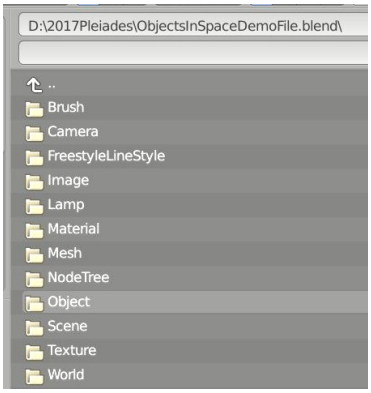
In this section, we will take the previously made World environment with starfield and we will animate it to give the appearance of diurnal motion. A finished example can be found in the demonstration file WorldAnimationDemoFile.blend for later examination.

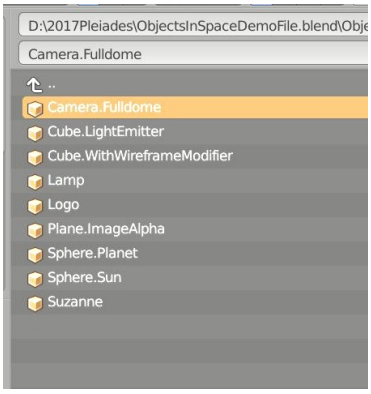
Start with a fresh new Blend file if you haven't already. Ctrl-N

- Check Settings: Cycles Render, Output Dimensions
- Select and delete the default Cube object

Set up fulldome camera or append from an earlier file.

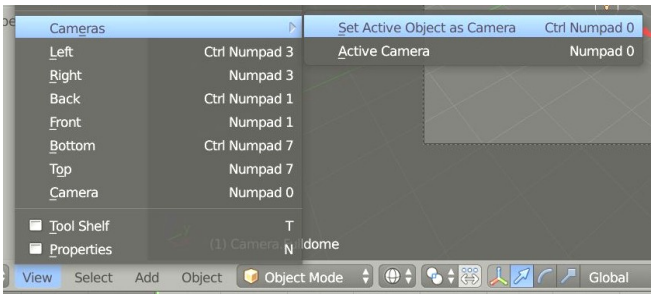
- If appending, import the camera from the list of Objects, not Cameras. By appending it as an Object instead of a Camera, it will appear in the Outliner Editor and the 3D View.





- If the fulldome camera was appended from an earlier file, make it into the active camera for both previews and renders.

This can be achieved by either deleting the other camera or by selecting the fulldome camera and setting it using the keyboard shortcut Ctrl-Numpad 0



View > Cameras > Set Active Object as Camera

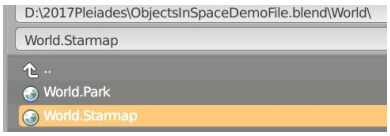
Notice that the Outliner Editor shows which camera is active by putting a pale circular highlight around the movie camera icon.

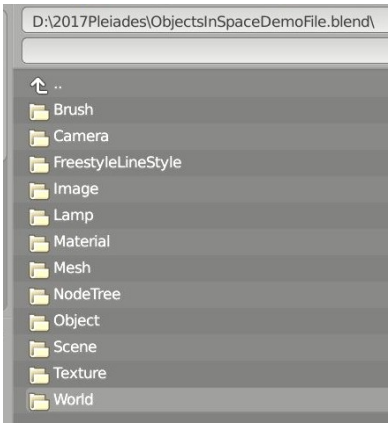
Save the Blend file.

- Shortcut for Save is Ctrl-S, Save As is Shift-Ctrl-S
- Navigate to a suitable folder and give the file a name: WorldAnimation, then click “Save As Blender File”

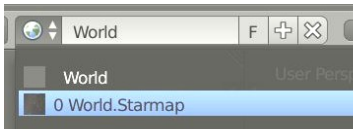
Set up World environment starfield and prepare it for animation

- Either set it up from scratch as in Part 3, or append it from an earlier file.





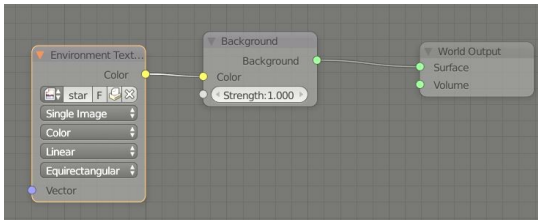
- If appending, the appended World will not be active by default. Go to the Node Editor of the Compositing Screen and select the World from the drop-down menu.



Recall that the Node Editor can be used for compositing or materials and that materials can be for objects or worlds.

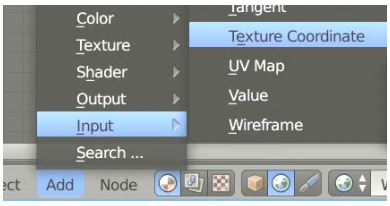
If you cannot see the World drop-down menu, make sure that the Node Editor is set for both Materials and World.

Once the appended World is active, the node tree will appear in the Node Editor

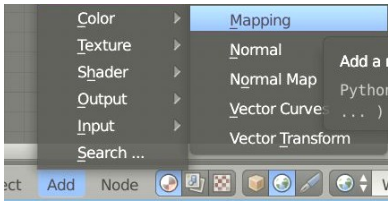


- Next add two nodes, Texture Coordinate and Mapping:

Texture Coordinate node
Add > Input > Texture Coordinate



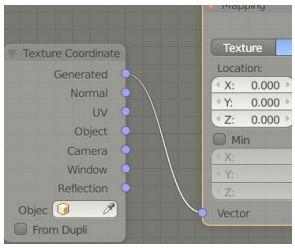
Mapping node
Add > Vector > Mapping



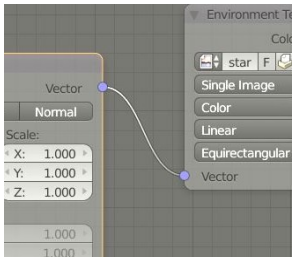
Shortcut Tip:
In the Nodes Editor, 3D View and several others, the “Add” menu can be more quickly accessed using: Shift-A

- Connect the following node sockets:

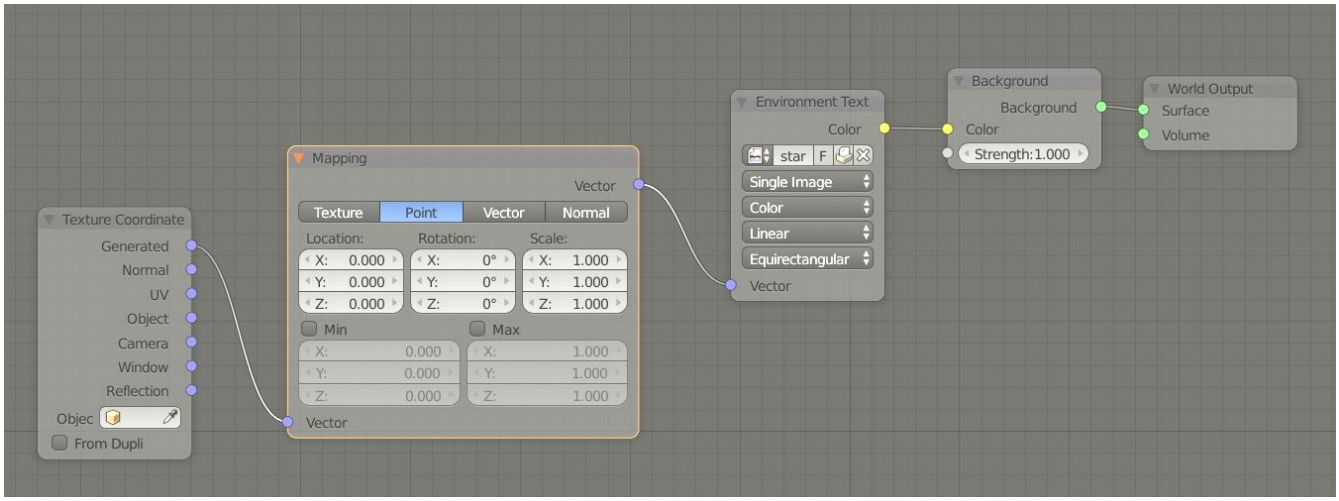
Texture Coordinate node
Generated output socket
to Mapping Vector input socket



Mapping node
Vector output socket to
Environment Texture Vector input socket



The node setup should look like this when finished:

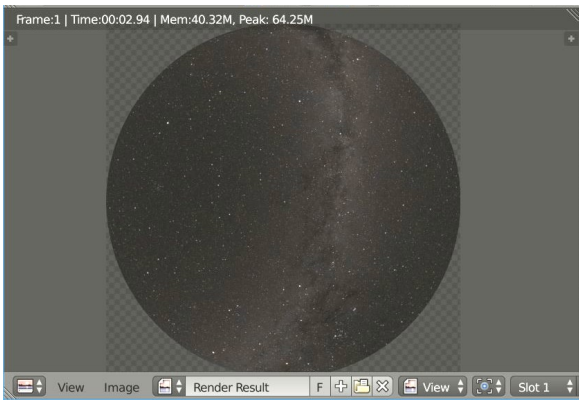


Save the Blend file.

Simulate Latitude

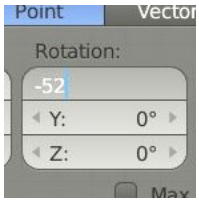
- Make a test render using F12 shortcut or menu.

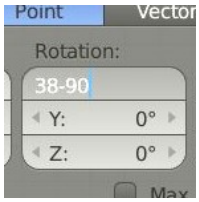
Note the position of Polaris in the image. Our camera is aimed straight “up” along the Z axis, so our World environment map appears to have us at the North Pole.



- In the Mapping Node, change the Rotation X value from 0 for -52. This will put our starfield at 38 degrees.

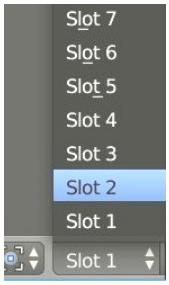
  We could enter the number directly...



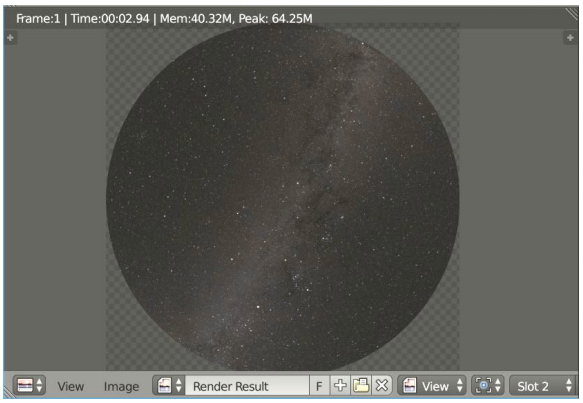


...or enter “38-90” and the calculated value will be entered.

- Before making another test render, click in the Render Result toolbar “Slot 1” and select “Slot 2” from the menu.



- Now make the new test render. Note the change in positions. Go back to Slot 1 to compare.



Workflow Tip:
Use render slots to check for differences in test renders. You can switch by selecting the slot with the mouse or use J to step through the slots forward and Alt-J to step backwards. Alternate between J and Alt-J to toggle between two consecutive slots.

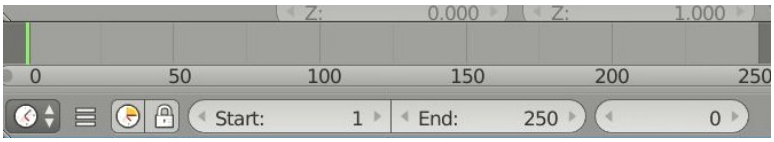
Save the Blend file.

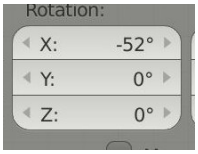
Now we can animate!

Simulate Diurnal Motion

We will hold the rotation X value constant while changing the rotation Z value. *Keyframes* are used to store values for properties at different times. We will use them here to set the rotation value at different frames of the timeline, then extrapolate for constant motion.

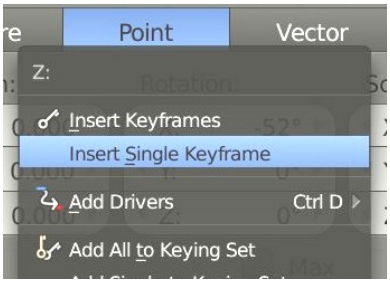
- Make sure that we are still at frame 0 in the Timeline Editor and that the rotation Z mapping value is 0 in the Node Editor.



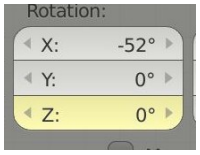


- Make a keyframe for the rotation Z mapping value

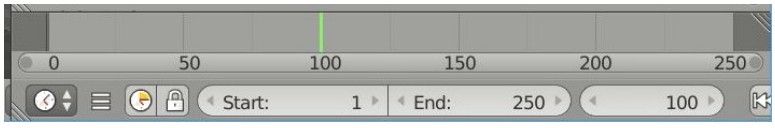
  In the Mapping Node, hover over the " Z: " rotation value and right-click, then select *Insert Single Keyframe* from the pop-up menu.



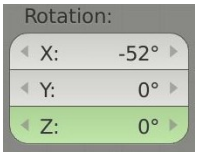
  Value boxes with keyframes are yellow if the timeline is currently resting on a keyframed frame.



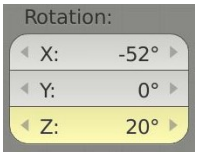
- Go to frame 100, either using the mouse to change timeline or by entering the frame number in the Timeline editor toolbar.



  Notice that the box values with keyframes are green if not currently on the keyframed frame.



- Change the rotation Z mapping value to 20.
- Make a keyframe for the rotation Z mapping value. Note that the box changes from green to yellow.

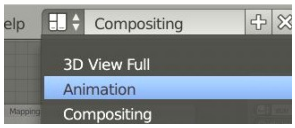


Save the Blend file.

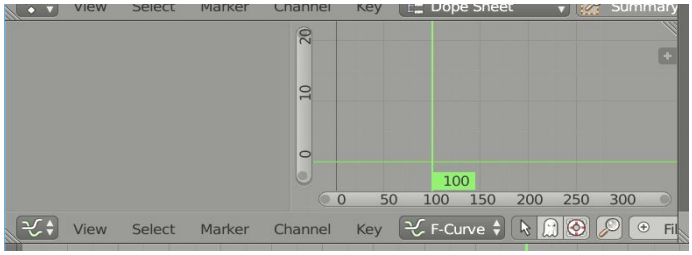
Extrapolate Motion

Currently the simulated diurnal motion slowly begins at frame zero, speeds up a bit, and then slows again to a stop by frame 100. For this example we want continuous motion, so we need to tell Blender how to extrapolate.

- Change to the Animation Screen.



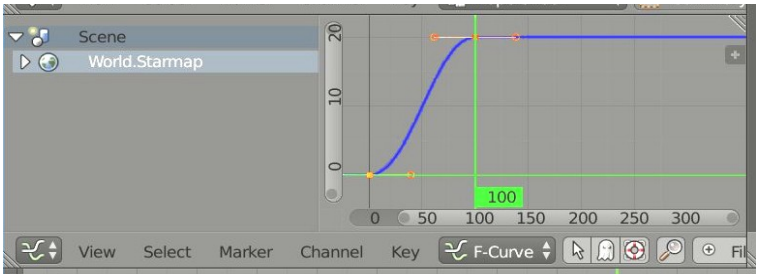
The Curve Editor near the lower left is what we will use for extrapolation.



At first we might not see anything for the World environment keyframes.

If there is no curve visible, either go back to the Node Editor and select the Mapping node, *or* enable viewing of channels of non-selected data.

In the Curve Editor toolbar there is a set of three buttons:

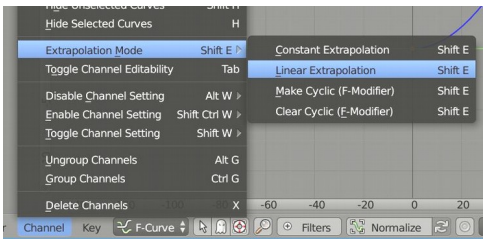


Toggle the arrow button to allow viewing of curves for unselected data.

Now we see the World.Starmap mapping keyframes plotted on the chart even if the node isn't selected.

Screen Space Tip:
To temporarily enlarge a single Editor to fullscreen, use:
Ctrl ↑ or View > Toggle Maximize Area

- With the World.Starmap curve still selected, use the menu to extrapolate:



Channel > Extrapolation Mode > Linear Extrapolation

Change the World name to World.StarmapDiurnal (either in Outline Editor or Properties Editor). If you append this World environment into another file, the animation settings will transfer with it.

Save the Blend file.

Later, if you want to change the speed of the simulated diurnal motion, you can go to the Mapping node and replace one or both of the keyframes, or you can select and move keyframes in the Curve Editor. As you learn more about Blender and animation curves you will find more ways to alter motion.