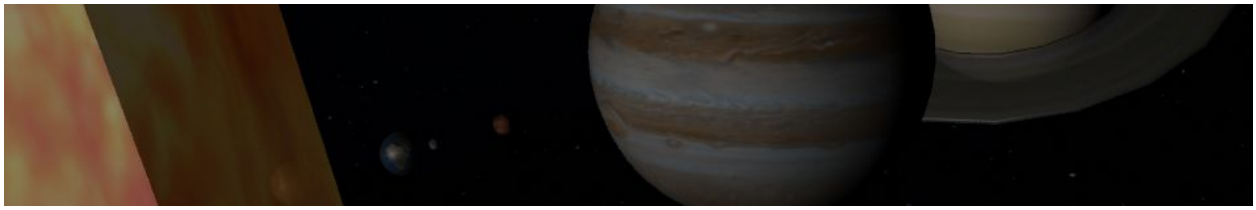
The Solar System (part two)



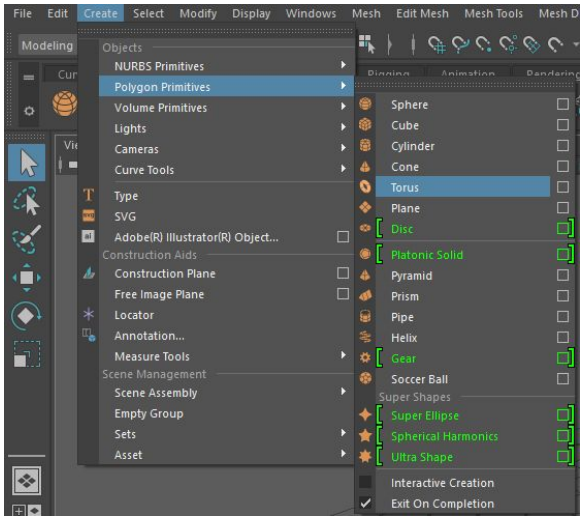
Here are the things we will cover in this PDF:

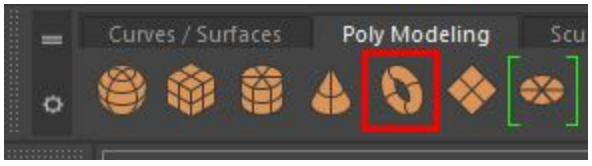
- Making the Rings
- Making the Moons
    - Parenting the moons
- Texturing
    - Using CrazyBump to create normal maps
    - Creating Materials
    - Applying Materials to the objects

Making the Rings

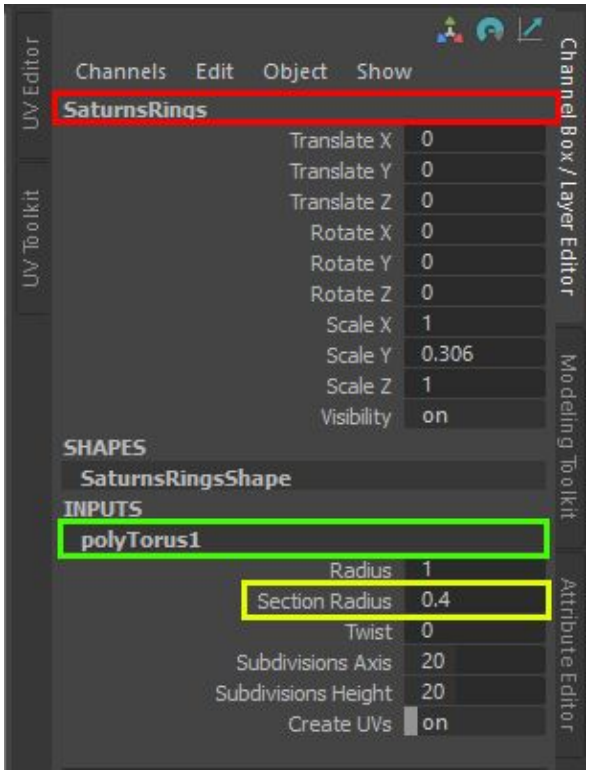
The rings themselves are fairly simple to create. We will use a torus and change its dimensions to make it look more like rings. I got into the habit of actually scaling this manually and it is much easier to just change numbers. So to start, let's create a torus.

As with most things, there are a few ways to do this. Here are the two simplest. Go to Create>Polygon Primitives>Torus. Or just push this button in the Poly Modeling tab.

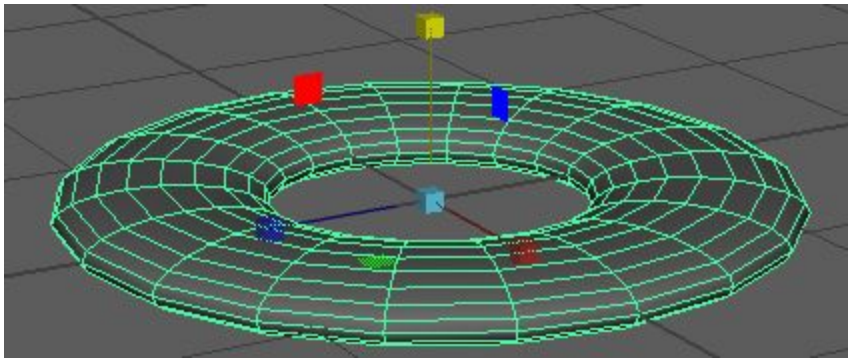




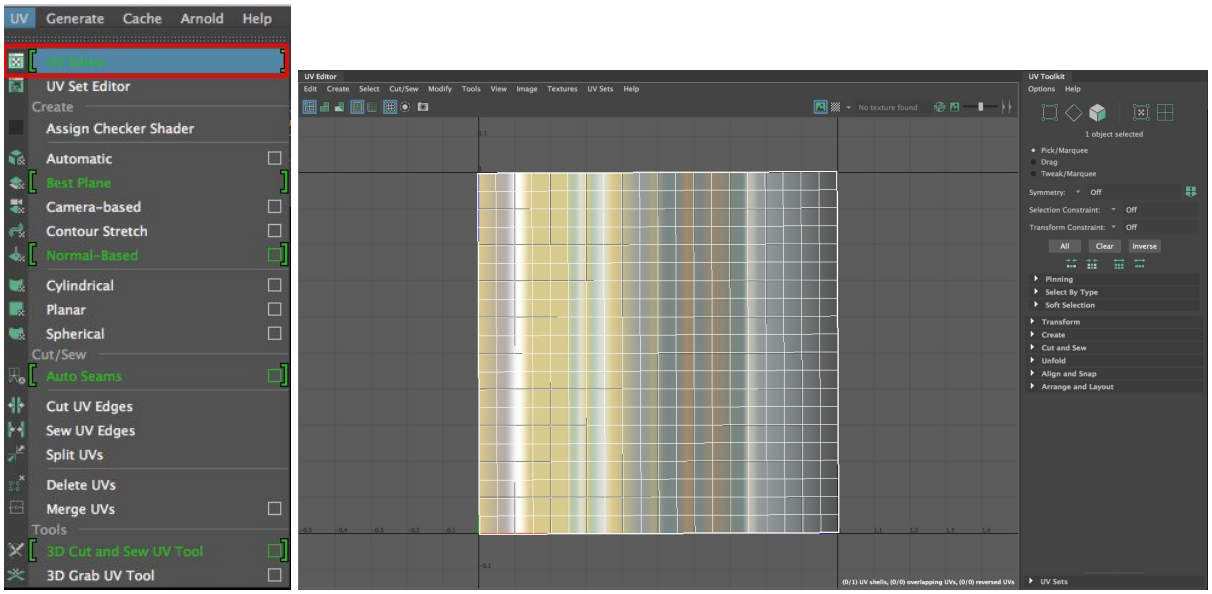
Once it's created, NAME IT. Do that immediately. Once it's named (Red, because reiterating can be helpful), we will change some stats on this so keep it selected. First, select polyTorus1 under inputs (Green). Then you need to change the Section Radius (Yellow) to either .3 or .4 or a number that makes sense to you? I'm using .4. This makes the circle on the inside of the torus larger so we can fit a planet into it without it just sitting through it. Next we need to scale it down some. You can do this by just pushing "R", or by hitting the scale button on the left hand side of the screen.  . This will allow you to manually change the size. Remember that you can also change the scale X,Y,Z in the channel box tab, but it is probably easier for this one to do it using the manipulator.



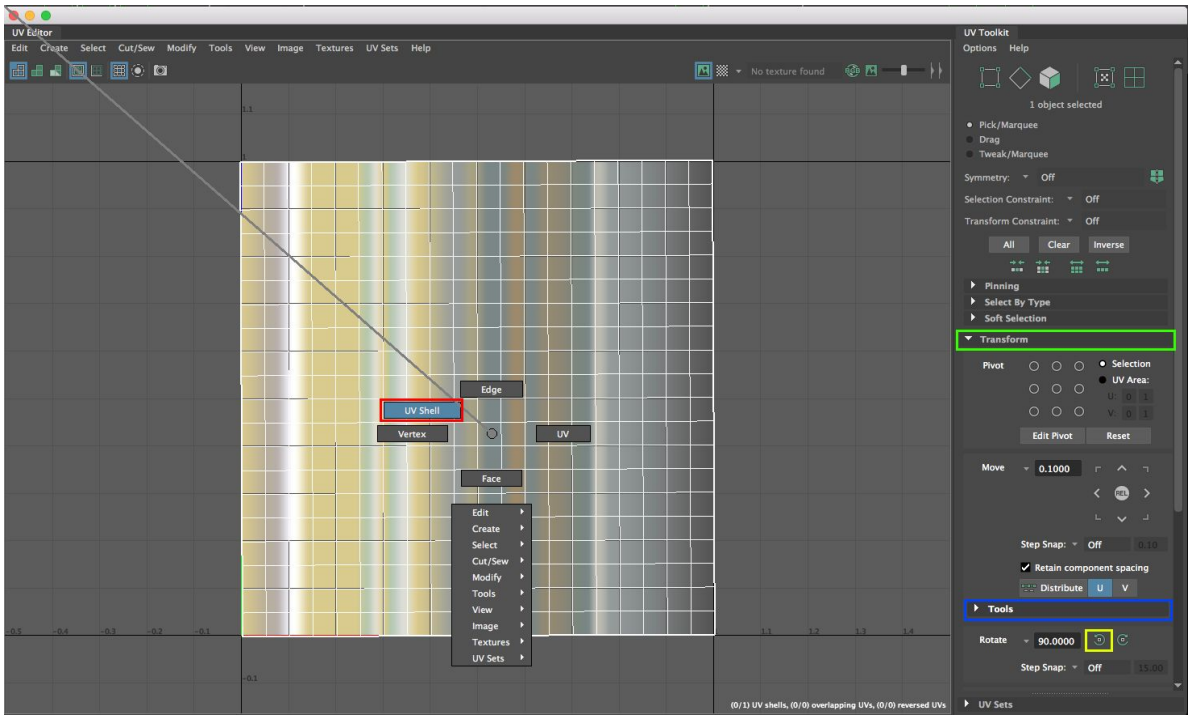
Once finished, You should have something similar to this. Don't make the ring completely flat. It needs to have some height to avoid z fighting. You may also want to rotate (E) it a bit.



Lastly, so the texture looks correct, you'll need to change the UVs a little bit. The UVs are fairly easy for now. They will get harder once we get further along in the course. For now, just select the torus, and open the UV Editor. UV>UV Editor. Should bring up this window.



First we need to select the UVs. To do this, hold RC (right click) and select UV Shell (Red). Then select the UVs (they will turn red when selected). Next click the transform drop down in the right (Green). This will show you the tools drop down (Blue). Finally click the rotate button (Yellow). This will ensure that your texture looks correct. The images shown for the torus already have a texture on them, yours will be grey blank space, but you can still go ahead and change this now.

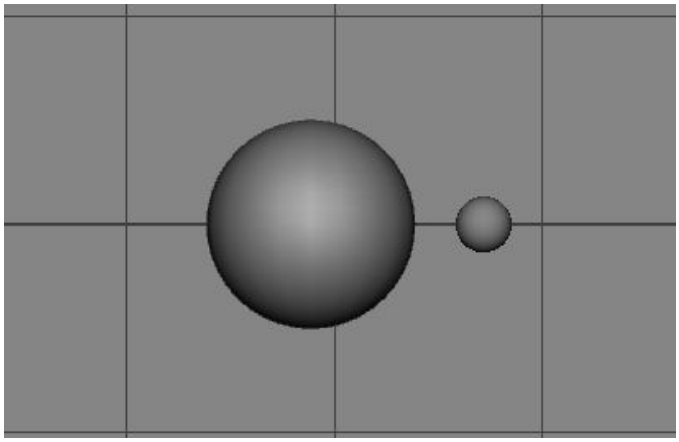


Making the Moons

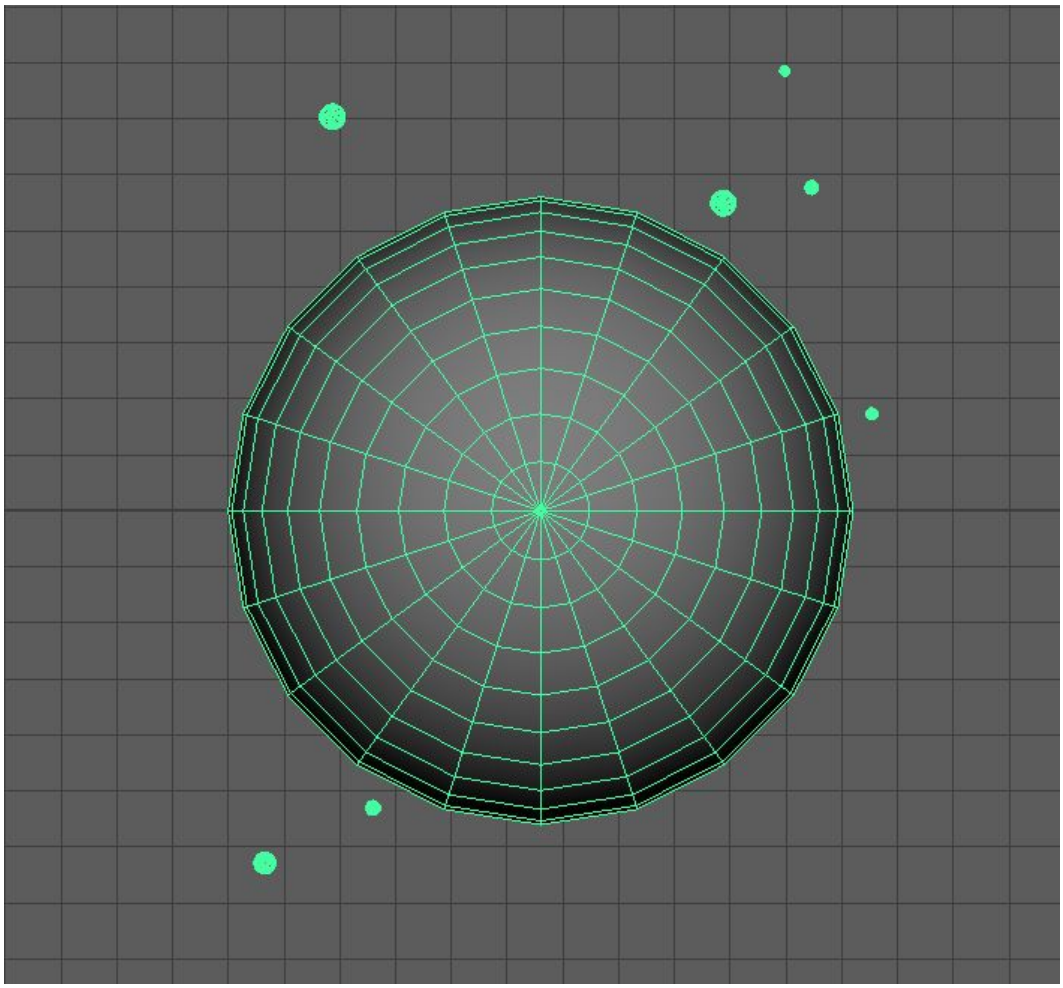
We will be making moons for every planet that has them, but we will not be attempting to be realistically accurate with this as there are 79 around Jupiter alone. Instead, we will follow this guide. If you want to make more than this, you absolutely can, but you must have at least this many.

Planet	Moons
Earth	1
Mars	2
Jupiter	7
Saturn	6
Uranus	4
Neptune	3
Pluto	2

So, the distance of the moons varies, but we will generally just eyeball that. Getting it perfect would be exceptionally hard considering we are doing the rest of the planets at such a close distance. Meaning from Mercury to Mars .1% of a grid space is 1 million miles. We can create the spheres the same way we made the planets and since they all go along the X axis, eyeballing it will be easier. We can use the scale for the moons from our planetary fact sheet. If you want to go in and attempt to make the other moons their appropriate scale, you are more than welcome, but it will be fine if you just use the same scale. As far as the distance for earth is concerned, you can use this to help you figure it out.



Jupiter and Saturn will be a little bit harder to figure out because there are so many moons. However, the internet will make that a little bit easier. We can use our top down view to place the moons and when we begin the animation, we will group them so they move as one unit. I searched for a top down of Jupiter and moons and found something I could use. Here is what I came up with.

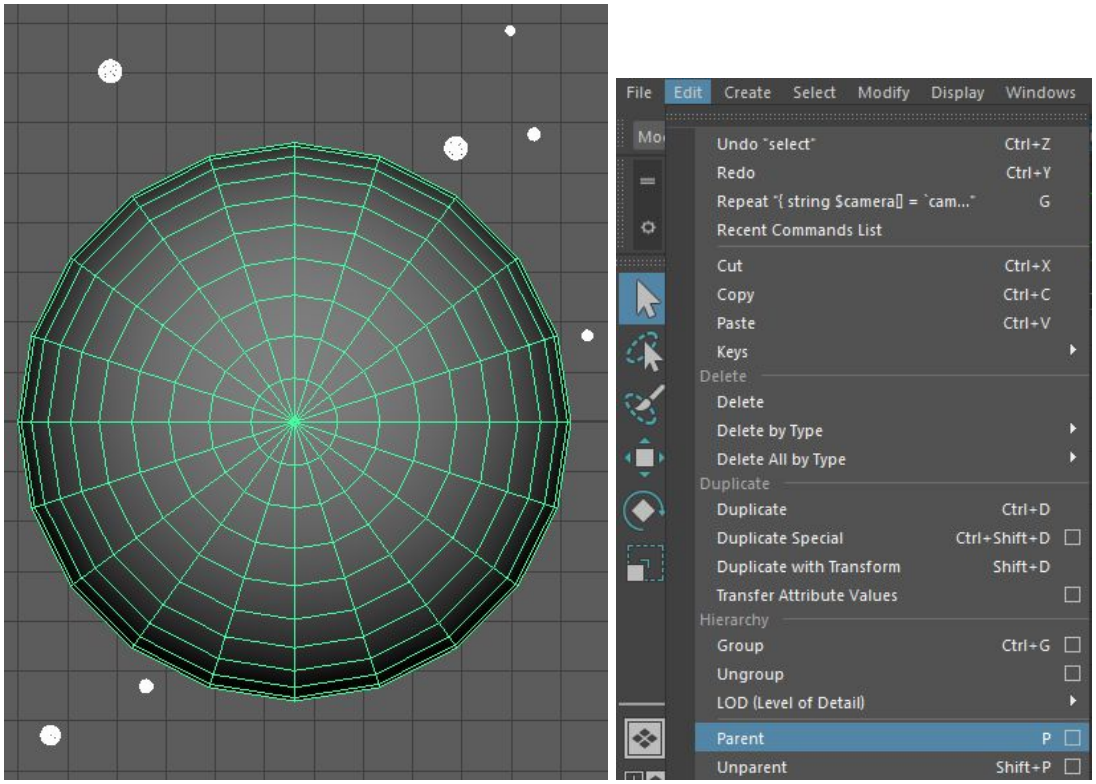


Again, this does not have to be perfect. Get as close as you can and make sure your moons aren't too far out. This will cause them to collide with other planets or moons. The easiest way to ensure that this doesn't happen is to parent them and then group them. I will show you how to do that now as you will have to do that with all of them anyway so they can revolve around their respective planets.

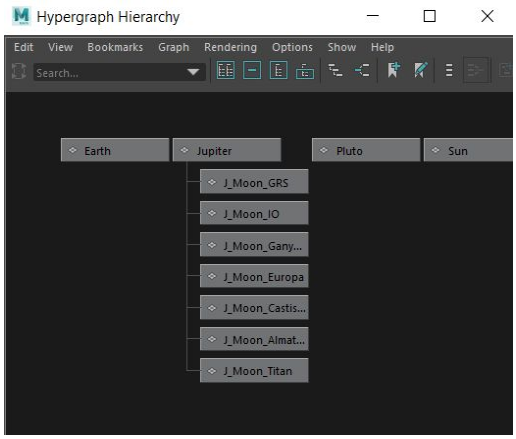
<u>Parenting the moons</u>

Parenting objects allows you to select one object, the "parent" while also selecting the "children" of said object. It places the "child" objects, hiergraphcially under the "parent" objects. As you may have guessed, there a couple ways to do this. You must select the child, then the parent. So all of the things you want to be attached to the one object must be selected first.

If you hold shift, you can select multiple objects. If you hold control, you can deselect objects. Once you select the object, you don't need to hold the button anymore as long as you don't click in the viewport off of your selection. Doing so will deselect all of your objects. So, if you select all of Jupiter's moons, then select Jupiter (child then parent), it will look like this.



Your last selection will always be green. Now you can either press "P" to parent, or go to Edit>Parent. This will ensure that the moons move with the planets. Now when you select Jupiter, it will also select the remaining moons. In the hypergraph hierarchy (Windows>General Editors>Hypergraph Hierarchy), it should look like this.



Texturing

We will be using the Hypershade window to make our materials and texture everything we do. To help make our materials pop more, we will use CrazyBump to make normal maps based on our textures. We can do that as soon as we find textures. Hopefully by now, you've already scoured the internet and found the textures you want to use. I don't mind if you end up using the same textures for all of the moons, but know that you can find some texture maps on the internet for some of the moons.

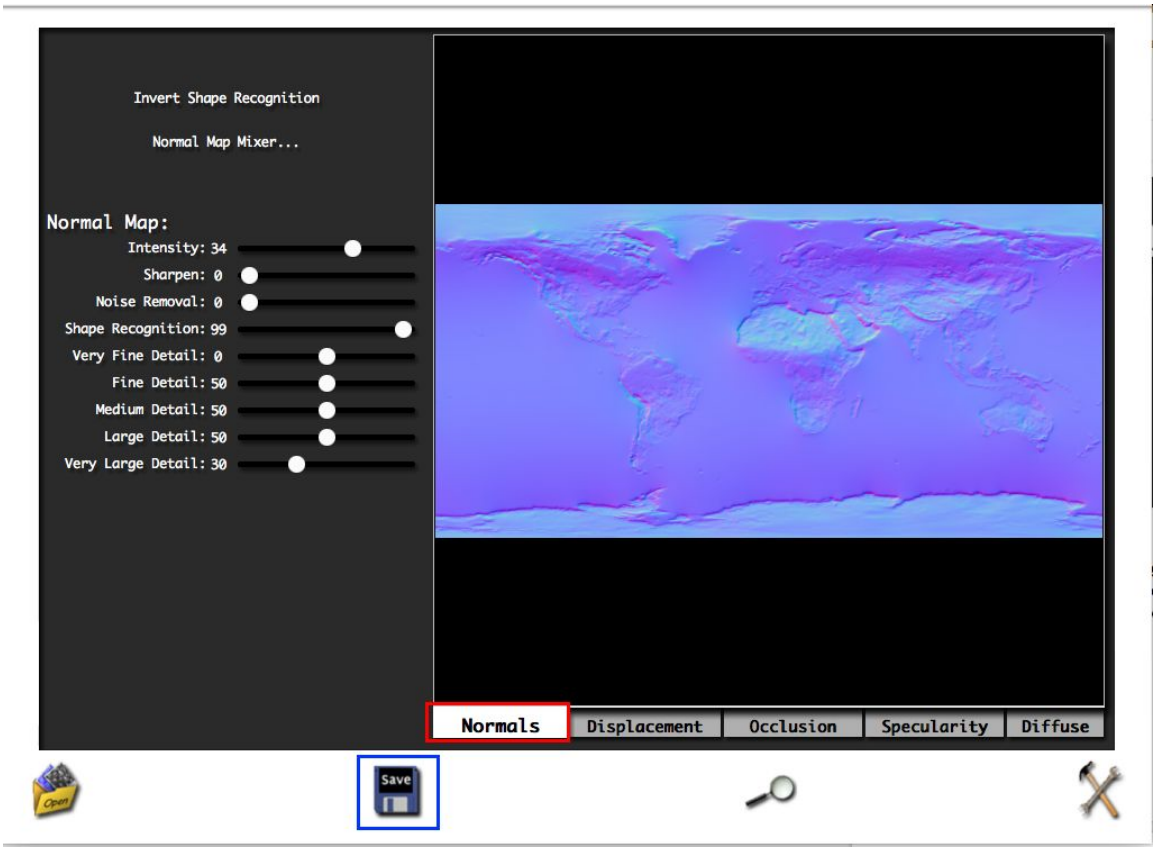
Using CrazyBump to make normal maps

This tool is very simple to use for our purposes. It will provide us the normal map that we can apply to our materials in Maya to make them seem like they have more depth than they actually do. Maps that accomplish this goal are often referred to as height or bump maps, but normal maps look a lot better. I'll be showing how to make a simple height map when we do the Crate project.

The first thing you see when you open crazybump is this window. You'll need to click the open folder to add your file. Remember that you are adding the texture that you found known as a diffuse or color map.

Then choose "Open photograph from file" and find the file that you want to use. Next, you'll have to choose which kind of normal map you want to use. Usually the option with the textures pushed out is the best way to go, but it depends on the diffuse map you found. Choose the one that looks best to you.

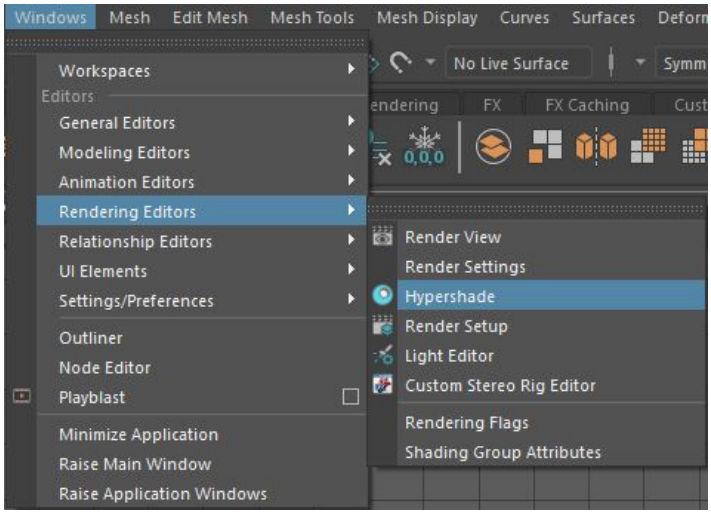
Now you shouldn't have to change anything on the sliders for this particular project. So you should just be able to hit save (Blue) on the Normal tab (Red). Then choose the location you want it to be saved (Preferably in your source images folder so you don't have to move it)



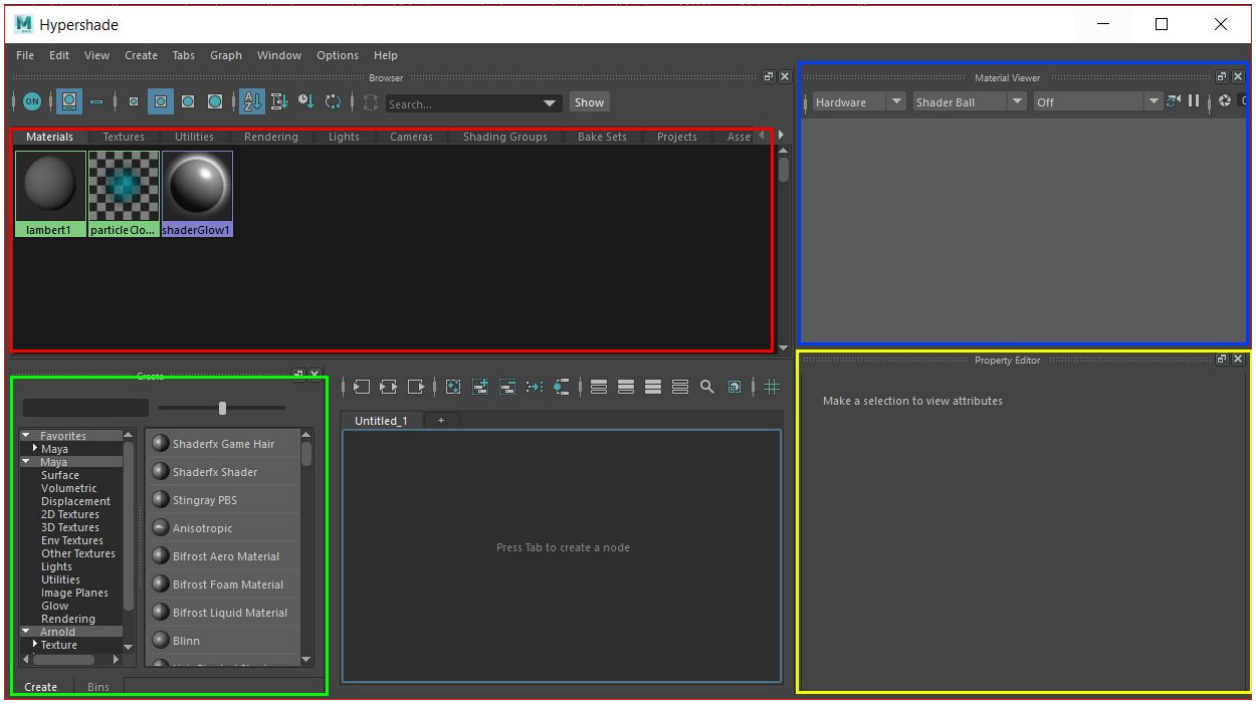
Creating Materials in Maya

To apply our textures to objects in Maya, we first must create materials based on those textures. The first step in this is to ensure that your texture files, including your normal maps, are in the source images folder of your project directory.

Now we will open the hypershade window. Windows>Rendering Editors>Hypershade.

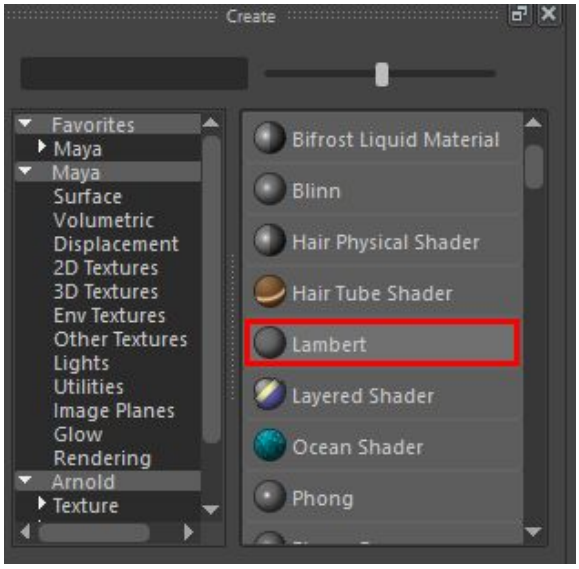


Once this window is open, there are a few things to note. First is your materials (Red) which are displayed in the Browser. This portion of the window will display all of your materials. Next is Create (Green). This lists all of the available types of materials you can create. All you have to do is select it and it will create it for you. The material viewer (Blue) will show you what that material looks like prior to placing it on an object. FInally is the property editor (Yellow), which we will use to make changes to the material we are creating.

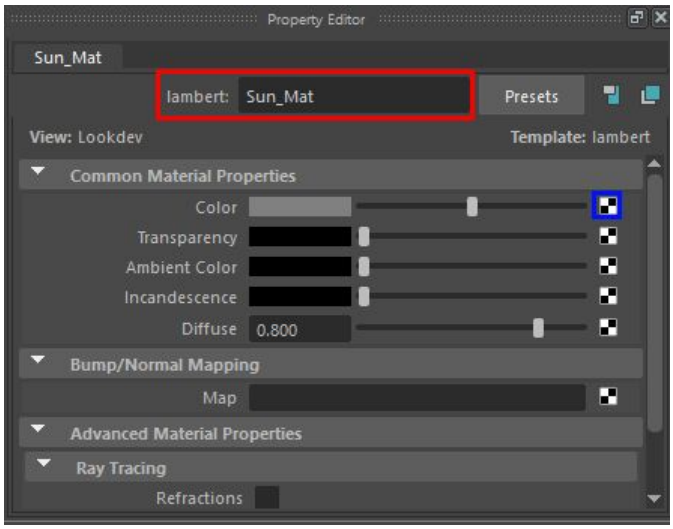


Now that we've looked at the window and the portions of it we will use, lets make some materials. First thing we are going to do is create a new lambert. If you'll notice in the materials, there is lambert1, particle cloud, and sharderglow1. Do not mess with those. If you change

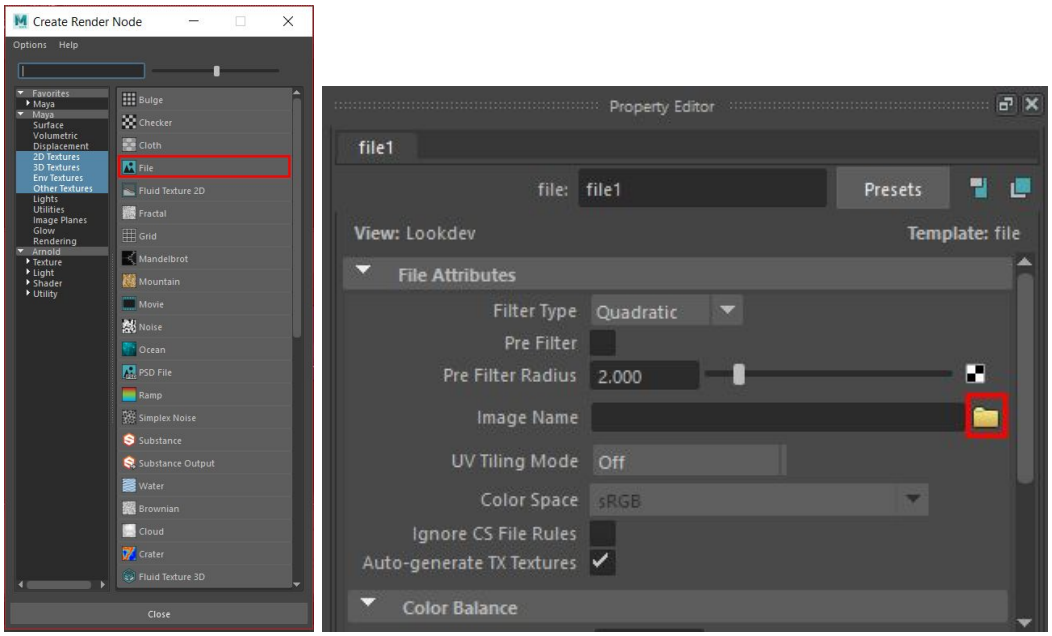
lambert1, everything new you bring into the scene will have that material. In other words, don't mess with lambert1. So if you scroll down in the "create" area, you'll see lambert. If you click that, it will create a new lambert.



Now we will edit the lambert using the property editor. The first thing you need to do is name it (Red). Always remember that everything has to be named. With materials, it's easy to keep up with them if you name them Ojectname_Mat. So for this one, I named it Sun_Mat. Next, we will add our textures to it. Click the checkered box next to color (Blue).

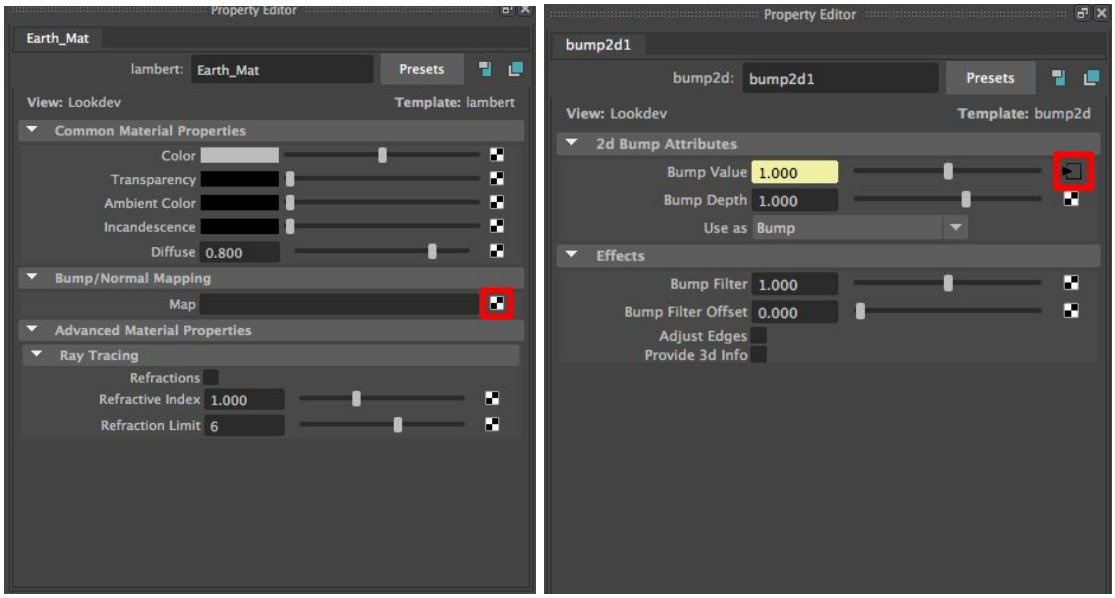


Those checkered boxes will be how we add texture files to those specific things. We will add the diffuse (color) map to this one. Once you click the box, you should get this window. Choose file. Then chose the folder next to image name.



Now, as long as you set your project, this will bring up your source images folder and allow you pick from the textures you put there. This creates a path so when you set your project, it should always load your textures when you open your scene.

To add the bump/normal map we created, we just need to select the material again in the browser, and then select the checkered box next to Bump/Normal Mapping. Then select file again, Next you'll select what I refer to as a playbox button (there is probably a real name somewhere, but ehh). Then you'll select the folder same as above and you can add the bump map there.



Applying Materials to objects

There are a couple ways to apply materials. You can either middle mouse click and drag the material from the hypershade window onto the object. Or you can select the object and hold right click (RC), select Assign Existing Material>Then chose the material. If you do this, and the material isn't showing up, try pressing "6" as this turns on the textured view in the viewport.