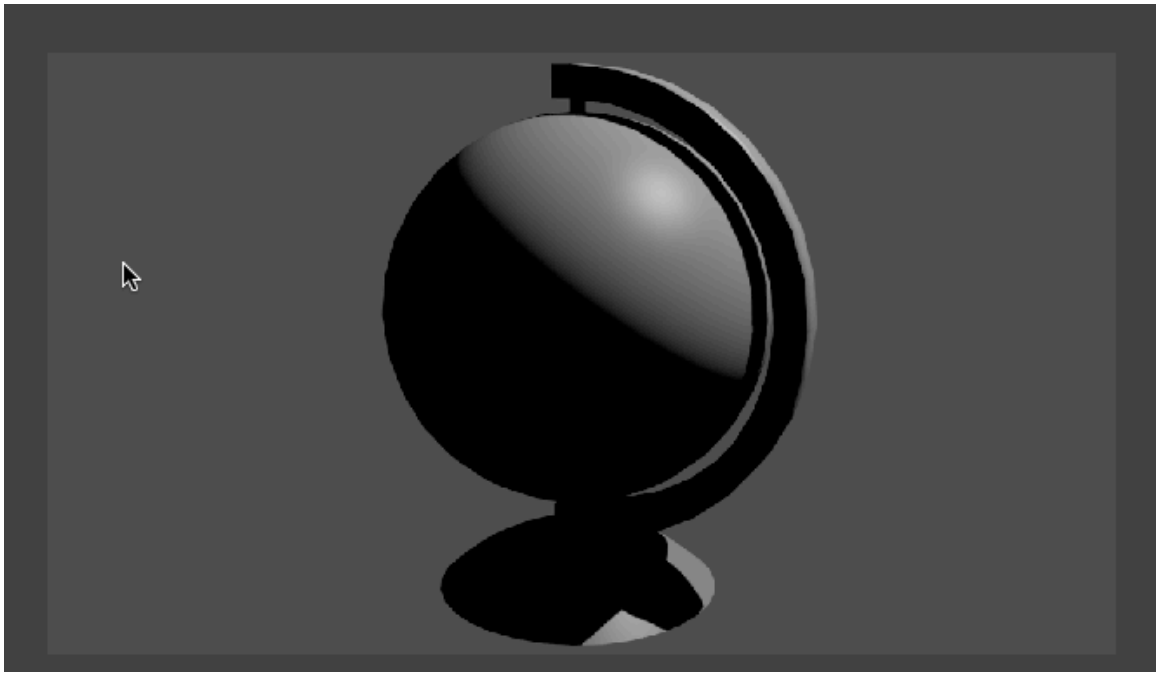
Press CTRL-ALT-NUMPAD-) (Align Camera). This will align the scene camera object with the view. (Note: you may have to go back and forth adjusting the display view – click your middle mouse button) and the camera view – Numpad-0)



Once you have the view you want in camera view, press the Render button at the top of the 3D window and select Render Image.



This renders the scene in Blender's UV Image editor.

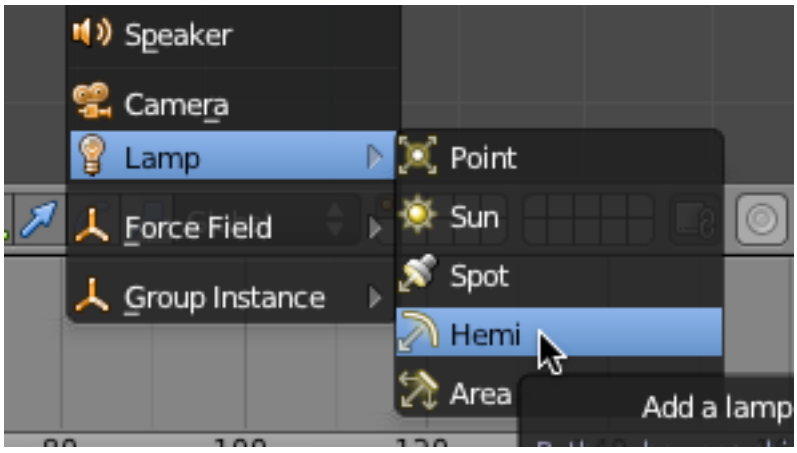


You can go back to the 3D viewport by pressing ESC (Escape).

Lighting:

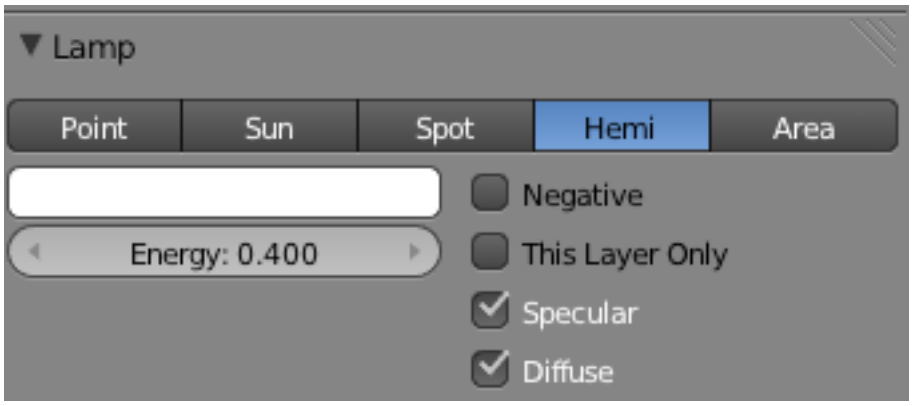
Our scene is much too dark. For the purposes of this tutorial we will add an abundance of lighting so we can see clearly.

Go to front view. Select the default Blender point lamp and delete it. Place your cursor below the Base object and press SHIFT-A and add a Hemi Lamp.

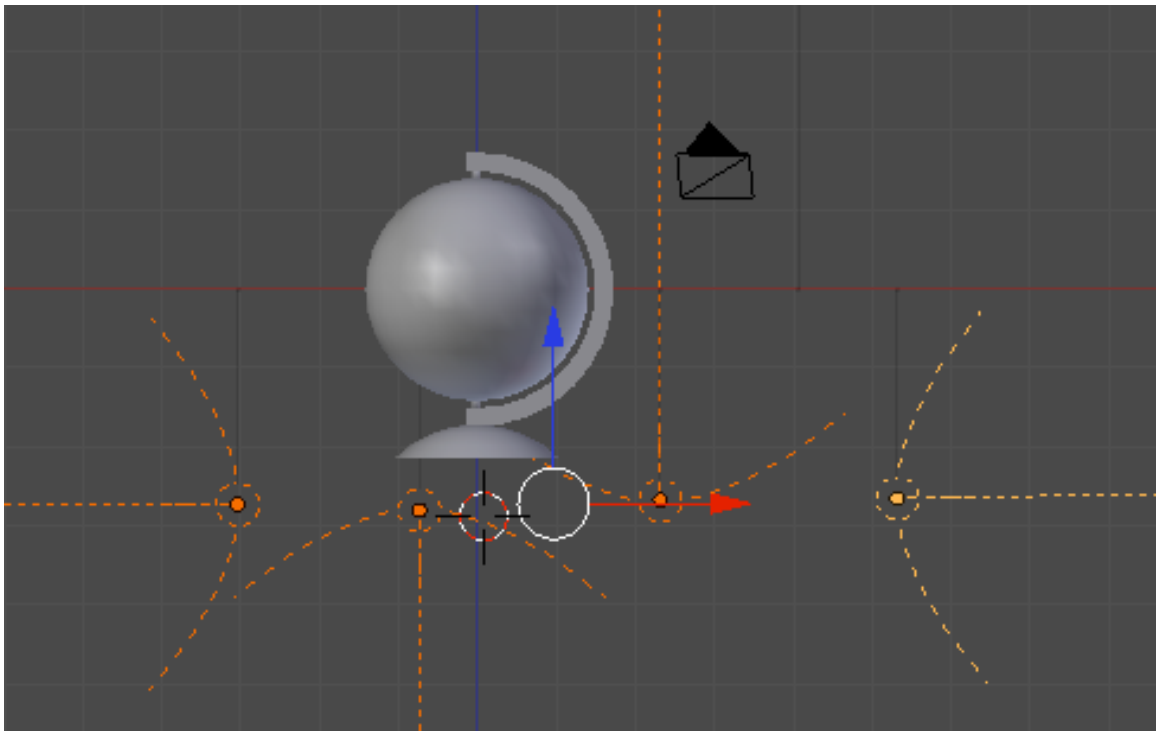


Go to the Object Data Editor.

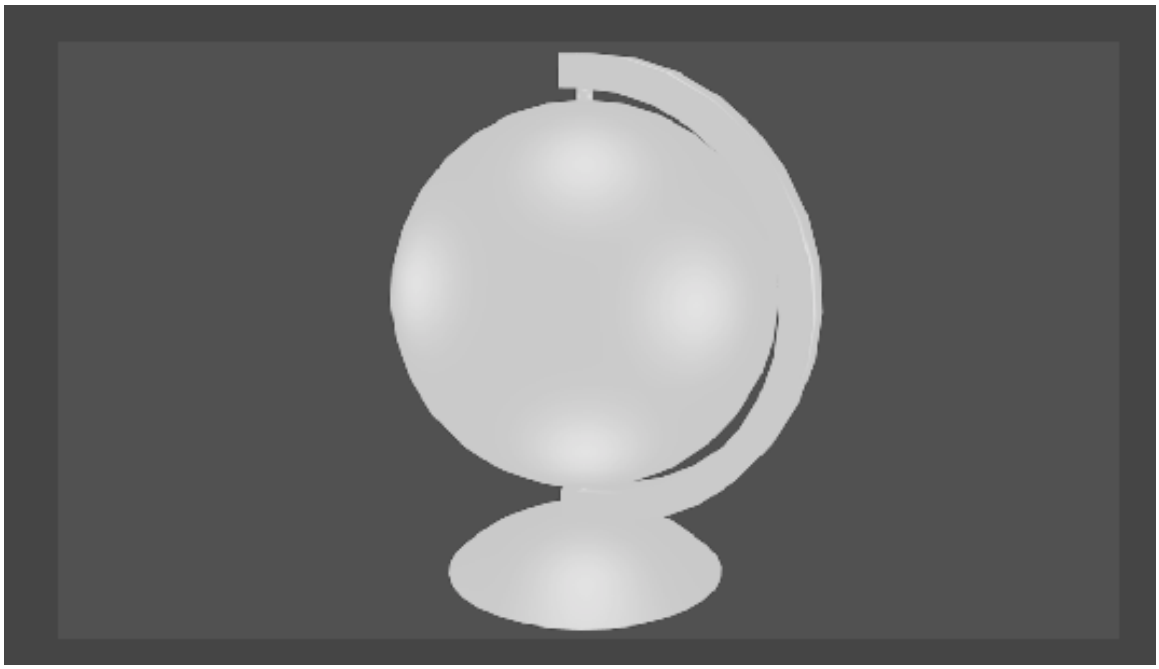
Set the Energy level for this Hemi lamp to .4.



Using SHIFT-D (Duplicate) make 3 duplicates of this Hemi Lamp object. Rotate the Hemi lamps so that their light direction is as shown below.



Render the scene.

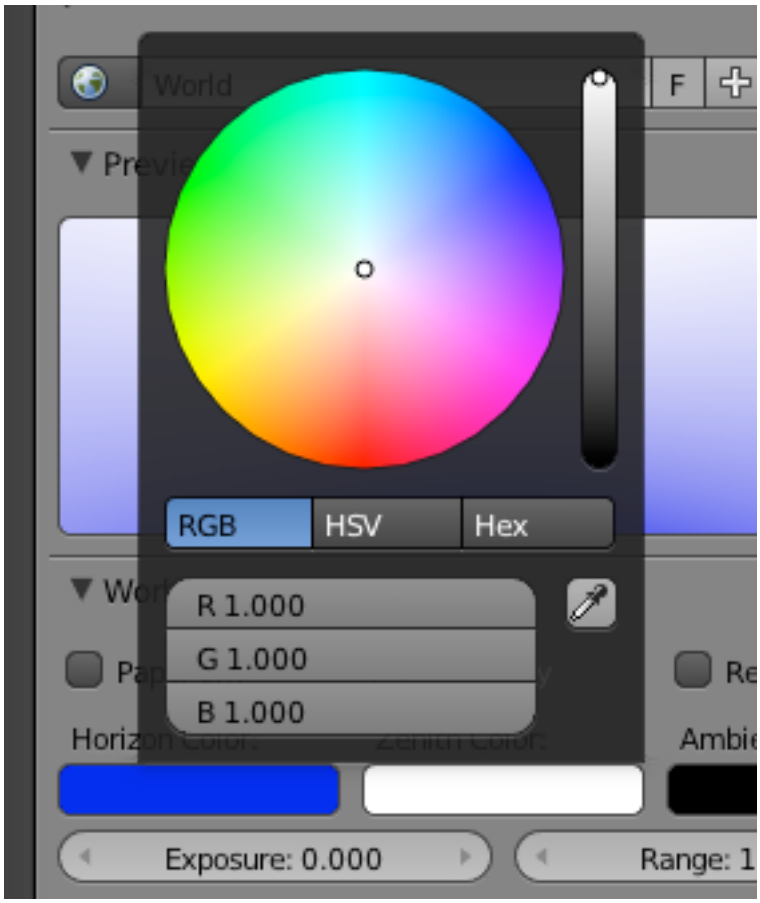


World:

Next we will change the background color. Go to the World Editor.

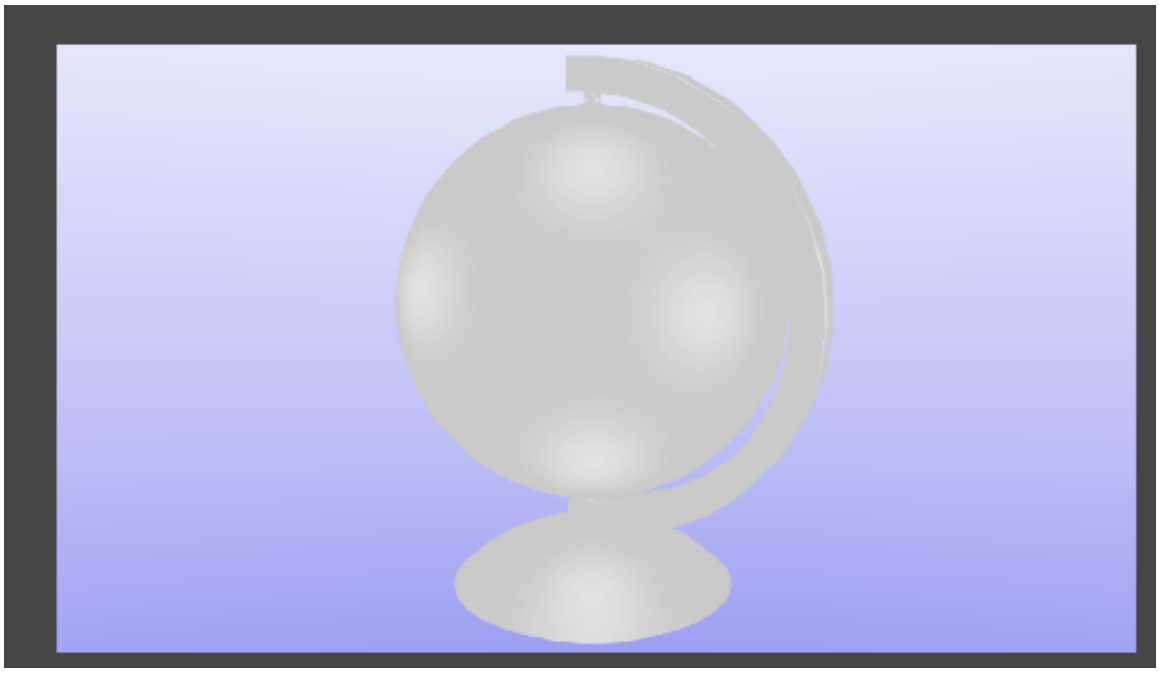
Click in the Horizon Color Swatch. Change the setting to R=0, G=0 and B=.821 forming a blue Horizon color.

Click in the Zenith Color swatch. Change the setting to R,G and B = 1 forming a while color.



Checkmark the Blend Sky checkbox. This will give the background a blended color with blue on the bottom and white on the top.

Render the scene.

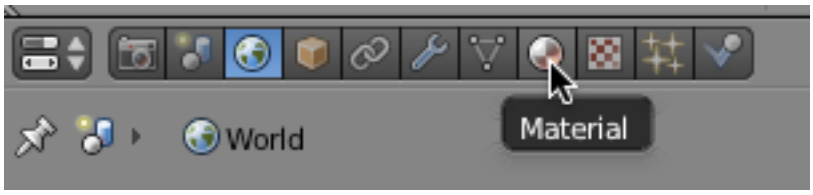


Save your Blend file.

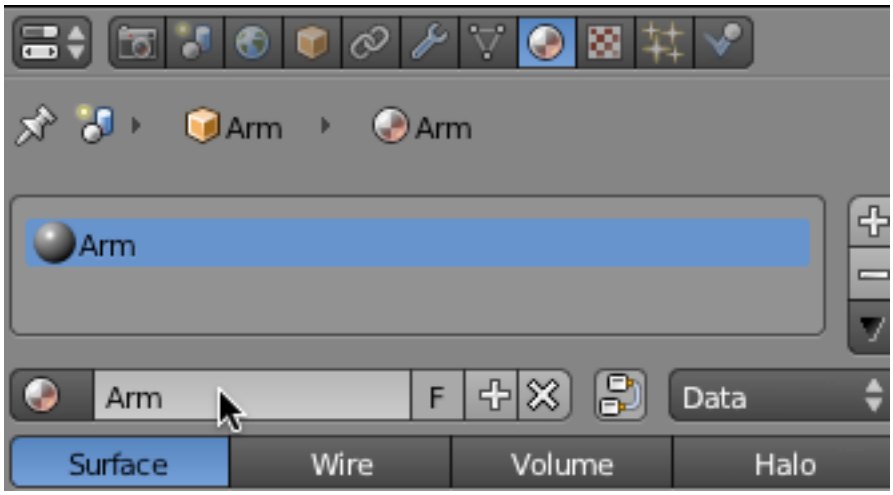
Some Materials:

Next we will add some materials to the Arm, Pivot and Base objects. We will be using 2 image files for textures named “Labrador.jpg” and “Mahogony.jpg”. These image files can be downloaded HERE.

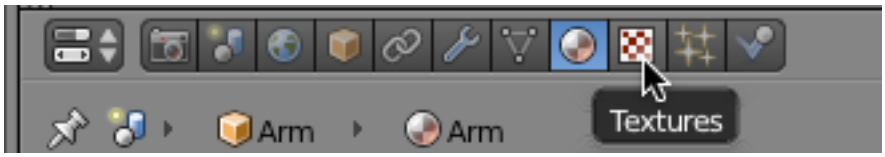
Select the Arm object. Go to the Material Editor.



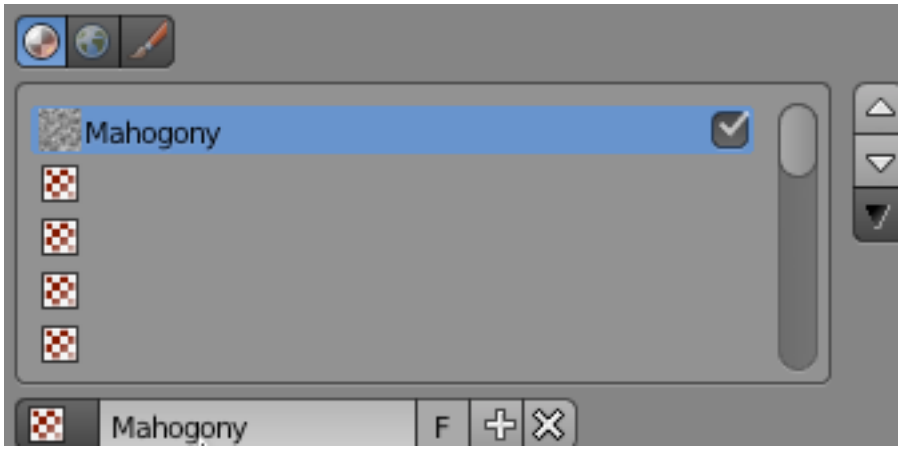
Press the New button and name this material “Arm”



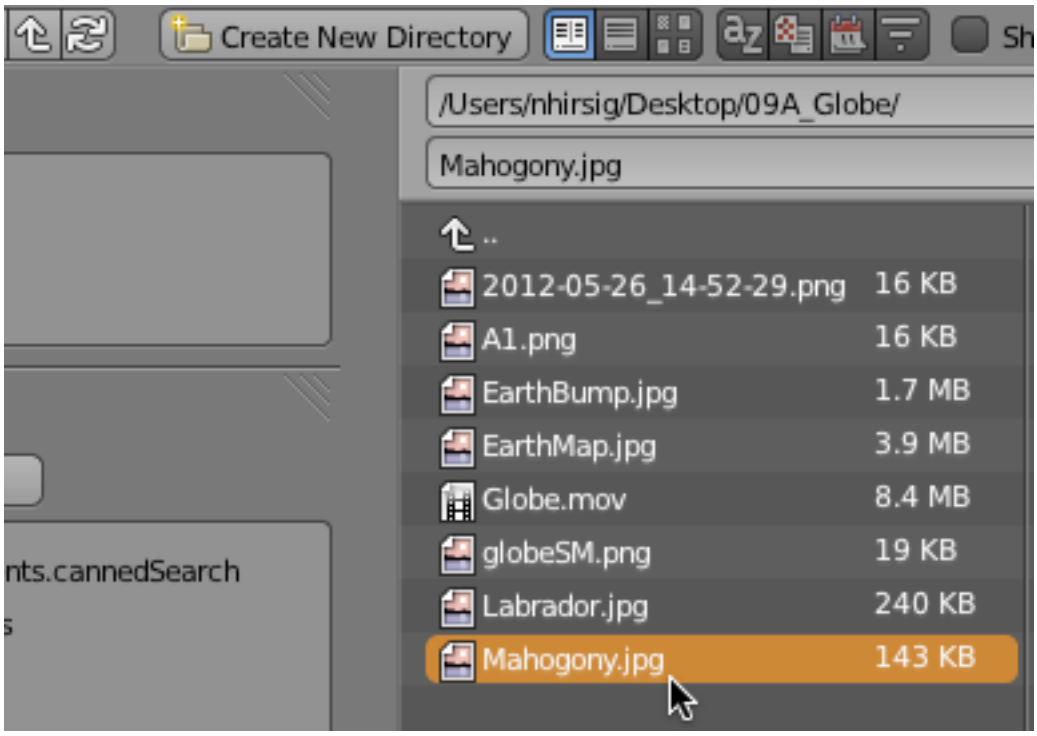
Go to the Texture Editor.



Click New and name this texture “Mahogony”.



Change the Type to Image or Movie and then click on the Open button. This displays Blender’s File page. Find the mahogany.jpg image on your computer and select it.



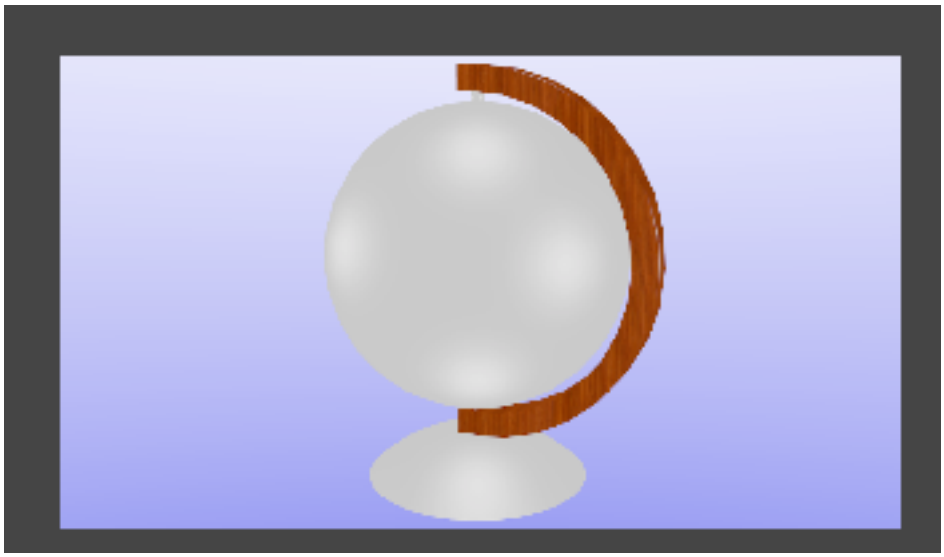
Click on the Open Image button.

In the Image Mapping panel, set the X and Y Repeat to 2.
In the Image Sampling panel checkmark the Flip X/Y axis
In the Mapping panel set the Projection to Cube.

Go back to the Materials editor

In the Specular panel set the Intensity to 1 and set the Hardness to 292.

Render the scene.



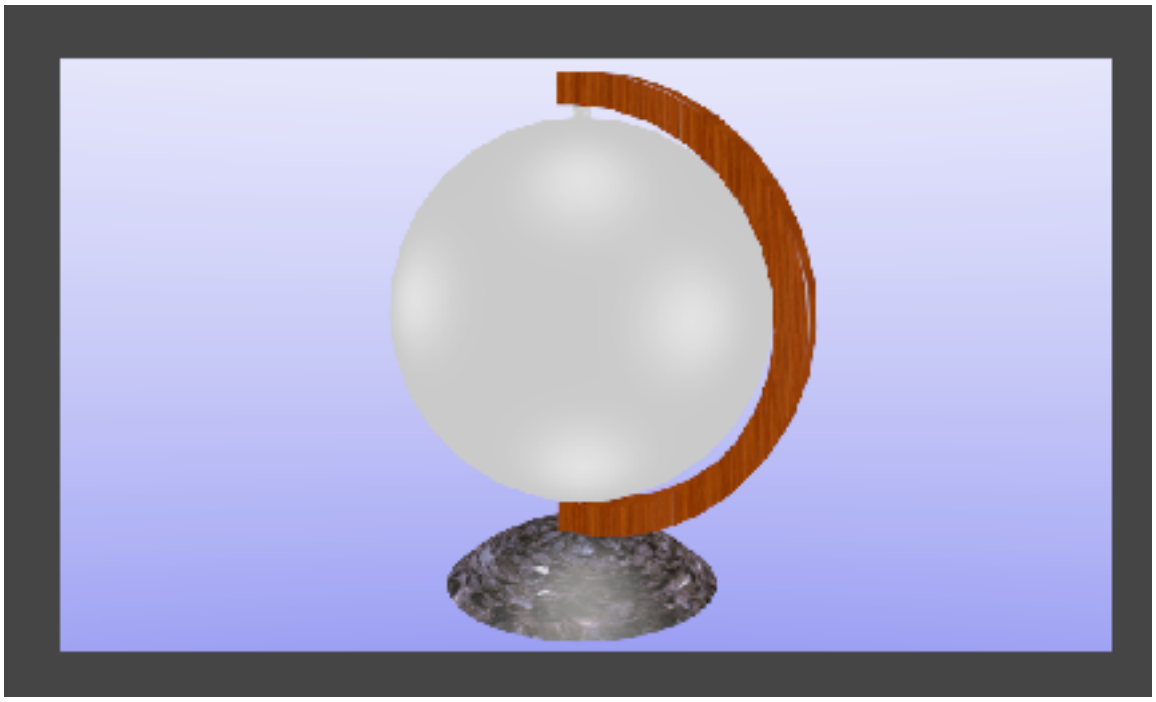
Save your Blend file.

Select the Base object. Go to the Material Editor. Press new and name the material “Base”

Go to the Texture Editor. Click New and name the texture “Labrador”. Change the Type to Image or Movie. Click on the Open button. Locate the Labrador.jpg image on your computer, select it, then press the Open Image button.

In the Mapping panel set the Projection to Sphere.

Render the scene.

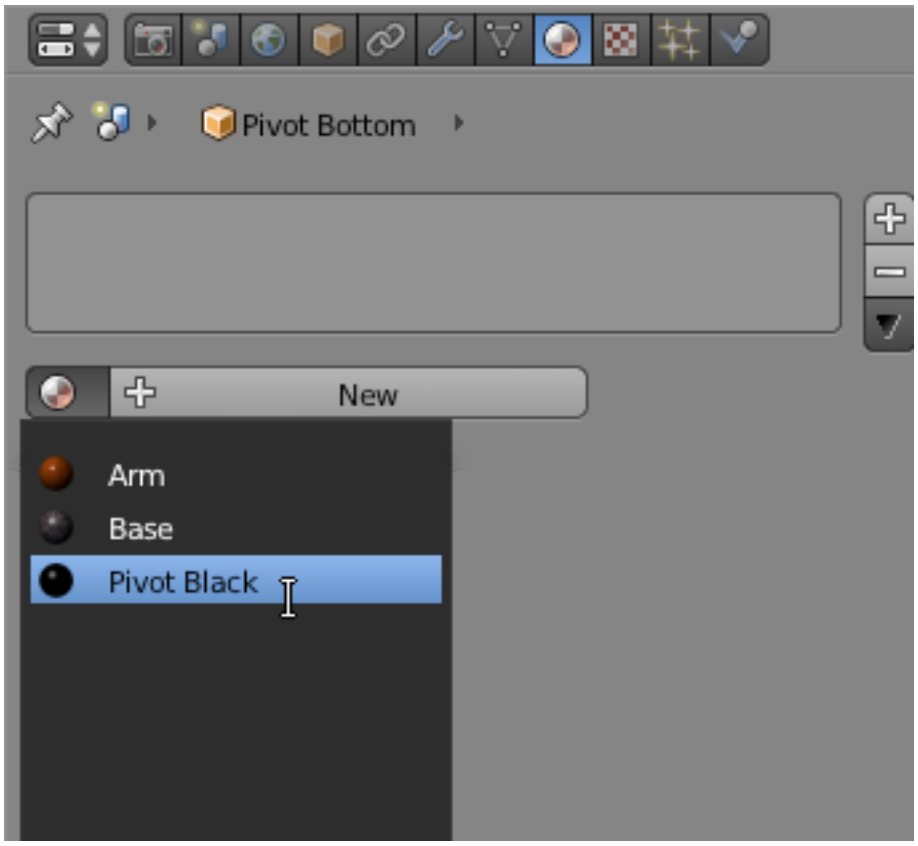


Save your Blend file.

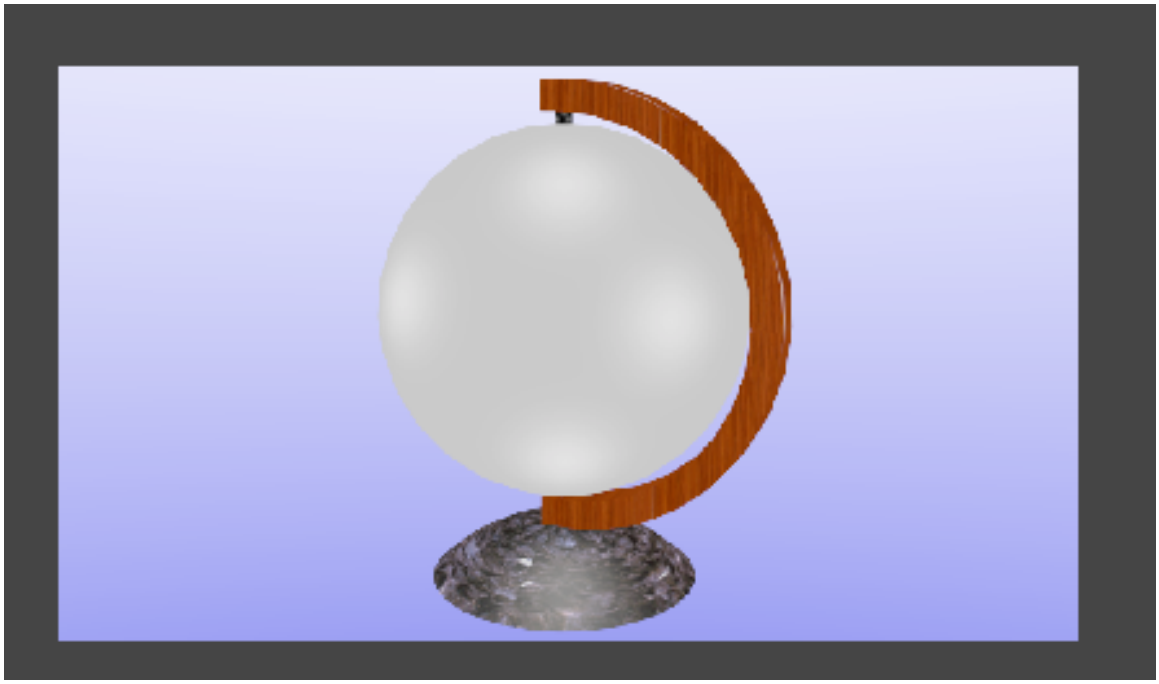
Select the Pivot Top object. Go to the materials editor. Press New and name the material Pivot Black.

Click on the Diffuse color swatch and set the R,G, and B sliders to 0 forming a black color.

Select the Pivot Bottom object. Click on the Browse button to the left of the new button and select the “Pivot Black” material from the list. This will assign to the object the previously created material.



Render the scene.

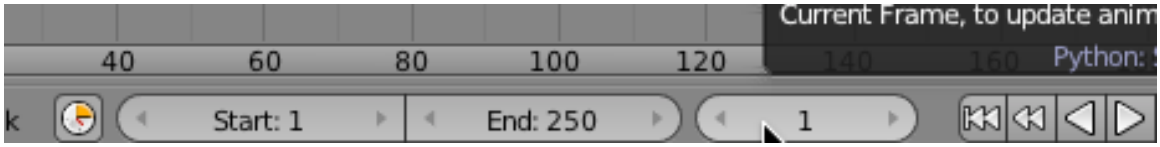


Save your Blend file.

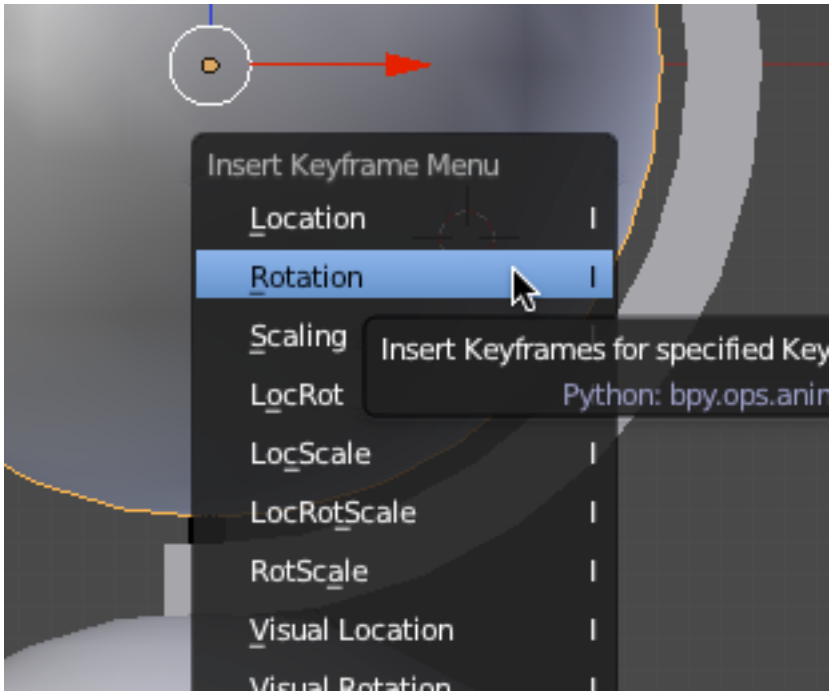
Animation:

Before we add the material to the Earth object, we will animate its movement around the pivot points.

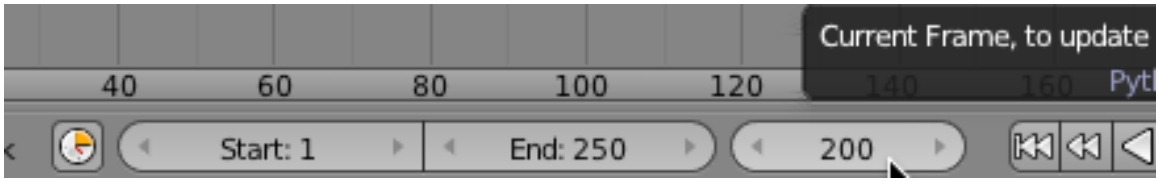
Go to the timeline and make sure you are in frame 1.



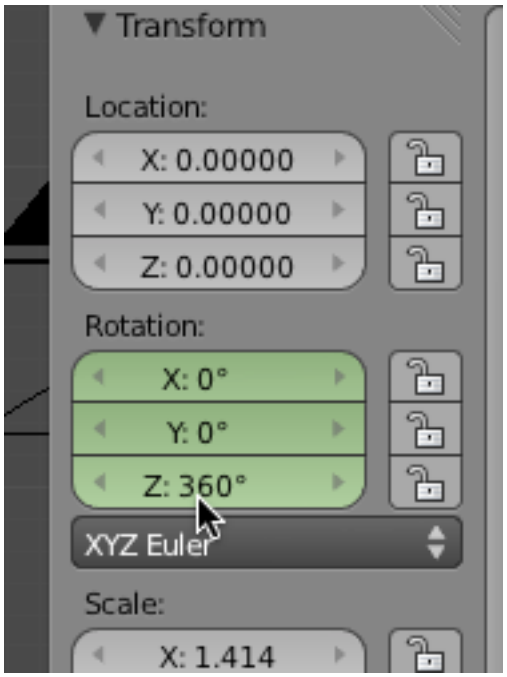
Select the Earth object. Press the IKEY (Insert Keyframe) and choose to insert a Rotation Keyframe.



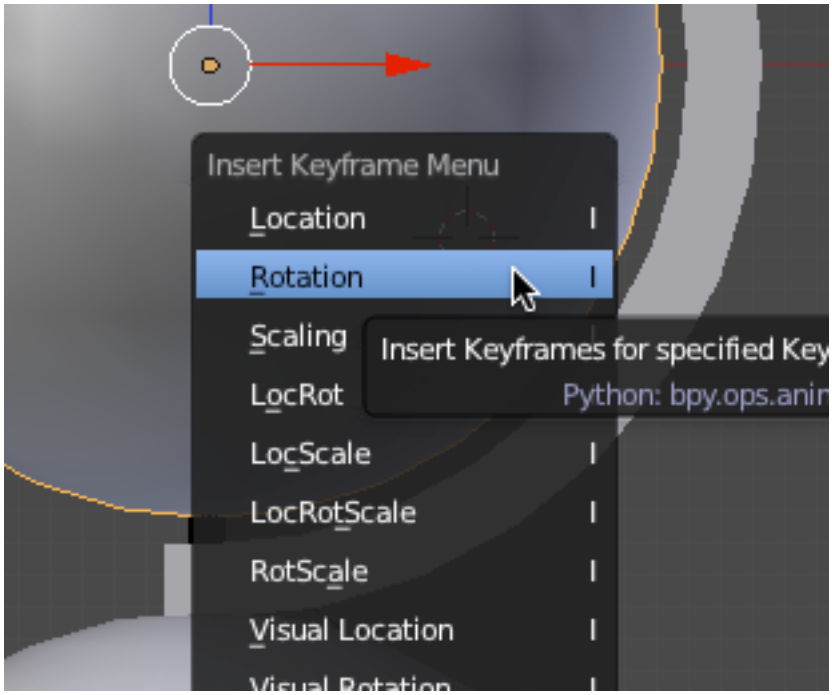
This records the rotation of the Earth object at frame 1 (which is 0 degrees). Change the current Frame to 200.



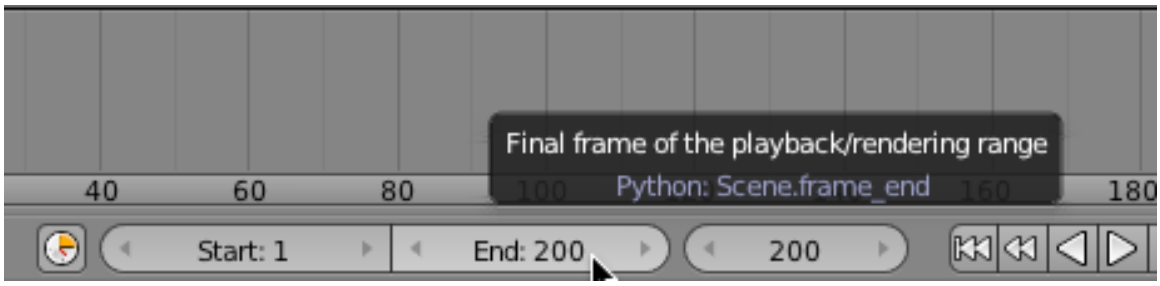
In the Properties Panel set the Z Rotation to 360.



Press the IKEY (Insert Keyframe). Choose to insert a Rotation keyframe. This records the rotation of the Earth object in frame 200 (which is 360 degrees around the Z axis).



In the Timeline window change the End Frame to 200.



In the animation window press the Play button.

The earth object revolves around the Z axis 360 degrees over the course of 200 frames. You can also see the Z Rotation change in the Transform Properties Panel as the animation plays. You can stop the playback of the animation by pressing the Stop button on the Timeline or pressing ESC.

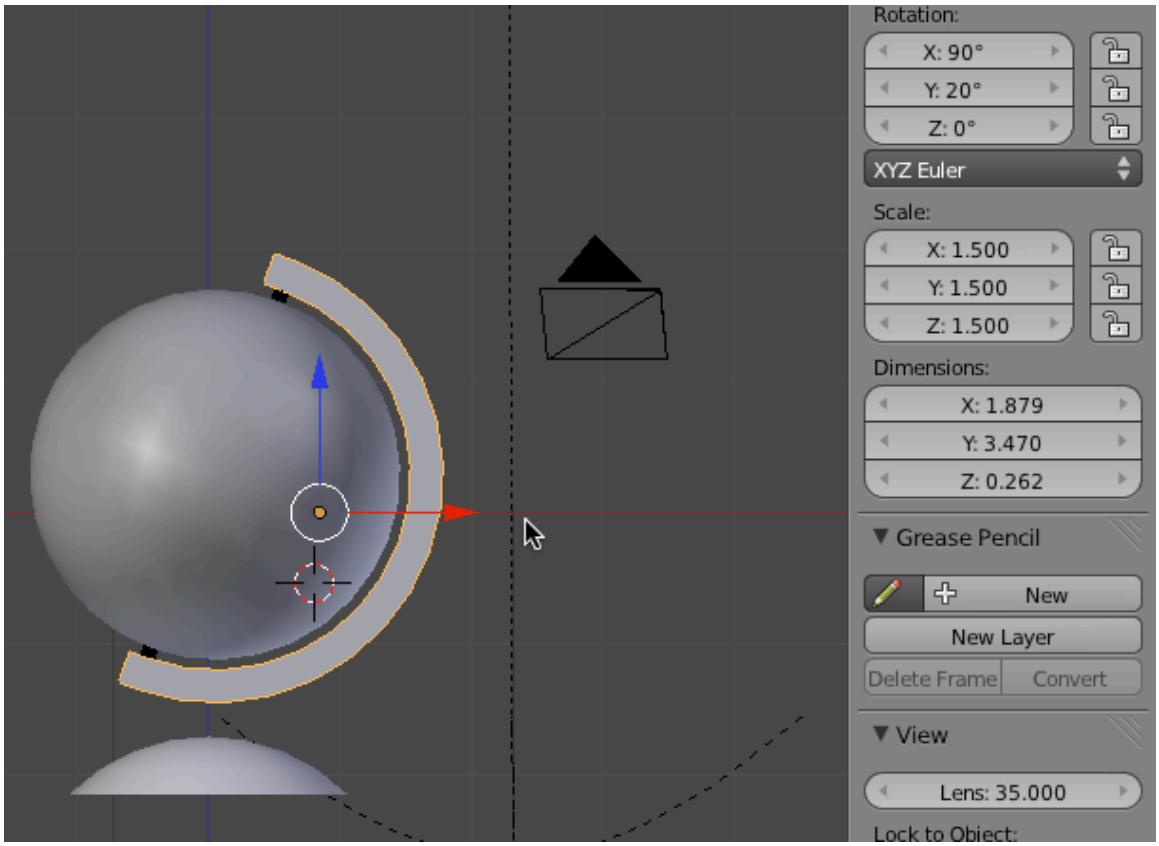
Save your Blend file.

Parenting:

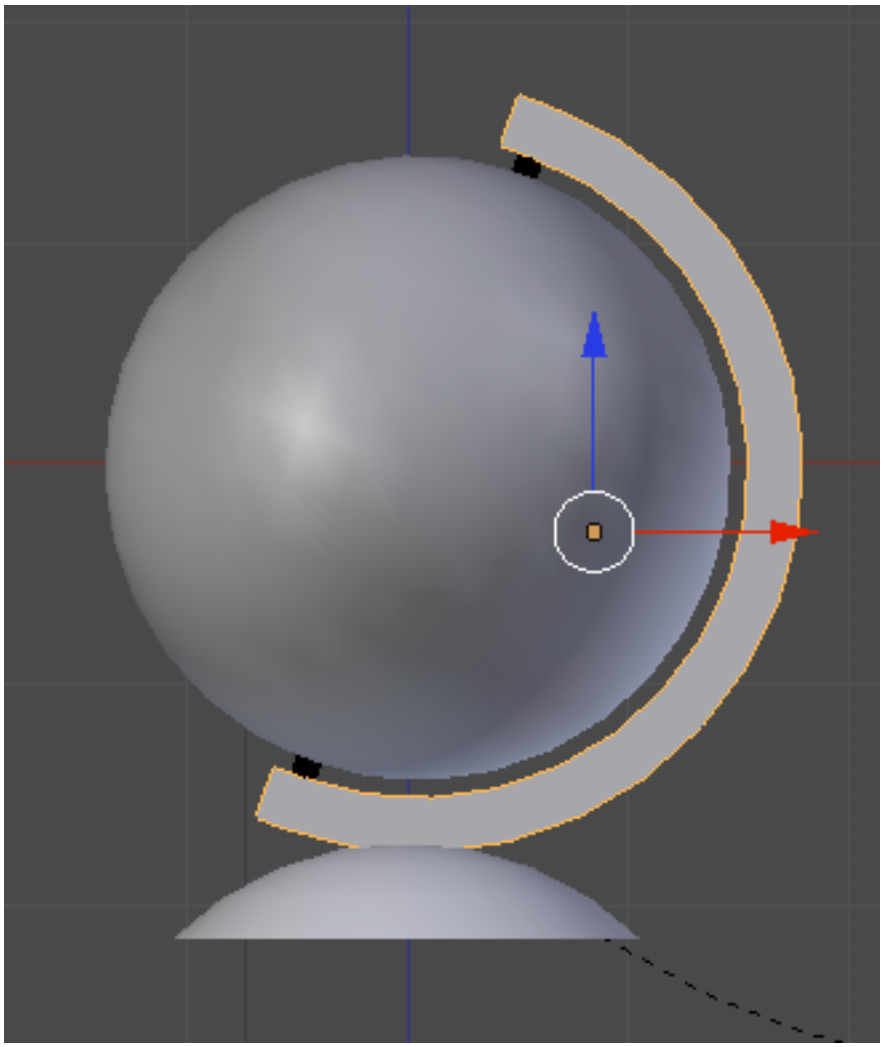
First select the Earth object. Hold your SHIFT KEY down then select the Pivot Top, then Pivot Bottom and then the Arm object.

Press CTRL-P (Parent) and set the parent to the object. Since we selected the Arm object last, it becomes the parent of the Pivot and Earth objects. If we move, rotate or scale the Arm object, the rest will follow.

Go to Front view. Now select the ARM object. Press the RKEY (Rotate). Hold down the CTRL KEY and rotate the Arm object 20 degrees.



Since the Arm is a parent to the Earth and Pivot objects, they also rotate with the Arm. Use the Blue Widget to lower the Arm object back on the Base.



Note: we created the animation of the Earth object's rotation prior to setting it at a 20 degree angle. We did this so that we could animate the Earth object on its true Z axis. If you play the animation the globe still revolves around the true Z axis.

Save your Blend file.

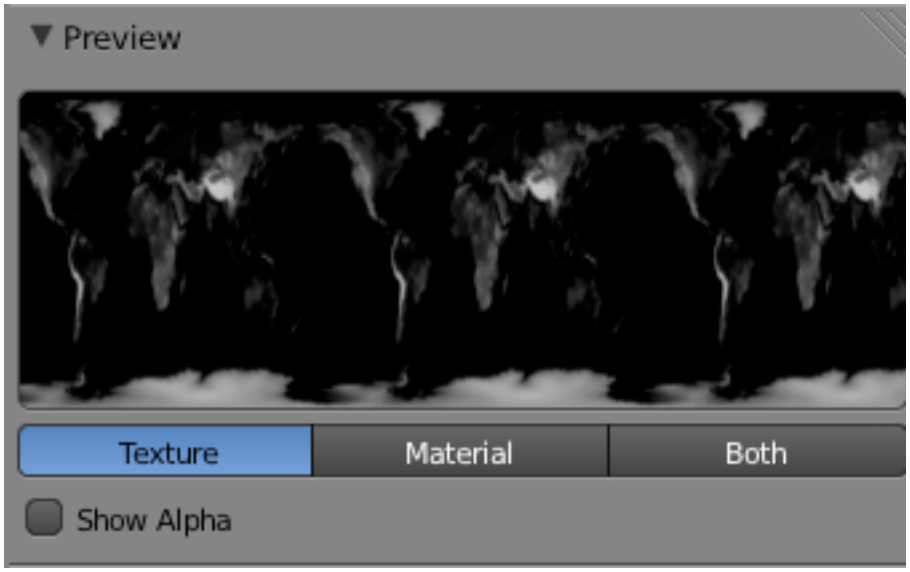
More Materials:

We will now add the material to the Earth object. We will be using 2 image files named "EarthBump.jpg" and EarthMap.jpg. These image files can be downloaded HERE.

Note: Both of these image files come to us courtesy of James Hastings-Trew (http://planetpixelemporium.com/planets.html).

Select the Earth object alone. Go to the Materials editor. Press New and name this material "Globe".

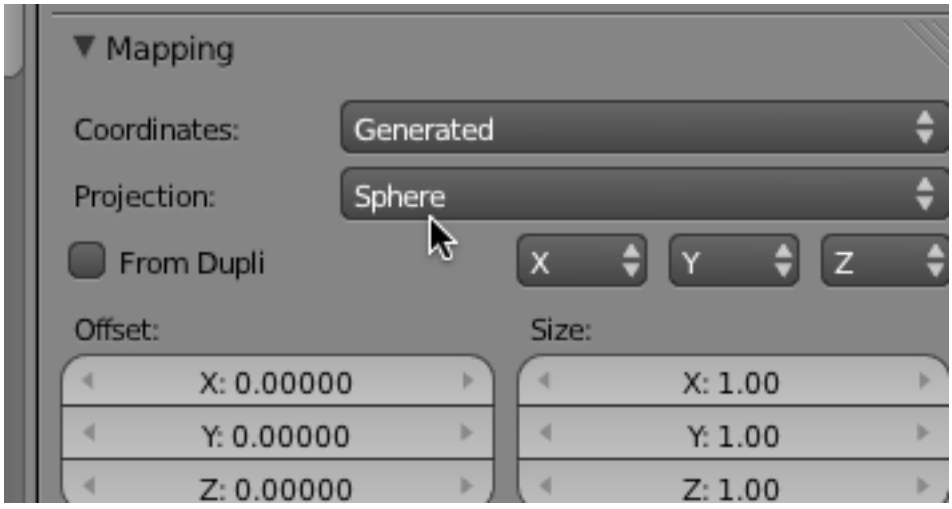
Go to the Texture Editor. Press New and name this texture “Globe Bump”. Change the Type to Image or Movie. Click on the Open button. Locate the EarthBump.jpg image file on your computer then press Open Image.



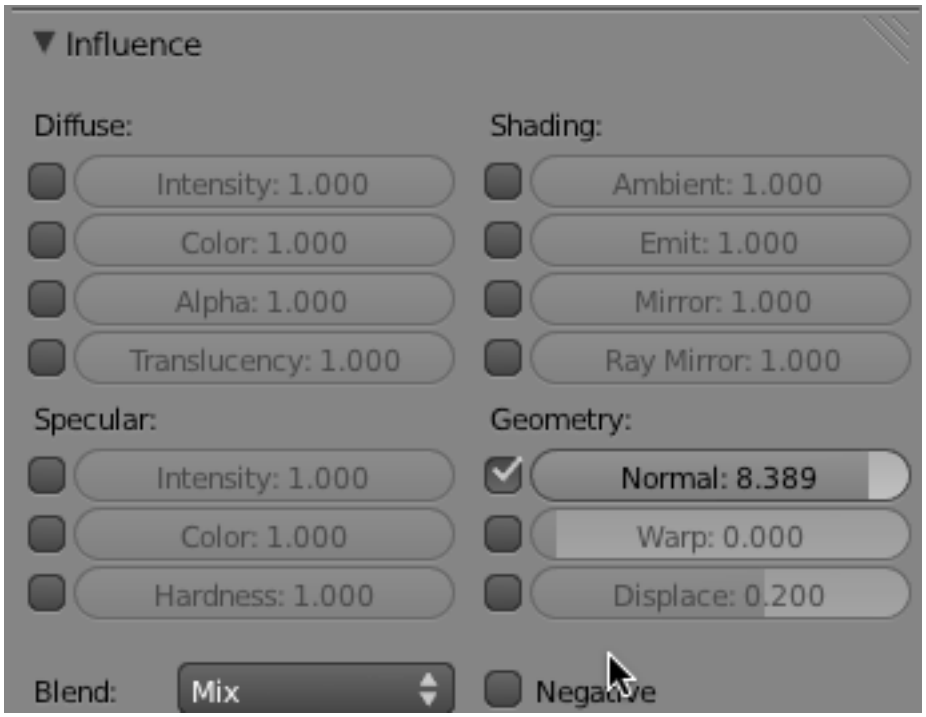
We will use this image as a bump map for the Earth object. A bump map is an image file that consists of shades of white and black only.

When a bump map is applied to the object’s “Normal” (direction in which the model faces point toward), it results in a “relief” effect. That is the lighter portions seem to be elevated and the darker portions seem to be lowered. This gives the impression of depth; even though the model’s vertices are NOT actually moved.

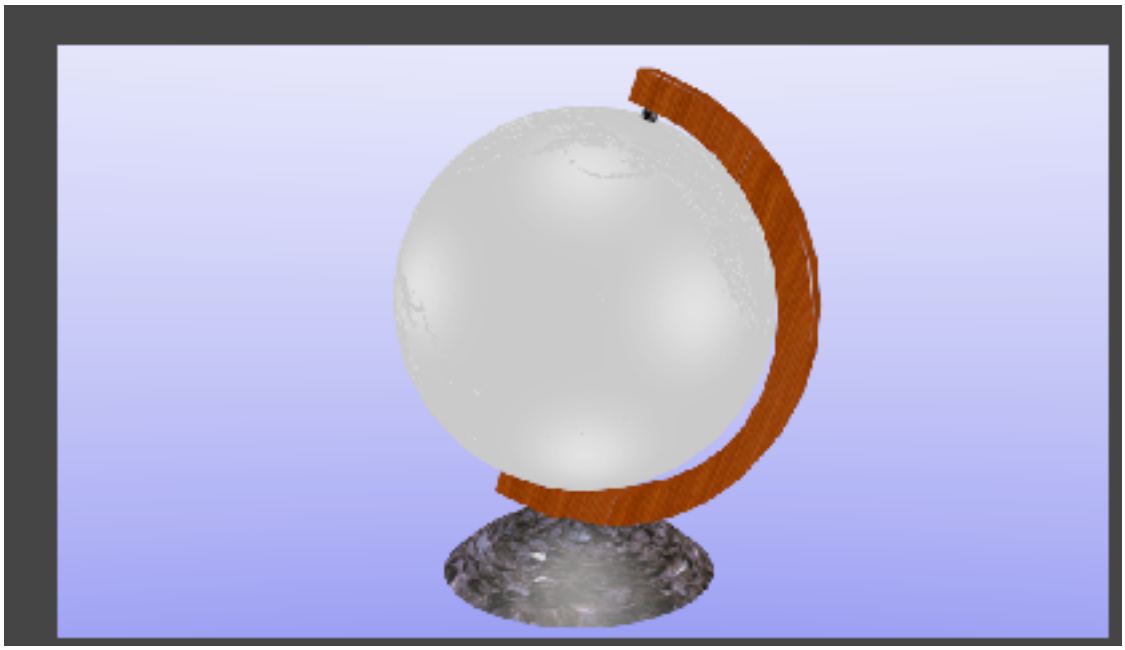
In the Mapping panel set the Projection to Sphere.



In the Influence panel, UNCHECK COLOR, then checkmark Normal (under Geometry) and set the Normal slider to 8.389

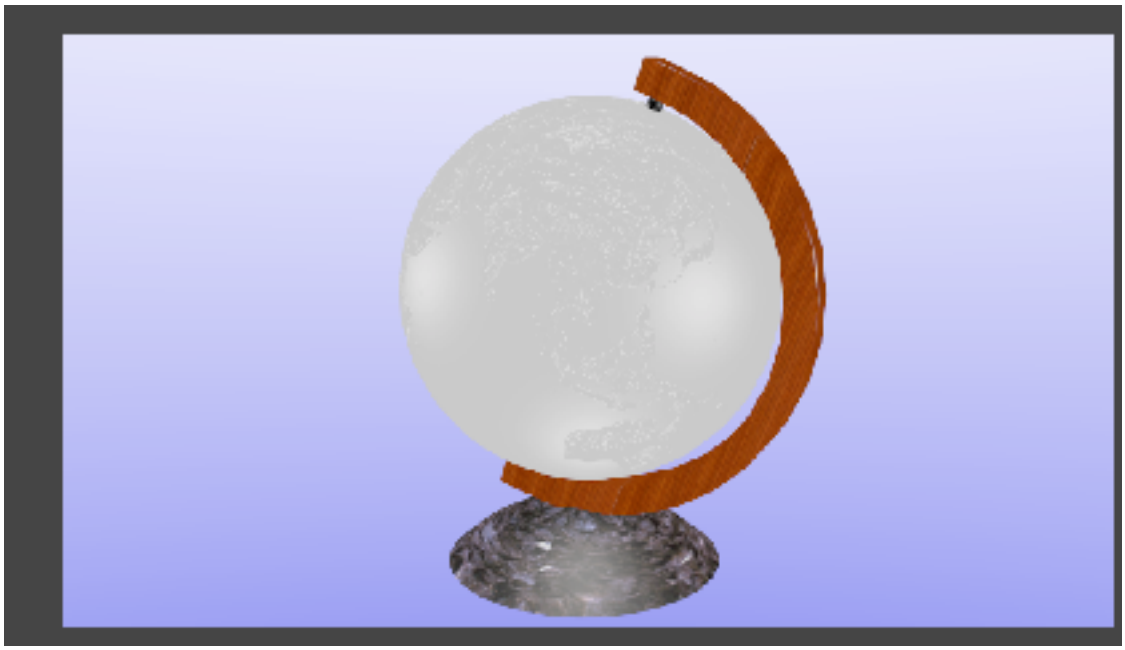


Render the scene.



If you rendered frame 1 (like the image above), you will see little of the relief effect because the part of the image facing the camera is the Pacific Ocean. Set the current frame at frame 70.

Render the scene.

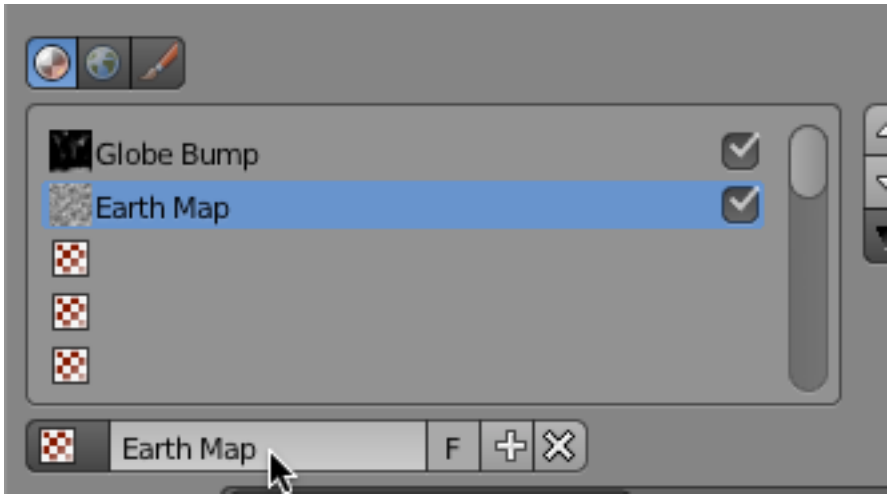


Here you see more of the relief effect. Note that this is all effect. The actual vertices of the Globe have not been moved.

Save your Blend file.

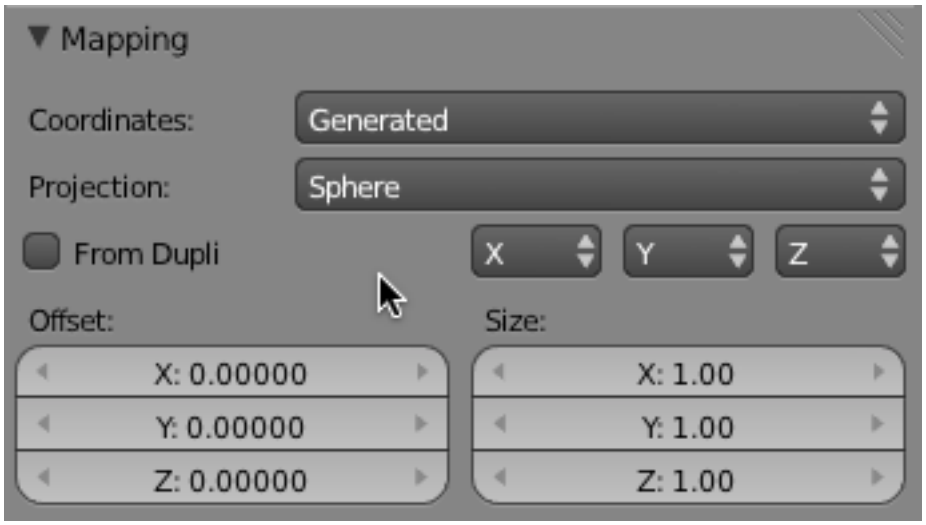
We will now add another texture of the earth with colored areas.

Go to the Texture Editor. Select the second texture channel, press New and name it Earth Map.

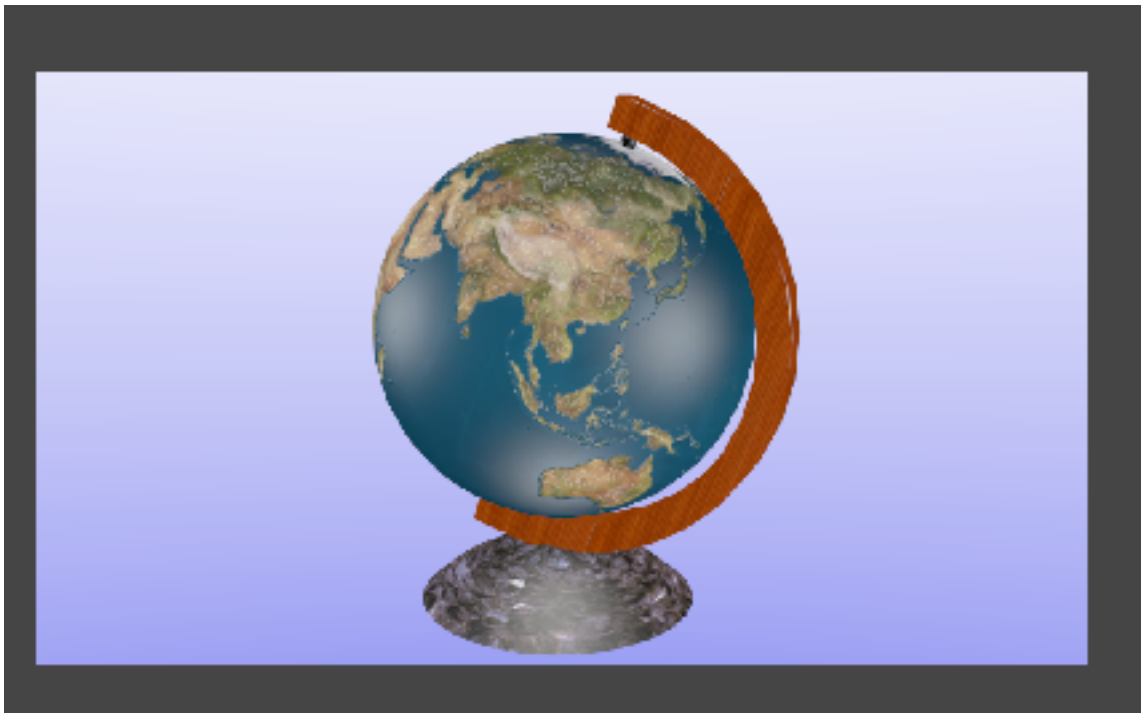


Change the Type to Image or Movie. Click on the Open button. Locate the EarthMap.jpg image file on your computer then press Open Image.

In the Mapping panel set the Projection to Sphere.



Render the scene (frame 70).

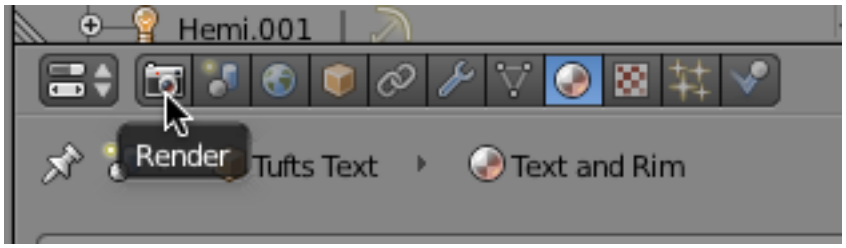


The Earth object is now rendered with both the bump and image maps.

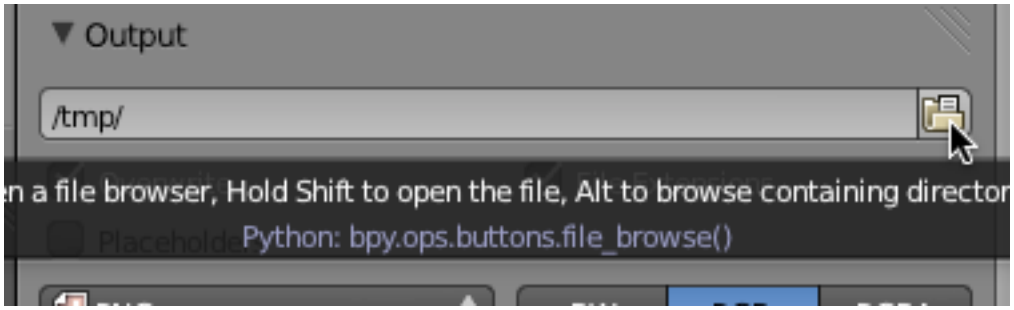
Save your Blend file.

Render Animation:

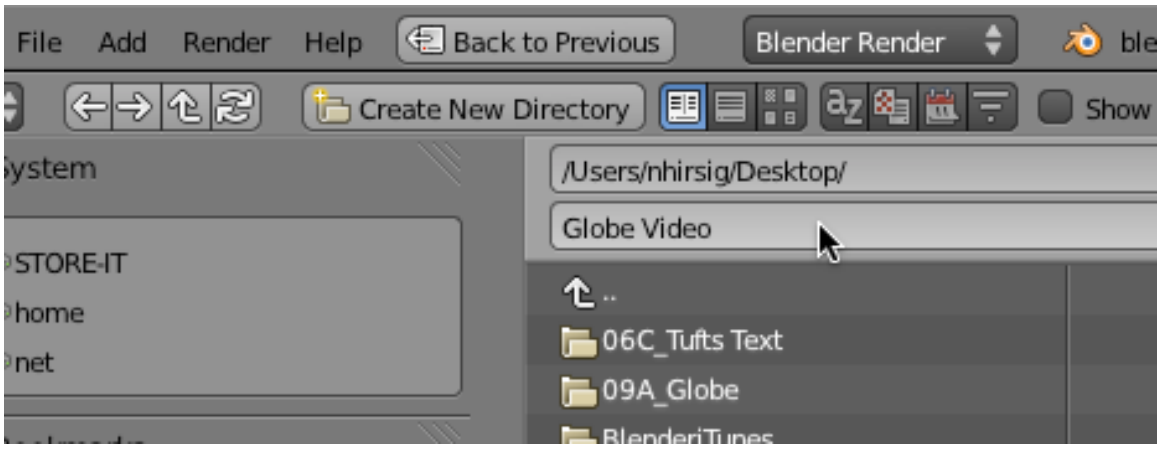
Go to the Render Editor.



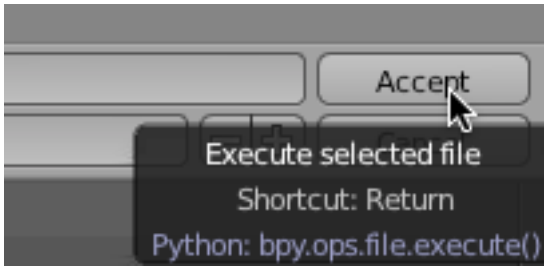
Scroll down to the Output panel and click on the folder icon as shown below.



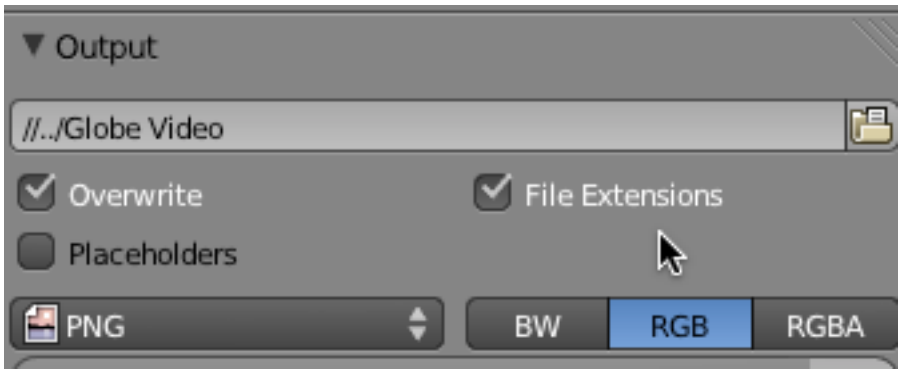
This displays Blender's file page. Decide where you would like the video file to be located (I choose the desktop) and then name the file Globe Video (You do not have to add a file extension to the name).



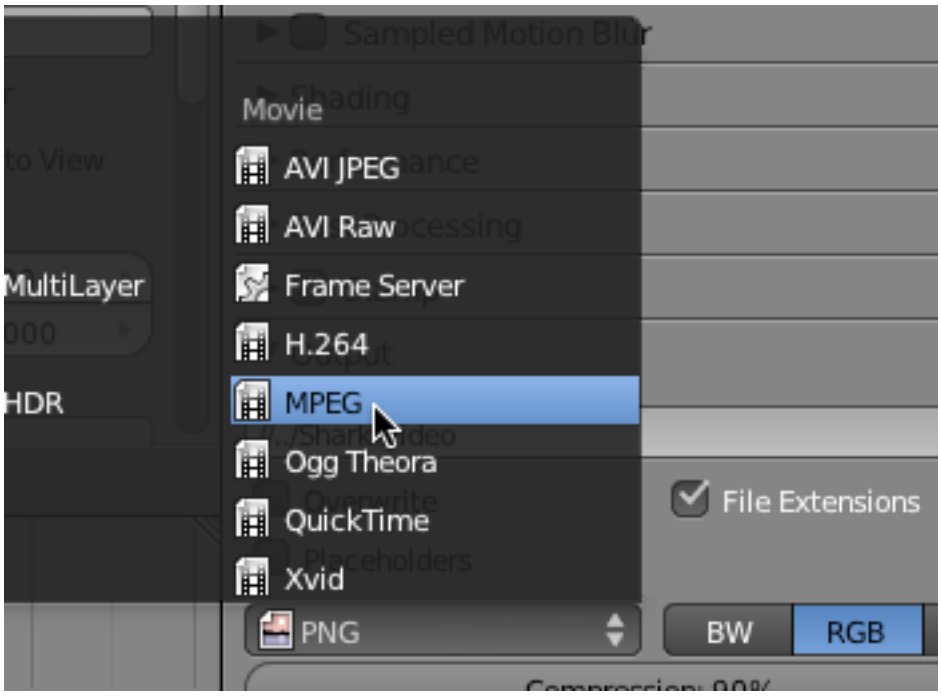
Click on the Accept button.



This sets the name and file saving path in the Output panel of the Render Editor.



Click on the PNG (which is really the file type button) and select MPEG



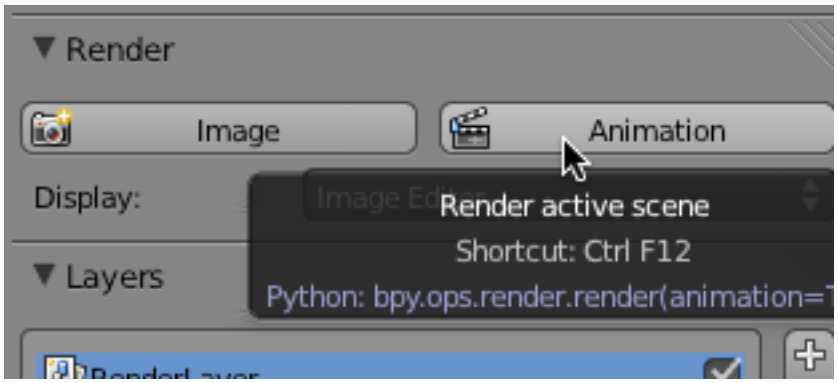
Note: You can choose a different video file type if you want.

Scroll up to the Dimensions Panel. Note that the default dimensions of the video (or the image) is 1920 pixels by 1080 pixels at 50%. This means the size of the video (or image) will be rendered at 960 x 540 pixels.

You can change this size by reducing the % slider. At 25%, the rendered video will be 540 x 270 pixels.

The larger the render dimensions, and the more complex the modeling, animation, texturing and especially the lighting, the longer it will take to render.

To render the video file, click on the Animation button.



This will render each frame in order in the UV Image Editor. This may take a long time. When the rendering is complete. You should have a video file (of your chosen file type) located on your desktop (or wherever you set the video to be rendered to.)

If you choose MPEG as the file type, the video file is, by default, named Globe Video0001-0300.dvd. You can rename this to Globe Video.mpeg.

Save your Blend file.

You can view this Video file HERE.

A completed copy of this tutorial .blend file named “Globe_Complete.blend: can be found HERE.