

# TUTORIAL: THE SNOWFIGHT SEQUENCE

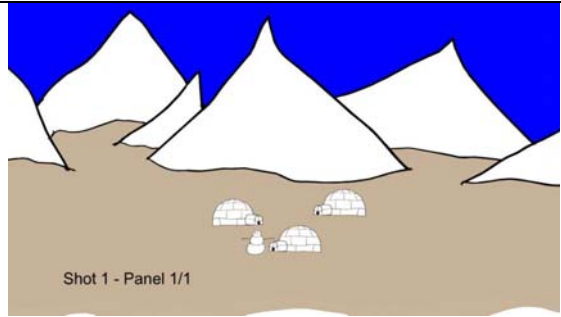
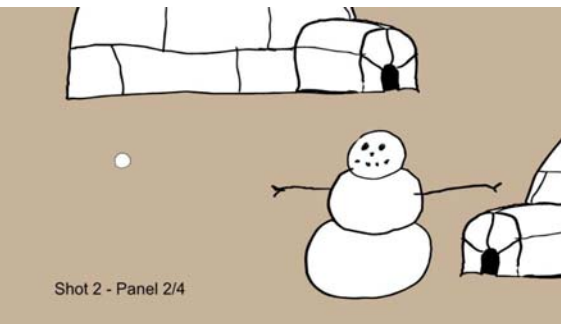
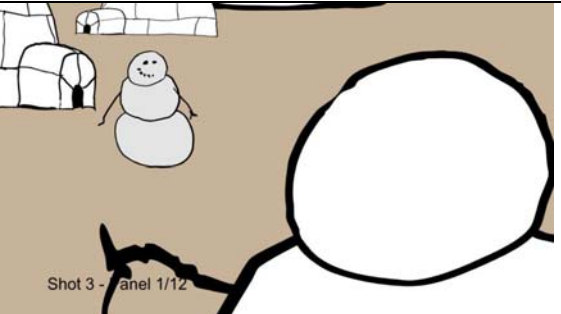
## 1. Review The Project

We will be producing a simple three shot sequence. Review a short Quicktime of the story reel of the sample project you will be completing, open Quicktime Player and browse to:

C:\myProjects\Plumber\demo\prod\edit\boards.mov

## 2. Create an Asset Plan The Project

We will make a simple **Asset Plan** to figure out what Assets we are going to need for our production – which we will call the Snowfight sequence.

Shot Name	Thumbnail	Assets In Shot	Description
0010	 Shot 1 - Panel 1/1	Sky Mountains Igloos Snowman Ground	Establishing shot. Camera pushes in on Tundra scene, with igloos and with our Snowman
0020	 Shot 2 - Panel 2/4	Ground Igloos Snowman Snowball	Cross-fade to tighter shot. A snowball enters from screen left and hits Snowman in the face. He turns to see where it came from.
0030	 Shot 3 - Panel 1/2	Igloos Ground Snowman Thrower	Two shot of Snowman and Thrower. Thrower waves at Snowman.

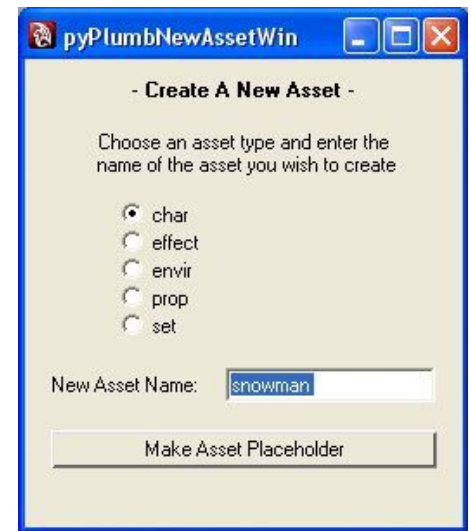
Sample Asset Plan for Snowfight

According to our **Asset Plan** we need 6 unique Assets for this Show: **Sky, Ground, Igloo, Mountain, Snowball** and **Snowman**. While we need several Mountains and Igloos, we will only be creating them once and bringing in multiple instances of them.

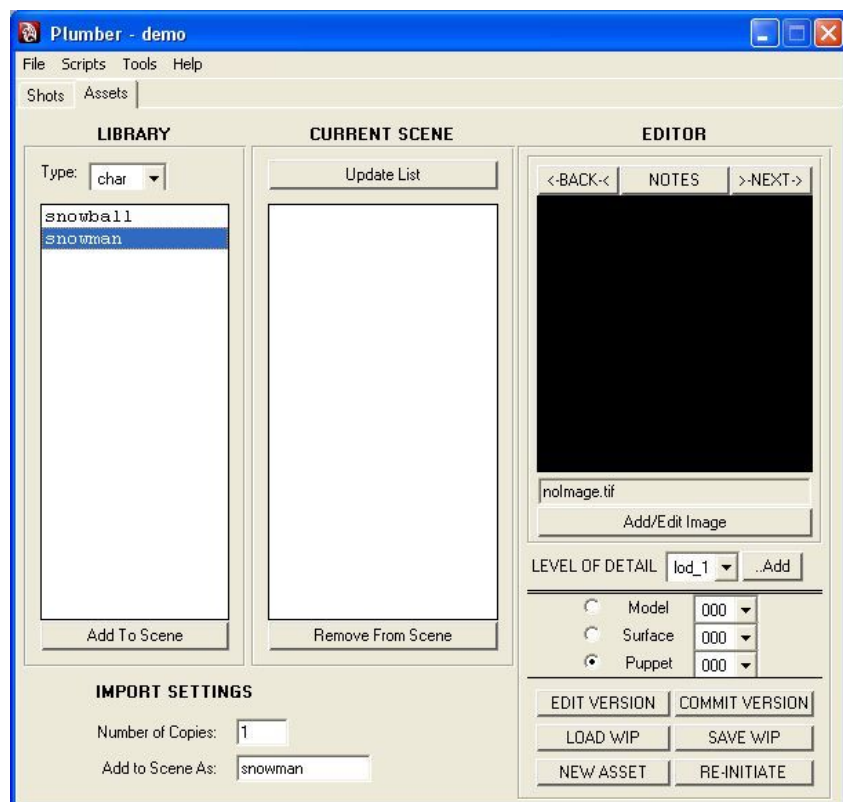
If you open the **Asset Module** of Plumber and browse through the Asset Types, you will see that all of these Assets already exist, except for Snowman and Sky, which we will need to create.

### 3. Create an Asset Placeholder for Snowman

- In the Asset Editor, press the **New Asset Button**. This will bring up the **New Asset Window**
- From the list of available **Asset Types**, choose **char** (characters).
- For the **New Asset Name**, type **snowman**.
- Press **Make Asset Placeholder** button and the UI will close.

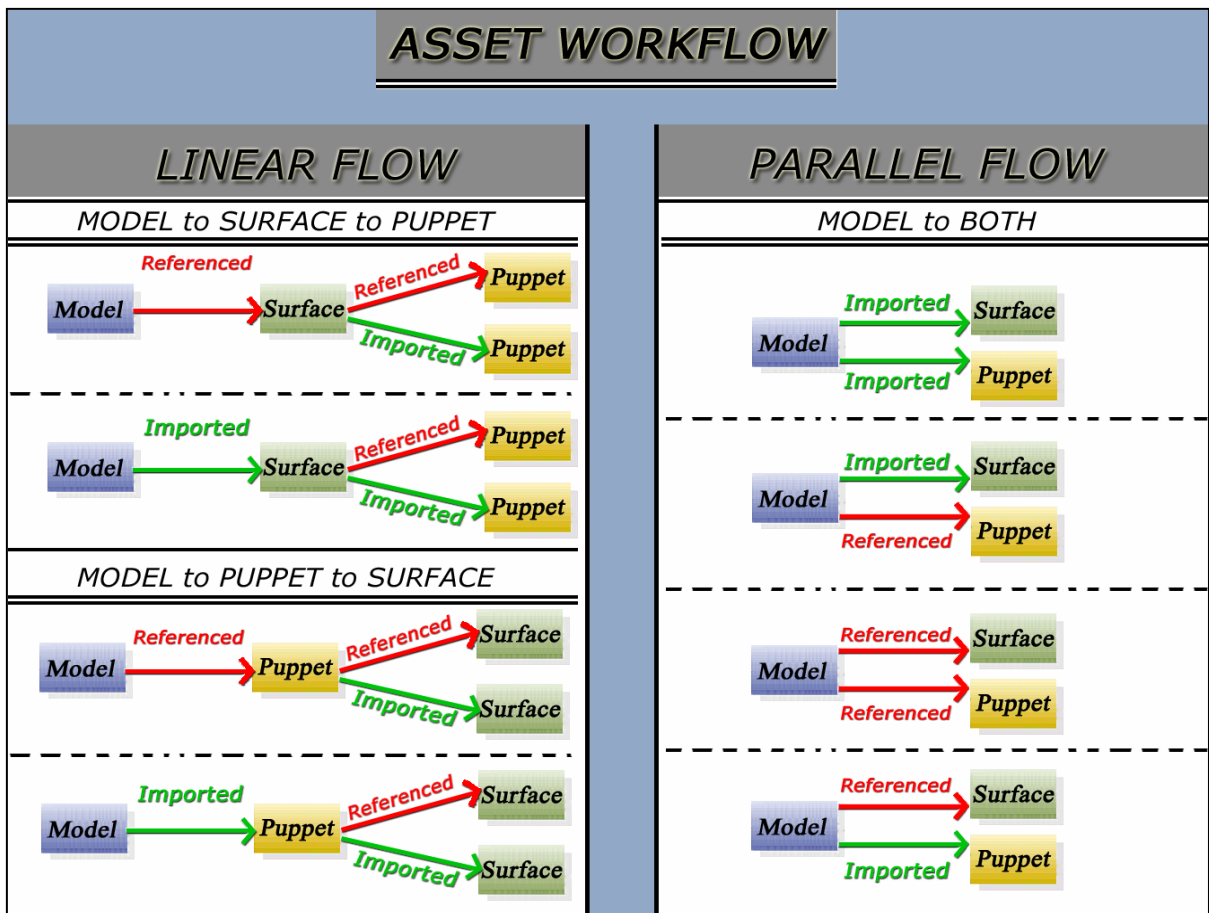
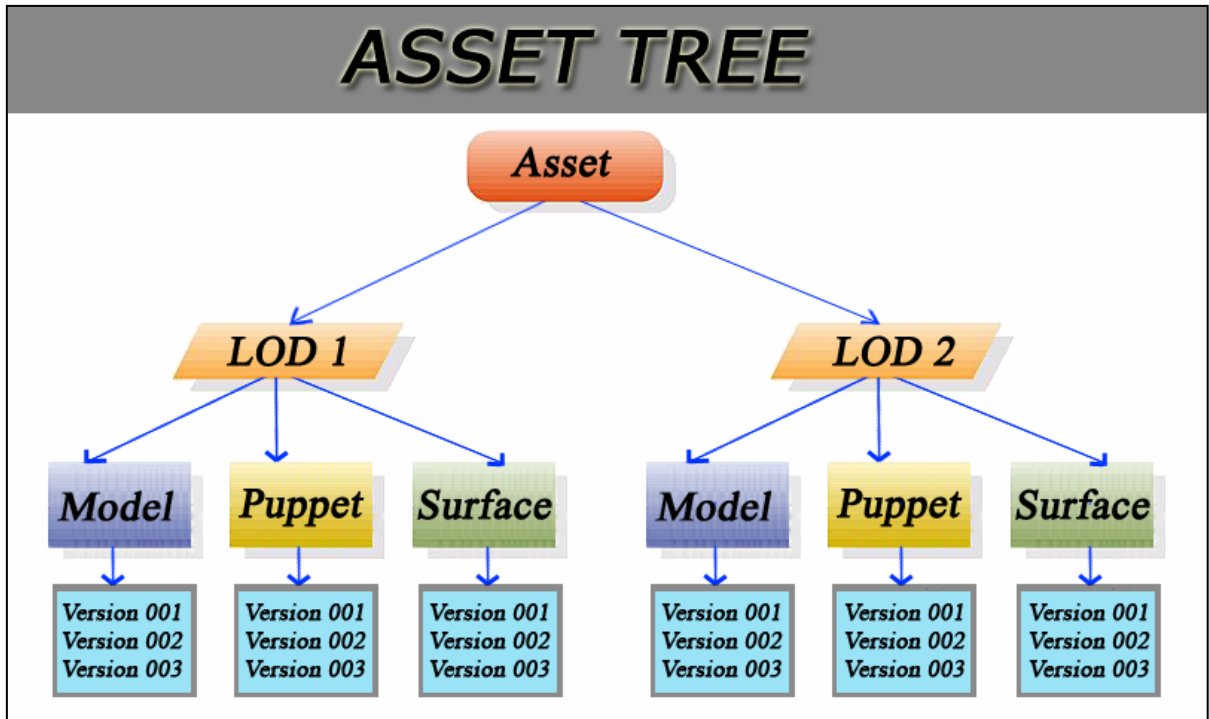


- In the **Asset Library** area, set the **Type** to “char.” You will see the snowman listed. Click “snowman.”
- **Snowman** is now the **Active Asset**. The **Active Asset** is the only one that can be edited, loaded or otherwise affected. As the Active Asset, we can try to bring it into the current scene. Press the **Add To Scene** button.
- *OOPS!* We can't bring in the **snowman** Asset. We made a placeholder for it, but only Puppets get bought from the Library for production work.



#### 4. Determine The Asset Workflow

Before we start to make the asset, we need to understand how Plumber Assets work. Examine the Asset Tree and Asset Workflow diagrams, after which we'll check out the Preferences to determine what our Workflow is.



#### a. Asset Hierarchy Tree

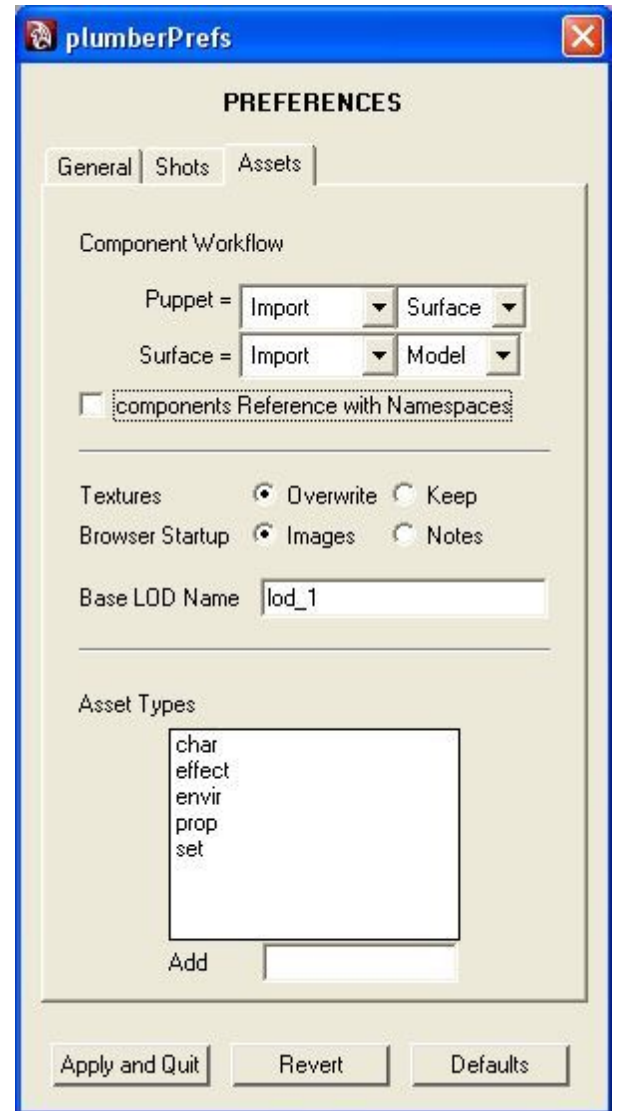
- An Asset consists of **LODs (Level of Detail)**. There needs to be at least one, but there can be as many as you wish. When we created the **Snowman** Asset Placeholder, we created an empty LOD called **LOD\_1**.
- Each LOD is comprised of three **Components** – the **Model**, the **Puppet** and the **Surface**. Different LODs are technically not linked to each other, and can contain completely unique sets of geometry, rigged controls, etc.
- Each Component consists of numerically iterated **Versions** of the Component. The highest numbered Version is the one passed through to other Components.
- Components have dependencies on other Components, which determines the order in which Components need to be made. The **Asset Workflow Preferences** settings set up the inter-Component dependencies by deciding the **Asset Workflow**.

#### b. Asset Workflow

- The two types of Asset Workflow are **Linear Flow** and **Parallel Flow**.
- In a **Linear Flow**, the Components feed into each other like an assembly line. In the first listed Linear Flow, the Model is the basis for a Surface, which is then used to make the Puppet.
- In a **Parallel Flow**, after the Model is completed, the Surface and Puppet are completely independent of each other. Since the Puppet cannot drive the deformations of the Surface, a custom production system will need to be used.
- Components can be either **Referenced** or **Imported** towards a child **Component**. These settings are determined by the **Show Preferences**.
- While Referencing can allow changes to automatically filter down to Child Components, such changes *can* be destructive previously completed Children. Importing is always safe, but children Components will *always* need to be fixed after a change to the Parent Component.

#### c. Open Preferences To View and Set Asset Workflow

- We will open up the **Preferences UI** to see what workflow this Show is using. Preferences are always saved for a Show, not an individual user. You may have a completely different set of Preferences all of your shows in your Repository.
- Preferences may be found under the Tools Menu in the Plumber UI. Preferences are covered in detail in the Reference section of this documentation. For now, be careful not to change anything. You can avoid this by **NOT** hitting any of the three buttons at the bottom of the UI. We are only concerned with the final tab – Assets. Click on the Assets tab.
- All Assets must start from Model, so by looking at these settings, and working back from Model, we will be able to understand the Workflow.
- The Model is Imported to make up the Surface. The Surface is Imported to make up the Puppet. This is a Linear Flow:  
**Model->Surface->Puppet**
- The Components are being Imported instead of Referenced.
- Close the Preferences Window by clicking the **X** in the Upper Right corner to ensure that the any accidental changes made in the UI will not be applied.



## 5. Create Model Component For Snowman

This tutorial is assuming that your units are set to Centimeters. If they are not, the scale of your Snowman will be different than the scale of the existing Assets in this Show. This is not a Modeling tutorial, so a basic knowledge of modeling with Maya is also assumed.

- Start **Plumber** and set it to the **Assets** module.

- In the **Asset Library Browser**, set the **Asset Type** to “char.”
- Select the “snowman” entry in the **Asset Browse List**.
- In the **Asset Editor** area, select “Model” in the **Component Version Selection Area** by clicking in the round circle to the left of the word Model. Model is now the Active Component.
- The **Model Version Browser** is set to 000 because the only **Version** available is Version 000. When *any* Asset gets selected in the **Asset Browse List**, the Versions Browser for each Component will initially be set to the Highest/Most Recent Version.
- Editing a Component’s Version 000 is the way to **Initiate** work on a Component, so with the Model Component Active click the **EDIT** button.
- If you get a warning about having unsaved changes, either Cancel and save – if you wish – or press “YES” to continue. You will then get a warning about how there are no committed Versions for Model, so A New Maya Scene will be initiated.
- With History turned on in Maya, create three Polygon Spheres with these settings:

Radius: 60, Subdivisions Axis 24; Subdivisions Height 20

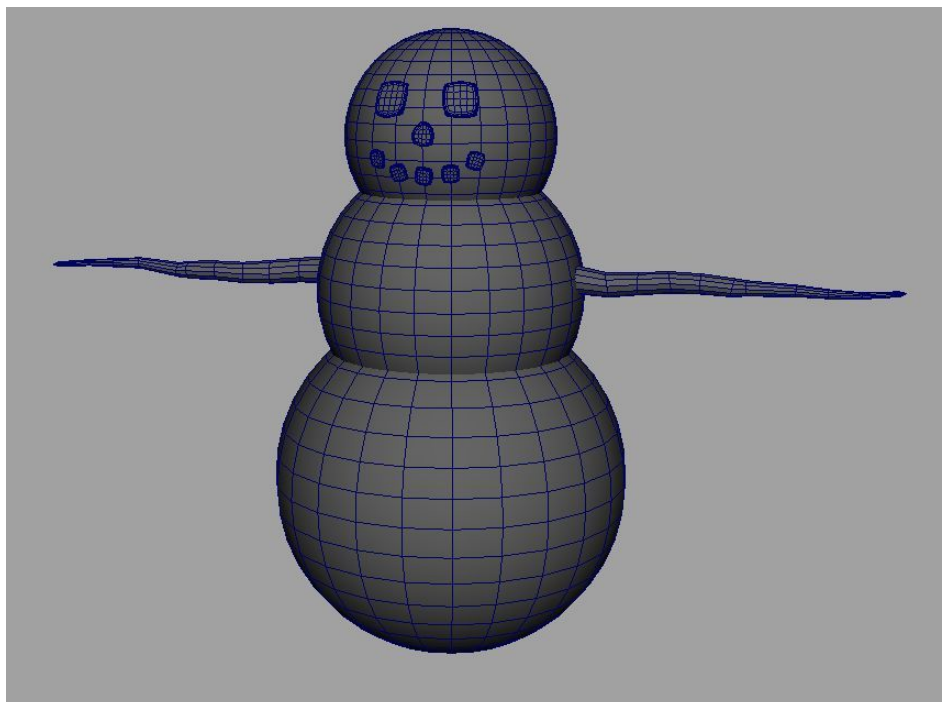
Radius: 45, Subdivisions Axis 24; Subdivisions Height 20

Radius: 35, Subdivisions Axis 24; Subdivisions Height 20

- Make two Polygon Cylinders with these settings:

Radius: 3, Height:100, Axis Div: 12, Height Div: 10, Axis: X

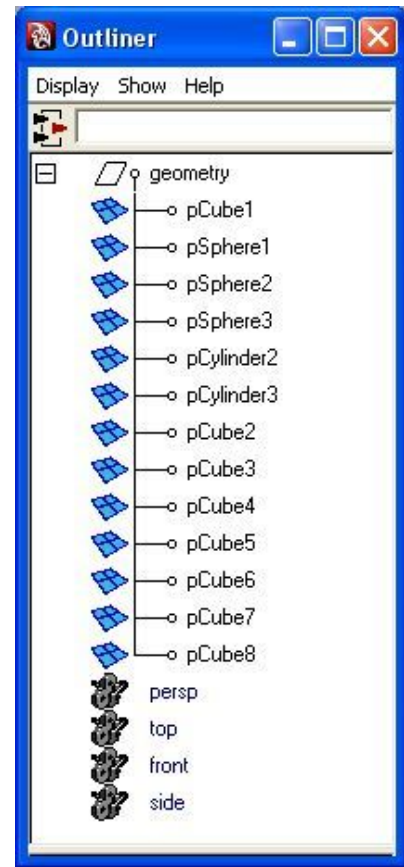
- Using the image as a guide, make a Snowman with the main body being made from the three spheres you created, and the arms out of the Polygon Cylinders. Add eyes, mouth and nose (they will be Coal, of course), along with any other





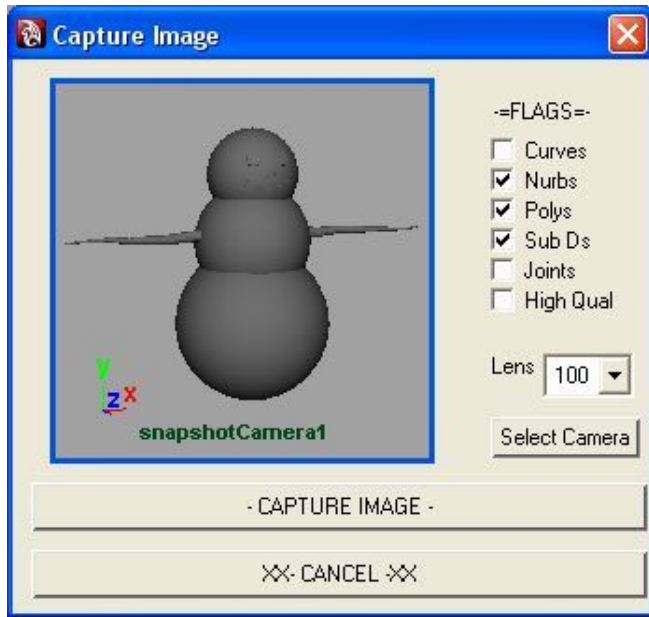
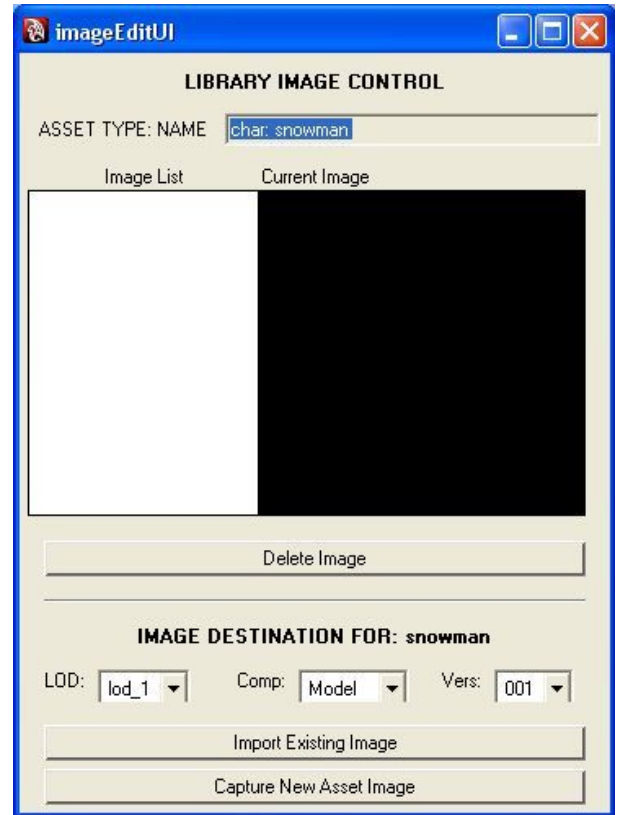
embellishments you want.

- Freeze the transformations on all of the objects, but do not delete History.
- We are almost ready to **Commit** the Model Component. When a Component is Committed, it becomes available for the other Components to use. In order to Commit the Model, however, we must first have everything we are planning to Commit in a single hierarchy.
- Group together all of the geometry that makes up your Snowman Model. I renamed the group node “geometry,” but you can call it anything you’d like. Now that everything is together it is time to Commit.
- Click the **Commit Version** button in the Asset Editor.
- You are prompted to enter some notes. These are the way you will be informing everyone (or yourself) about the Version of the Model you are Committing. You absolutely must enter a note, or the Commit will be Cancelled. When you have entered your note, press “OK.”



- A window will pop up, asking you to “Select the Object to Commit.” From the list, click on the object that is the top node of your Snowman hierarchy. Then press “Select.”
- The Snowman Model Component is now Committed. If you look at the available Versions for Model, you will see a Version 001, and that the Notes area is displaying the note you entered.
- To finish off the asset, we’ll add a Reference Image for it. With Snowman still as the active Asset, press the **Add/Edit Image** button to open up the Reference Image Library UI.

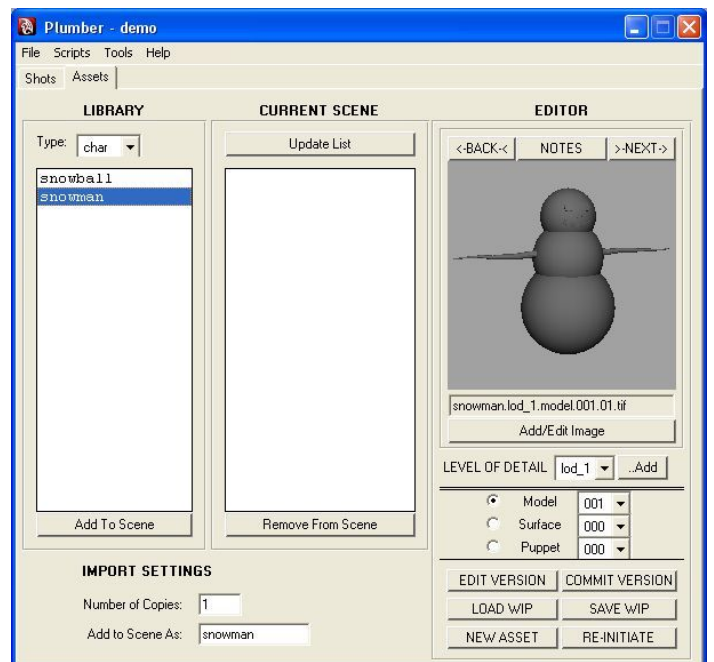
- In the **Image Destination Browser** area, choose **lod\_1**, **Model**, and **001**. Press **Capture New Asset Image**. This will bring up the Capture Image UI.



- In the **Capture UI**, compose an appropriate image using standard Maya camera hotkeys, and press **Capture Image**.

- Now, when you update the Asset Editor UI by clicking on Snowman in the Asset Library List, the newly captured image will display when Model version 001 is active.

We are now ready to make the Surface, the next step in creating our Puppet.





## 6. Create Surface Component For Snowman

- As per our workflow, this Component begins with a Model that gets imported to create the Surface. We need to begin the Surface by making Version 000 of the Surface Component Active.
- Click Edit Version for Version 000 of Surface. You may be warned about unsaved changes, but we've already Committed that version, so there is nothing we need to save.
- Unlike when we initiated the Model, Surface doesn't start from an empty scene. It imports the Model we just committed. The only difference is that the top node of the Model is actually a Group Node called "model." We're ready to make our Surface.
- In the Hypershade, create a White Lambert material with an incandescence of .25 .25 .36. Assign this to the Three main spheres. Create a Lambert that is almost black -- a Grey color set to .1 .1 .1 -- and assign this color to the lumps of coal for the eyes, nose and mouth.
- We now need to properly set up the UVs on the arms we made. Before we do this, we should delete the construction history on the arms, but it would be nice to be able to get back to this point without having to restart the surfacing again. We can accomplish this by saving a **WIP (Work In Progress)**. We do this by clicking the **Save WIP** button
- A WIP file has been saved. To make sure, check the script editor. The most recent feed back should be:

```
-----  
# Plumber Save Asset WIP #  
-----  
- Sourcing "C:/myProjects/Plumber/demo/data/mel/userDef/preSaveWip.mel"  
- Sourcing "C:/myProjects/Plumber/demo/data/mel/userDef/postSaveWip.mel"  
- WIP Saved: snowman_lod_1_surface.wip.001.ma
```

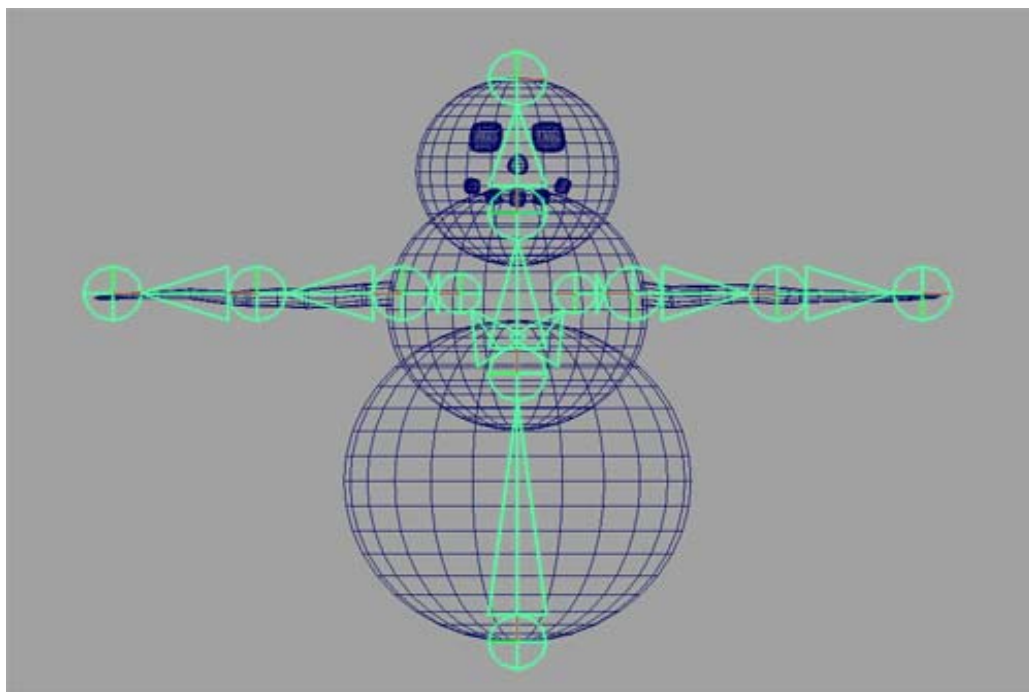
- Now, delete all history in the scene from:  
Maya>>Edit>> Delete All By Type>>History
- Click **Save WIP** again.
- Click the **Load WIP**, and you should see something like this image ---->
- We see both of the WIPs we just saved. Now, if we ever need to get back the construction history, we just need to load the first WIP, which you do by double-clicking on it in this UI.



- Set up the UVs on the arms using the UV Editor in Maya. Now create a material with an appropriate texture map, such as bark, and assign that material to the arms.
- Press the Commit Version button. Just like before enter a Note, then select the model node from the list, and then press OK. The Surface Component has now been Committed.
- We can now make a reference image for the Surface Component as we did with the Model, using the **Add/Edit Image** button.
- Make the destination **lod\_1**, **Surface**, and **001**. Press ok.
- Compose an image, but put the window in Texture shaded mode (hotkey “6”) before capturing the image.
- Now we can finally create the Puppet we need for production work.

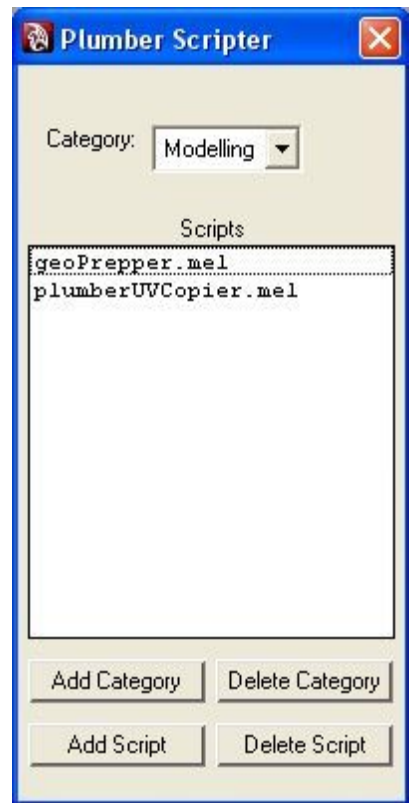
## 7. Create the Puppet Component For the Snowman

- Just like with the Model and Surface, let’s perform an Edit Version on the 000 Version to initiate a Component – this time, it being the Puppet. Select Puppet, and press Edit Version.
- You’ll see that now we have the Surface as the top node.
- We need a simple rig for this Puppet, so make a skeleton like the one in the image below. You can name the joints anything you want.



- While the skeleton is still it's own hierarchy, perform a Maya Export Selection. We'd like to be able to bring in this skeleton again on its own, because we are later going to make an additional LOD of the Snowman Asset. Make sure that when you Export it, that you do not save it in the Plumber Repository.
- We are going to have a common control hierarchy on all of our assets, and we are going to use a melscript to make it. There is a script called topNodes.mel in the **Xtras** directory where you Unzipped the PLUMBER.ZIP file used to install it. We are going to make that script a part of the repository.

- Got to the **Scripts** menu in the Plumber UI. There are two options, **Add Scripts** and **Modeling**. Choose **Add Scripts**. The **Scripter UI** should appear and look something like this.

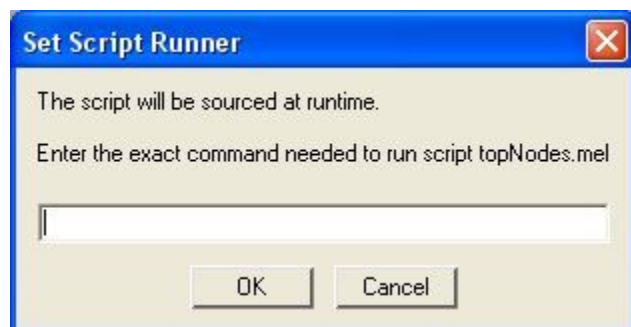


- The scripiter takes mel script tools you have written, or acquired, and brings them into a common place and lets you run them at the pressing of a button. A **Category** for Modeling already exists.. We will create a Rigging Category.

- Press the **Add Category** button.
- When prompted, type **Rigging** and then press OK. It might seem like nothing happened, but if click on the Category list box, you will see that a Rigging Category is ready for use. Select the Rigging Category.

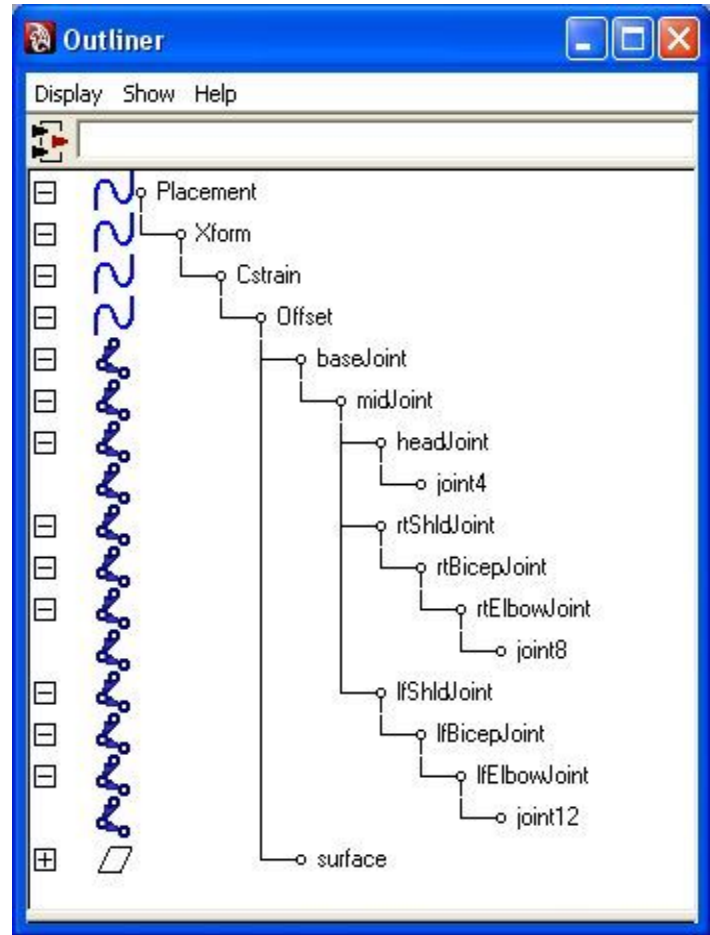
- The Scripts list will now be empty. Press the **Add Script** button. A file browser will come up. Browse to the **Xtras** directory and choose **topNodes.mel**.

- The **Set Script Runner** window will come up. This script only needs be sourced to run, but if an actual run command is needed, t his where you enter it. Multiple like statements can be separated by a “;” but for now, enter no text and press **OK**.



- The Scripiter now has topNodes.mel in its list. Close the Scripiter and go to the **Scripts** menu in the Plumber UI.
- There are now three options: Add Scripts, Modeling, and our newly created Rigging scripts category. If you choose the Rigging category, you will see that **topNodes** is available for us to use. It will be there everytime we run Plumber. Select **topNodes** to run it, and a base hierarchy will now appear in Maya.

- Take the Base joint of your skeleton and the **surface** node, and make them the child of the **Offset** node in the topNodes created control hierarchy. Depending on how you named your joints, your outliner should look something like this. →



- If you don't like the yellow color your geometry and joints are, **Enable Drawing Overrides** in Maya for the surface node, and for the base joint in your skeleton. You can now set the color of them to their default.

- Turn off **Inherit Transform** for the **surface** node. We are now going to bind the skin of our snowman.

- Bind the skin to the bones as you see fit. One joint per sphere, two joints for each of the arms, and face coal to the head.

- If you're happy with the way everything works, Commit the Puppet.

- Make a Reference Image for the Puppet using the **Edit/Add Image** button to bring up the UI. Set the destination to **LOD\_1, PUPPET, 001** and press **Capture New Image**.

- When the **Capture Image** window comes up, click on the **Joints** flag. The joints should now be visible, and will be included in the Reference Image. Feel free to use the other flags when you need them. Compose the image and press **Capture Image**.

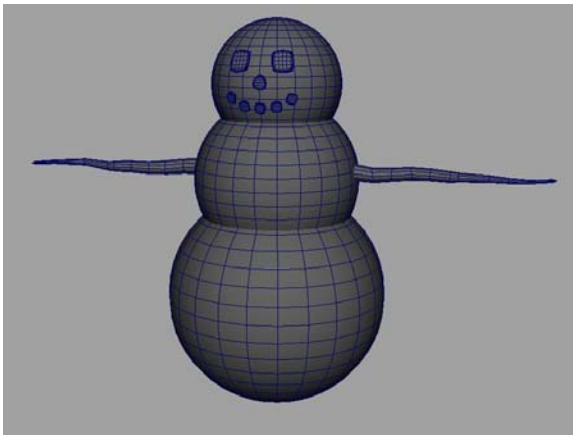
- **Congratulations**. You have now completed your first Plumber Asset.

## 8. Create the Second LOD of the Snowman

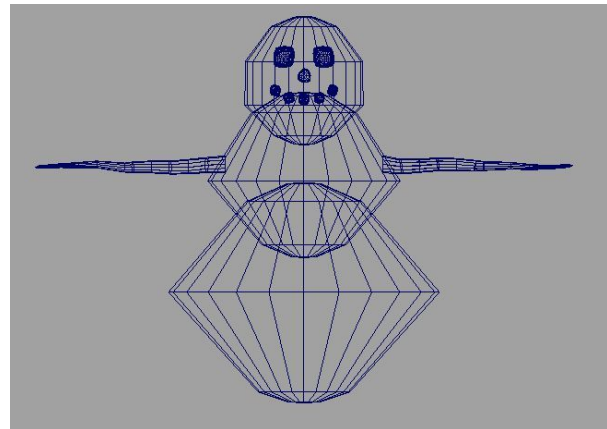
Frequently, one LOD is going to be all you need for Assets, but there are distinct advantages for using additional LODs. While our Snowman is not a heavy Model or Puppet in terms of geometry or controls, this will not always be true, especially for rigged characters. Creating a second LOD with lighter geometry and fewer deformers can make Production more efficient.

We will make a second LOD of our Snowman, and later, when we start **Shot Work**, we will use the Asset Spreadsheet to switch the LOD for Animation.

- In the Asset Library, make the Snowman Asset active by selecting it from the list. The Asset Editor should update, displaying all of the information for the Snowman.
- Try to select an LOD in the Asset Editor, and you can see that **lod\_1** is the only available LOD.
- Click the **..Add** button in the LOD area of the Asset Editor. You will be prompted for a name for your new LOD. Let's call it **lod\_A** for Animation. Press **OK**.
- Now, when you try to select an LOD, **lod\_A** is also available. Next we need to create a Model, Surface and Puppet for this new LOD in order to make it useable.
- To start, select **lod\_1**, and perform an **Edit Version** on the **Model**. Our Model of the snowman should load in our current Maya session. If you're having trouble, make sure that you are set to **lod\_1**, and not the newly created **lod\_A**.
- Using the polygon editing tools in Maya edit the three large spheres that make up the Snowman's body so they look significantly lighter.



Before



After

- Make sure that the entire Model is one hierarchy. Delete All History.
- Now, set the active LOD to **lod\_A**. and commit our slimmed Snowman as the Model.
- Depending on how you edited your Snowman, when you Commit this time you may not be prompted to select the top node for Committing. This is because there is already a model node as the top node of the hierarchy that was created when it was previously Committed. If there is a model node at the top, Plumber knows what you want to check in. This is also true of Surface and Puppet components, too.
- Create a Reference image for your model – make sure you set the Destination LOD to **lod\_A**.
- Remake our Surface in **lod\_A** using our new Model. With **lod\_A** active, select the Surface component in the Asset Library, and edit. The newly slimmed version will be loaded. Apply the shaders you want, and then commit it. Make a Reference Image.
- For the Puppet to properly transfer animation back and forth after we switch LODs during shotwork, the Animated nodes and controls in each LOD must be named the same. This is why we performed the Export Selection of the skeleton we made.
- Initiate our Puppet in **lod\_A** by performing an Edit Version of Version 000 of the Puppet.
- Import the skeleton we previously Exported – make sure that you are not using namespaces, or renaming on Import.
- From the Plumber Scripts Menu, run Rigging>>topNodes.
- Take the Base joint of your skeleton and the **surface** node, and make them children of the **Offset** node in the topNodes.
- Bind the Snowman to the skeleton and, when you're ready, Commit the Puppet to **lod\_A**, make a Reference Image, and you have finished making **lod\_A** for the Snowman Asset.



## 9. Set Assets: Creating Tundra

Now that all of our Assets have been created, it's time to start bringing them in together. According to our Storyboards and our Asset Plan, we needed Sky, Igloo, Ground, Mountain, Snowball and Snowman. By browsing the Asset Types in the library you can see that these Assets are all in the Asset Library.

While some are Envirs (Environment), and others are Props or Chars, these are merely different labels. In other words, we could have made our Snowman as a Prop instead of a Char and there would be no difference in how it gets created or how it can be used. Having different Types is merely an organizational tool for the Library and for the Spreadsheet – as you'll see later.

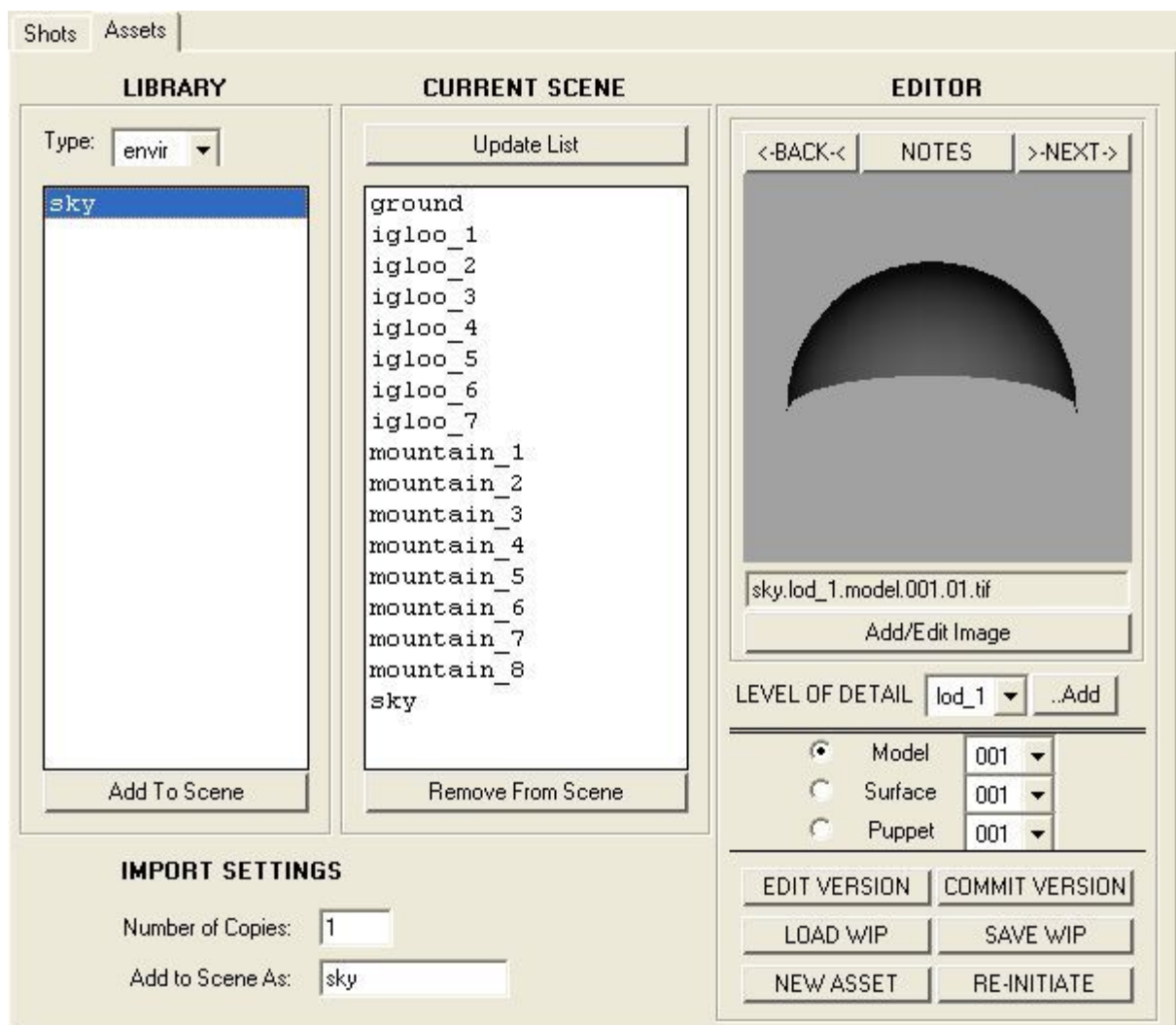
The one exception, however, is the **Set** Asset type. A Set Asset is a collection of other Assets that act as a one Asset. This is a very powerful production option that can save a tremendous amount of time and resources.

If a Set Asset is being used in 10 shots, and the director wants a change in the way the set laid out – changing the position of an Igloo, for example – you may have to fix 10 shots for continuity. However, if the change is made in the Set Asset in the Asset Library, all of the shots with that Set Asset will be updated automatically.

We will bring in our Igloos, Mountains, Ground and Sky and create one Set Asset called Tundra, and then later we will show one reason why sets are powerful.

- In the Asset Editor Area, press the **New Asset** button.
- In the New Asset Window, make sure you choose **Set** as the type of Asset. Name the asset **Tundra** and then press **Make Asset Placeholder**.
- In the Asset Library, change the Type to Set, and then select “Tundra.” Notice that in the **Asset Editor** area, the **Model** and **Surface** Components are greyed-out and inactive. Set Assets are made up of previously created Assets. The only Component a Set has is a Puppet.
- Step one of making a Set is to bring in the other assets. We will make the Tundra out of eight Mountains, seven igloos, one ground and one sky.
- In the Asset Library, change the Type to Prop and select **Mountain**.

- In the **Import Settings Area** at the bottom left of the UI set the **Number of Copies** to 8 (eight). Press the **Add To Scene** button.
- There are now eight instances of the Mountain asset in Maya, as you can see by the **Current Scene Asset List**. The Current Scene list updates when you add an Asset, remove an Asset, and when you press the **Update List** button. It is probably best to update the list whenever you have need to see what Assts are in your scene, just to be sure that the list is correct.
- Now, bring in 7 (seven) instances of the **Igloo** Asset by selecting it and changing the Import Settings and pressing **Add to Scene**.
- We now need to bring in one copy each of the **Ground** and **Sky**.
- Select the Ground Asset, and press Add To Scene. Change the Asset Type to Envir and add the Sky to the current scene. Your Plumber Current Scene Asset List should look like this:

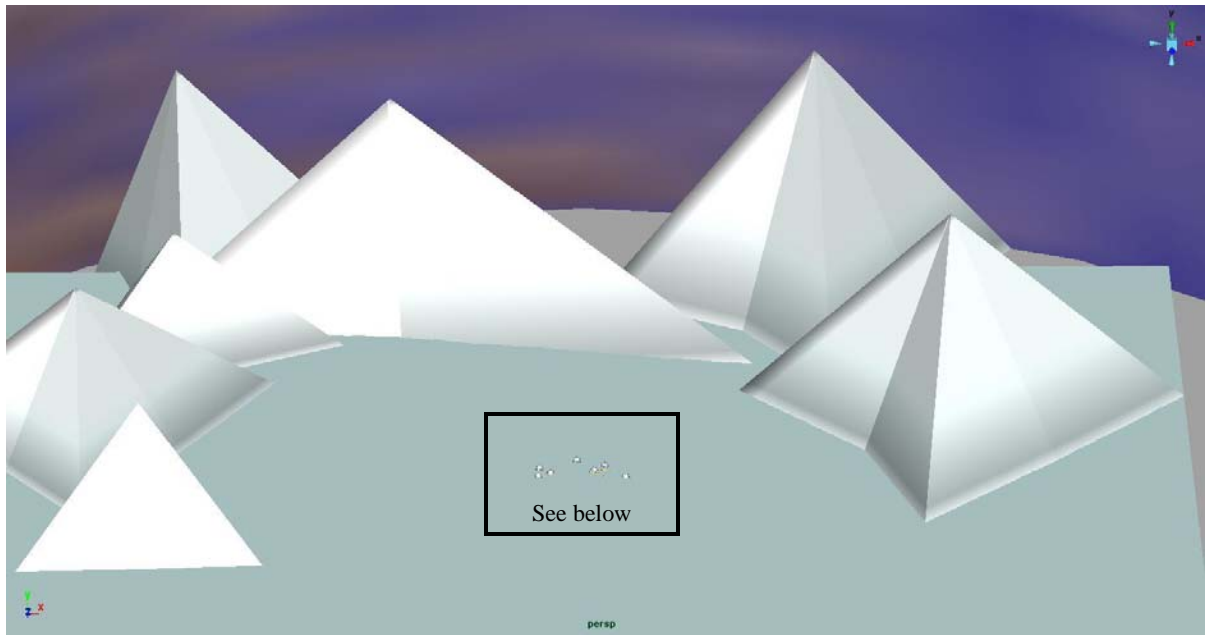


- Actually, we only need 7 Mountains to build the set as needed, so select mountain\_8 in the Current Scene list. Press the Remove From Scene button at the bottom of the list. Mountain\_8 is now completely gone from our scene. It is now time to position the Assets in Maya.
- There is a mel script in Xtras called **placementSelector.mel** that will make it easier to select the Placement nodes of our Assets. Use **Add Scripts** from the Plumber Scripts menu, and add it to an existing Scripts Category, or create a new Scripts Category to add the script to. There is no extra command to enter, the script only needs to be sourced.
- After you install **placementSelector**, run it. It will bring up a small window listing all of the Placement nodes in the scene. Click on one to select it.
- Now using the **Placement** nodes, either duplicate the setup pictured below the text box, or (**Preferably**) cut and paste the lines in the text box below in the Maya mel script editor and run it.

```

setAttr ground:Placement.scale 15 1 15;
setAttr igloo_1:Placement.translate -129.7457727 0 -352.4978422;
setAttr igloo_1:Placement.rotate 0 -77.13166011 0;
setAttr igloo_2:Placement.translate -1195.838723 0 -2127.39764;
setAttr igloo_2:Placement.rotate 0 31.24302719 0;
setAttr igloo_3:Placement.translate 530.5297931 0 -1162.595902;
setAttr igloo_3:Placement.rotate 0 -115.2353931 0;
setAttr igloo_4:Placement.translate -2882.011836 0 82.26665866;
setAttr igloo_4:Placement.rotate 0 63.40859519 0;
setAttr igloo_5:Placement.translate -3549.020013 0 -720.567958;
setAttr igloo_5:Placement.rotate 0 9.301384503 0;
setAttr igloo_6:Placement.translate -3648.035208 0 610.3185909;
setAttr igloo_6:Placement.rotate 0 104.0017792 0;
setAttr igloo_7:Placement.translate 1797.815389 0 755.5840089;
setAttr igloo_7:Placement.rotate 0 47.79793293 0;
setAttr mountain_1:Placement.translate -26393.26097 0 -23126.80786;
setAttr mountain_1:Placement.rotate 0 -36.07390362 0;
setAttr mountain_1:Placement.scale 131.7308625 77.32553029 131.7308625;
setAttr mountain_2:Placement.translate 14352.51104 0 -29524.17369;
setAttr mountain_2:Placement.rotate 0 130.6778493 0;
setAttr mountain_2:Placement.scale 170.35796 174.742268 170.35796;
setAttr mountain_3:Placement.translate -11345.54825 -3129.644758 -27332.39538;
setAttr mountain_3:Placement.rotate 11.35176302 -187.14213 5.688734748;
setAttr mountain_3:Placement.scale 349.9377635 174.4134788 101.6136618;
setAttr mountain_4:Placement.translate 22265.49053 0 -6345.012569;
setAttr mountain_4:Placement.rotate 0 114.8271695 0;
setAttr mountain_4:Placement.scale 203.6931989 147.6488612 165.5718651;
setAttr mountain_5:Placement.translate -28560.05772 0 12019.81714;
setAttr mountain_5:Placement.rotate 0 -58.49246354 0;
setAttr mountain_5:Placement.scale 112.5710002 93.38653599 89.83617316;
setAttr mountain_6:Placement.translate -23572.71137 -1493.198691 -34830.55021;
setAttr mountain_6:Placement.rotate -8.711892237 -6.566884806 10.79515551;
setAttr mountain_6:Placement.scale 155.6366438 155.6366438 155.6366438;
setAttr mountain_7:Placement.translate -32492.33901 0 -5128.798425;
setAttr mountain_7:Placement.rotate 0 132.6252441 0;
setAttr mountain_7:Placement.scale 149.0697487 106.6114789 169.2276658;

```

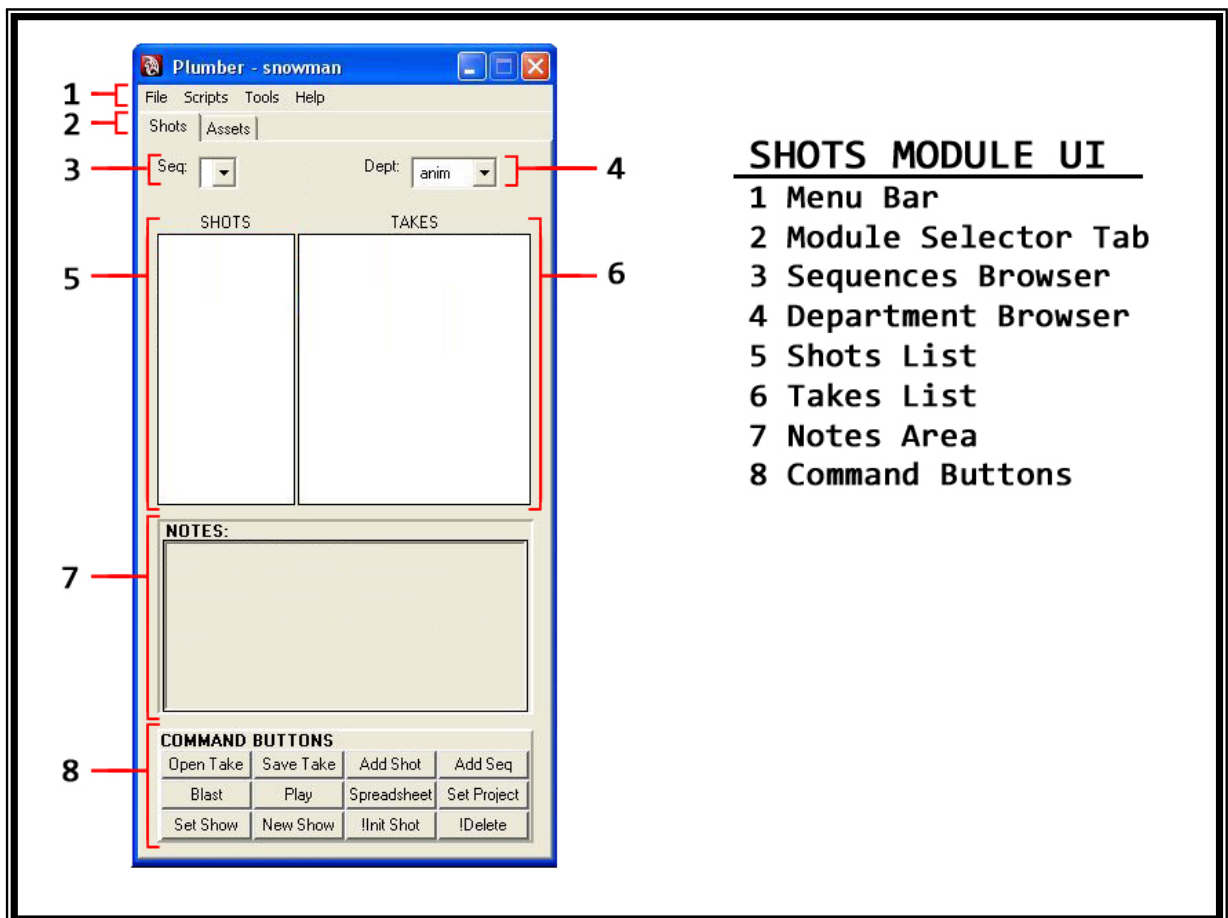


- When you are happy with the way the scene looks press Commit Version for the Puppet of the Tundra Set.
- After you enter a note, the “Select Assets” window will come up. This time you must select all the assets you want to be a part of the Set Asset. Select everything on the list, except the Persp, Top, Front and Side cameras. Then click **Select**.
- If you look at the Outliner in Maya, there is now a Puppet node that is the parent of all of the other Assets.

- Perform a New Scene in Maya to get rid of everything. Then select the Tundra asset in the Asset Library and press “Add To Scene.”
- You can now see in the Current Scene List that there is only one asset listed, Tundra, and but as you can see in Maya, all of our Assets have loaded. We will later show you what you can do with Set Assets.
- Open up the Outliner. You can see that the Tundra Puppet has a Puppet node as the top of the hierarchy. Unlike the top nodes of the other Asset types, the Puppet node of Set Assets allows you to translate, rotate and scale the Set as is needed.
- Finally, if you examine the Sky Asset in the Tundra set, you’ll notice that there are some lights integrated into the Asset. An Asset can be anything you can get out of Maya – geometry, lights, particle systems, etc. Anything can be part of an Asset.

## 10. Performing Shot Work With Plumber

- We can now finally perform shot work for our Snowfight scene. Open Plumber (if not already open) and set it to the Shots Module. The UI will look very much like this:



- As our sample sequence is three shots long, we need to set up three **Shots** in the Plumber Shots module. Shots can only reside in a **Sequence**, which we need to create. Press the **Add Seq** button in the **Command Buttons** area. Call the new sequence **Snowfight** and press OK.
- The **Sequence Browser** should now have Snowfight listed as a Sequence. We will now make three Shots in Snowfight. Press the **Add Shot** button in the **Command Buttons** area. When prompted create Shot **0010** for the first shot. Making shot 1 as shot 10 is a naming convention in many studios. It allows for new shots to be easily inserted between existing ones. Shot 0005 can go between 0000 and 0010, while your choices are limited with inserting between shot 0000 and 0001..
- After a brief moment, Plumber will update with Shot 0010 added. Now make Shots **0020** and **0030**, as well.
- Starting from a New Scene in Maya, bring in the Tundra, Snowman and Shotcam Assets (Set, Prop and Prop) from the **Assets Module**. Use the Shotcam as the main camera for your production.
- Change back to the **Shots Module**. Set the **Department** to **Layout**. Press the **Save Take** Command Button. At the prompt enter some notes about this Take. Since this is the first Take, the Assets will be in their Default positions, make note of this and press OK.
- The Takes list will update, and when the new Take is selected, the Take Notes becomes visible in the Notes area.
- Set the start frame in Maya to 101 and the end frame to 172. By keying only the Shotcam, compose shot 1 (0010) as per the story boards for frame 101, and compose the end position for frame 172, or simply cut and paste from the text box below to save time.



- ```
playbackOptions -min 101 -max 172;
currentTime 101 ;
setAttr "shotcam:camera.translateX" 0;
setAttr "shotcam:camera.translateY" 3156.063;
setAttr "shotcam:camera.translateZ" 16599.708;
setAttr "shotcam:camera.rotateX" -0.60;
setAttr "shotcam:camera.rotateY" 0;
setAttr "shotcam:camera.rotateY" 0;
setAttr "shotcam:camera.rotateY" 0;
setAttr "shotcam:camera.rotateZ" .0;
setAttr "shotcam:cameraShape.focalLength" 028.0;
setAttr "shotcam:cameraShape.nearClipPlane" 1000;
setAttr "shotcam:cameraShape.farClipPlane" 90000;
setKeyframe "shotcam:camera.tx";
setKeyframe "shotcam:camera.ty";
setKeyframe "shotcam:camera.tz";
setKeyframe "shotcam:camera.rx";
setKeyframe "shotcam:camera.ry";
setKeyframe "shotcam:camera.rz";
setKeyframe "shotcam:cameraShape.fl";
setKeyframe "shotcam:cameraShape.nearClipPlane";
setKeyframe "shotcam:cameraShape.farClipPlane";
currentTime 172 ;
setAttr "shotcam:camera.translateY" 2256.775 ;
setAttr "shotcam:camera.translateZ" 11922.325 ;
setKeyframe "shotcam:camera.tx";
setKeyframe "shotcam:camera.tz";
```

- Press the Save Take Command button and enter a note to the effect that the Layout has been completed, and press OK.
- Select the most recently saved Take for shot 0010. In Maya, tap the Spacebar to enlarge the viewport with the Shotcam view. Now, press the **Blast** command button. A playblast will be created of the current shot and viewport. The Playblast will be saved and linked to the take that is selected in the Plumber UI. If there is already a playblast associated with the Take, it will be overwritten. The Maya Script Editor will provide feedback about the Playblast that was just created.
- To review the Blast we just made, press the **Play** Command Button. This will play the Playblast associated with the currently selected take in the Plumber Shots UI.
- Switch to the Assets Module, and bring in the Snowball Asset (char). Switch back to the Shots Module and browse to Shot 0020. Using the Storyboards as a guide, layout the shot camera and character blocking, or use the text below in the script editor. You may want to adjust the Keyframe tangents to make it look more polished.

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <pre> playbackOptions -min 101 -max 172; currentTime 101 ; setAttr "shotcam:camera.translateX" -7.9710; setAttr "shotcam:camera.translateY" 198.1830; setAttr "shotcam:camera.translateZ" 1344.9690; setAttr "shotcam:camera.rotateX" -2.40; setAttr "shotcam:camera.rotateY" 0; setAttr "shotcam:camera.rotateZ" 0; setAttr "shotcam:cameraShape.focalLength" 45.0; setAttr "shotcam:cameraShape.nearClipPlane" 100; setAttr "shotcam:cameraShape.farClipPlane" 90000; setKeyframe "shotcam:camera.tx"; setKeyframe "shotcam:camera.ty"; setKeyframe "shotcam:camera.tz"; setKeyframe "shotcam:camera.rx"; setKeyframe "shotcam:camera.ry"; setKeyframe "shotcam:camera.rz"; setKeyframe "shotcam:cameraShape.fl"; setKeyframe "shotcam:cameraShape.nearClipPlane"; setKeyframe "shotcam:cameraShape.farClipPlane"; currentTime 142 ; setAttr "shotcam:camera.translateX" -7.9710; setAttr "shotcam:camera.translateY" 179.9630; setAttr "shotcam:camera.translateZ" 1050.4360; setAttr "shotcam:camera.rotateX" -2.40; setKeyframe "shotcam:camera.tx"; setKeyframe "shotcam:camera.ty"; setKeyframe "shotcam:camera.tz"; setKeyframe "shotcam:camera.rx"; currentTime 132 ; setAttr "snowball:Placement.translateX" -734.0540; setAttr "snowball:Placement.translateY" 188.4940; setAttr "snowball:Placement.translateZ" 32.1840; setKeyframe "snowball:Placement.tx"; setKeyframe "snowball:Placement.ty"; setKeyframe "snowball:Placement.tz"; setKeyframe "snowball:Placement.rx"; </pre> | <pre> setKeyframe "snowball:Placement.ry"; setKeyframe "snowball:Placement.rz"; setKeyframe "snowball:Placement.sx"; setKeyframe "snowball:Placement.sy"; setKeyframe "snowball:Placement.sz"; currentTime 138 ; setAttr "snowball:Placement.translateX" -21.4920; setAttr "snowball:Placement.translateY" 168.883; setAttr "snowball:Placement.translateZ" 32.184; setKeyframe "snowball:Placement.tx"; setKeyframe "snowball:Placement.ty"; setKeyframe "snowball:Placement.tz"; currentTime 142 ; setAttr "snowball:Placement.translateY" 191.368; setKeyframe "snowball:Placement.ty"; currentTime 148 ; setAttr "snowball:Placement.translateX" -51.447; setAttr "snowball:Placement.translateY" 3.039; setAttr "snowball:Placement.translateZ" 103.131; setKeyframe "snowball:Placement.tx"; setKeyframe "snowball:Placement.ty"; setKeyframe "snowball:Placement.tz"; currentTime 166 ; setAttr "snowman:headJoint.rotateX" 0; setAttr "snowman:baseJoint.rotateX" 0; setAttr "snowman:midJoint.rotateX" 0; setKeyframe "snowman:headJoint.rx"; setKeyframe "snowman:baseJoint.rx"; setKeyframe "snowman:midJoint.rx"; currentTime 172 ; setAttr "snowman:headJoint.rotateX" -15.424; setAttr "snowman:baseJoint.rotateX" -15.424; setAttr "snowman:midJoint.rotateX" -15.424; setKeyframe "snowman:headJoint.rx"; setKeyframe "snowman:baseJoint.rx"; setKeyframe "snowman:midJoint.rx"; </pre> |
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- Save a new Take for the Layout department of Shot 0020. Then make a Blast of this scene while the new Take is selected in the UI.
- For Shot 0030, we need another copy of the Snowman. We also forgot to bring it into shot 0010, so we will update the Set Asset Tundra. Switch to the Asset Module and press Edit Version for the Tundra Puppet.
- Bring in one instance of the snowman, but in the Import Settings area, change the name to “thrower.” When Thrower is in the scene, make “thrower:puppet” the child of the main puppet node of the Tundra set. Next, move the Thrower by cutting and pasting the text below in the Script Editor in Maya:

```

setAttr "thrower:Placement.translate" -2561.783 0;
setAttr "thrower:Placement.translateZ" -121.073;
setAttr "thrower:Placement.rotateY" 89.64;

```

- Commit the updated Tundra set, and switch to the Shots Module. Browse to the Layout Department of Shot 0010 and open the highest numbered Take. Thrower is now in this scene, too. Save a new take of 0010 and Blast it. We need Thrower in Shot 0010 for consistency.

- Now, delete the keyframes on the shotcam. Position the camera and animate the Snowman and Thrower as per the storyboards, or cut and paste the text below in the Script editor

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <pre> playbackOptions -min 101 -max 172; currentTime 101 ; setAttr "shotcam:cameraShape.nearClipPlane" 0.6; setAttr "shotcam:cameraShape.nearClipPlane" 1; setAttr "shotcam:cameraShape.focalLength" 45; setKeyframe "shotcam:cameraShape.fl"; setAttr "shotcam:camera.translateX" 191.617; setAttr "shotcam:camera.translateY" 179.064; setAttr "shotcam:camera.translateZ" 121.063; setAttr "shotcam:camera.rotateX" -5.4; setAttr "shotcam:camera.rotateY" 71.6; setAttr "shotcam:camera.rotateZ" 0; setKeyframe "shotcam:camera.tx"; setKeyframe "shotcam:camera.ty"; setKeyframe "shotcam:camera.tz"; setKeyframe "shotcam:camera.rx"; setKeyframe "shotcam:camera.ry"; setKeyframe "shotcam:camera.rz"; setAttr "snowman:headJoint.rotateX" -6; setAttr "snowman:baseJoint.rotateX" -6; setAttr "snowman:midJoint.rotateX" -6; setKeyframe "snowman:headJoint.rx"; setKeyframe "snowman:baseJoint.rx"; setKeyframe "snowman:midJoint.rx"; currentTime 108 ; setAttr "snowman:headJoint.rotateX" -19.492; setAttr "snowman:baseJoint.rotateX" -19.492; setAttr "snowman:midJoint.rotateX" -19.492; setKeyframe "snowman:headJoint.rx"; setKeyframe "snowman:baseJoint.rx"; setKeyframe "snowman:midJoint.rx"; currentTime 140 ; setKeyframe "tundra:thrower:rtShldJoint.rz"; setKeyframe "tundra:thrower:baseJoint.rz"; setKeyframe "tundra:thrower:midJoint.rz"; setKeyframe "tundra:thrower:headJoint.rz"; setKeyframe "tundra:thrower:lfShldJoint.rz"; setKeyframe "tundra:thrower:lfBicepJoint.rz"; setKeyframe "tundra:thrower:lfElbowJoint.rz"; </pre> | <pre> setKeyframe "tundra:thrower:rtElbowJoint.rz"; setKeyframe "tundra:thrower:rtBicepJoint.rz"; setKeyframe "tundra:thrower:headJoint.rx"; setKeyframe "tundra:thrower:baseJoint.rx"; setKeyframe "tundra:thrower:midJoint.rx"; currentTime 148 ; setKeyframe "tundra:thrower:rtShldJoint.rz"; setKeyframe "tundra:thrower:baseJoint.rz"; setKeyframe "tundra:thrower:midJoint.rz"; setKeyframe "tundra:thrower:headJoint.rz"; setKeyframe "tundra:thrower:lfShldJoint.rz"; setKeyframe "tundra:thrower:lfBicepJoint.rz"; setKeyframe "tundra:thrower:lfElbowJoint.rz"; setKeyframe "tundra:thrower:rtElbowJoint.rz"; setKeyframe "tundra:thrower:rtBicepJoint.rz"; setKeyframe "tundra:thrower:headJoint.rx"; setKeyframe "tundra:thrower:baseJoint.rx"; setKeyframe "tundra:thrower:midJoint.rx"; setAttr "tundra:thrower:rtElbowJoint.rotateZ" -26.111; setAttr "tundra:thrower:rtBicepJoint.rotateZ" -26.111; setAttr "tundra:thrower:baseJoint.rotateZ" 4.536; setAttr "tundra:thrower:midJoint.rotateZ" 4.536; setAttr "tundra:thrower:headJoint.rotateZ" 4.536; setAttr "tundra:thrower:lfBicepJoint.rotateZ" 30.756; setAttr "tundra:thrower:lfElbowJoint.rotateZ" 45.311; setAttr "tundra:thrower:headJoint.rotateX" 1.08; setAttr "tundra:thrower:baseJoint.rotateX" 1.08; setAttr "tundra:thrower:midJoint.rotateX" 1.08; setKeyframe "tundra:thrower:headJoint.rx"; setKeyframe "tundra:thrower:baseJoint.rx"; setKeyframe "tundra:thrower:midJoint.rx"; setKeyframe "tundra:thrower:rtShldJoint.rz"; setKeyframe "tundra:thrower:baseJoint.rz"; setKeyframe "tundra:thrower:midJoint.rz"; setKeyframe "tundra:thrower:headJoint.rz"; setKeyframe "tundra:thrower:lfShldJoint.rz"; setKeyframe "tundra:thrower:lfBicepJoint.rz"; setKeyframe "tundra:thrower:lfElbowJoint.rz"; setKeyframe "tundra:thrower:rtElbowJoint.rz"; setKeyframe "tundra:thrower:rtBicepJoint.rz"; </pre> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

- Browse to shot 0030, Layout Department, save a new Take and Blast the shotcam. We have now completed Layout on our Snowfight short.

## 11. Performing Animation

- In most studio workflows before a shot is sent to the Animation department it is simplified to make it easier for the animator. We will use the Asset Spreadsheet accomplish this, as well as making a second LOD of our Tundra set.
- Go back to the Asset Module, and perform an **Edit Version** on the Tundra Puppet. After it is loaded, add a new LOD called **“lod\_A”** using the **...add** button.
- Go back to the Shots browser and press the **Spreadsheet** Command Button. The Asset Spreadsheet UI will appear:

Plumber Spreadsheet

| CHAR    |           |       |                                            |            |
|---------|-----------|-------|--------------------------------------------|------------|
| Name    | component | LOD   | Load Status                                | Base Asset |
| thrower | puppet    | lod_1 | <input checked="" type="checkbox"/> Loaded | snowman    |

| ENVIR |           |       |                                            |            |
|-------|-----------|-------|--------------------------------------------|------------|
| Name  | component | LOD   | Load Status                                | Base Asset |
| sky   | puppet    | lod_1 | <input checked="" type="checkbox"/> Loaded | sky        |

| PROP       |           |       |                                            |            |
|------------|-----------|-------|--------------------------------------------|------------|
| Name       | component | LOD   | Load Status                                | Base Asset |
| ground     | puppet    | lod_1 | <input checked="" type="checkbox"/> Loaded | ground     |
| igloo_1    | puppet    | lod_1 | <input checked="" type="checkbox"/> Loaded | igloo      |
| igloo_2    | puppet    | lod_1 | <input checked="" type="checkbox"/> Loaded | igloo      |
| igloo_3    | puppet    | lod_1 | <input checked="" type="checkbox"/> Loaded | igloo      |
| igloo_4    | puppet    | lod_1 | <input checked="" type="checkbox"/> Loaded | igloo      |
| igloo_5    | puppet    | lod_1 | <input checked="" type="checkbox"/> Loaded | igloo      |
| igloo_6    | puppet    | lod_1 | <input checked="" type="checkbox"/> Loaded | igloo      |
| igloo_7    | puppet    | lod_1 | <input checked="" type="checkbox"/> Loaded | igloo      |
| mountain_1 | puppet    | lod_1 | <input checked="" type="checkbox"/> Loaded | mountain   |
| mountain_2 | puppet    | lod_1 | <input checked="" type="checkbox"/> Loaded | mountain   |
| mountain_3 | puppet    | lod_1 | <input checked="" type="checkbox"/> Loaded | mountain   |
| mountain_4 | puppet    | lod_1 | <input checked="" type="checkbox"/> Loaded | mountain   |
| mountain_5 | puppet    | lod_1 | <input checked="" type="checkbox"/> Loaded | mountain   |
| mountain_6 | puppet    | lod_1 | <input checked="" type="checkbox"/> Loaded | mountain   |
| mountain_7 | puppet    | lod_1 | <input checked="" type="checkbox"/> Loaded | mountain   |

- We are going to make a version of the Tundra set that has all of the unneeded Assets **Unloaded**, and we will switch the Thrower LOD to the **lod\_A** we created. When any Load Choice changes are made with the spreadsheet, they will be saved within the take when a new take is saved.
- For every Asset listed **EXCEPT** Thrower, Ground, Igloo\_1, and Igloo\_4, **Uncheck** the **Load Status** to **Unload** the Assets from the Set.

**NOTE:** If you manually placed your assets, as opposed to cutting and pasting the text into the Script Editor, you will probably have different assets you need to unload. Just keep the Igloo behind the Snowman, the Igloo behind the Thrower, the Ground, and the Thrower Assets.

- For the Thrower, set the LOD to **lod\_A**. In Maya you can see that the Set is much lighter than it was before, and that the Thrower has been replaced by the simpler version.
- Commit this Puppet to the **lod\_A** of Tundra. Now, switch back to the Shots Module and open the most recent Take for Layout in shot 0020.
- After it is loaded, start the Spreadsheet. Set the LOD of the Set Tundra to **lod\_A**. The set should now switch to the lighter version. Next, switch the LOD of the Snowman to **lod\_A** too. This shot is now ready for animation. Switch Departments to the Anim department and save the first take with the note “Initial save for Animation.”
- Browse to shot **0030 Layout** and start up the Spreadsheet. Switch the same Assets to the same LODs as we did for shot 0020, and save a new take in **0030 Anim** with the same “Initial save for Animation” note. All the shots that need to be prepped for animation are ready (Shot 0010 has no need of animation).
- This is not an animation tutorial, but feel free to animate these shots a little, save a few takes and make some playblasts. It will help you become more comfortable with the Takes-First Playblast-Second workflow.
- One trick to working with this Take/Blast system effectively is to Save a take and Blast it. If you are not happy with the way the shot is, make some changes and Save Over the take by doing a Maya Save (ctrl-s) NOT a *Save As*. Make a new Blast, overwriting the previous one, and see if you like it. When you hit a point that you are satisfied do a Maya Save (ctrl-s) if necessary. Now the Take is in synce with the Blast.

## 12. Lighting and Rendering

- Once you're happy with the way your shots are animated it's time to Prep for Lighting with the Spreadsheet. For each shot set the Tundra, the Thrower, and the Snowman to **lod\_1** from **lod\_A** (if you previously changed them), and save an Initial Take in **Lighting**. Now all of the Assets are at their most detailed LOD for Rendering.
- There are lights that are part of the Tundra Set, so we can just render our shots. There are many different ways to light shots with Plumber. Here are a few examples.
  1. Specific Lights Come In With Each Asset  
There could be a lighting LOD, for example, and in that LOD each asset has lights to allow the Chars to have a lighting rig that excludes all else. Set Assets could have their own exclusive lighting, as well.
  2. Create a Asset that is specifically a Lighting Rig:  
You can tweak your lighting however you see fit. The settings can be determined by lighting a key shot, and then the Library Asset can be updated so all the shots have the same starting point.
  3. Lighting exists only within Takes  
Lights specifically exist only in the Take files in the Lighting Department. They may be placed into the Maya session via special mel tools.
- To render our shots, browse to **0010 Lighting** Open the latest Take. Open up the Render Globals in Maya. The default render directory is already set to a path like this:

C:/myProjects/Plumber/demo/prod/seqs/Snowfight/0010/lighting/images

The file path name is also defaulting to:

Snowfight\_0010\_lighting\_001.iff

When Plumber performs an **Add Shot** it creates a Maya Project for every department and saves a Maya Workspace. This allows for all of the Maya file types to default to a directory within the Shot/Department directory structure within the Plumber Show. This assists with organizing Renders, but you will probably have your own workflows and tools to use within the Plumber system. For our Snowfight Project, we will merely start a Batch Render for each of our Shots.

Our resolution (Full HD) has been set by the Preferences, as has been the size of our Playblasts. The only things we need to really change are the start frame, end frame (make sure you set Maya to render a



sequence!) and Renderable Camera (make it the Shotcam.) After these are set, save a new Plumber take before you initiate your Batch Render.

- When all of your shots are done rendering, load the image sequences into your favorite Editing or Compositing program, and create an .avi, .mov or .mpg file.

**CONGRATULATIONS – YOU HAVE FINISHED YOUR  
FIRST PROJECT WITH THE PLUMBER PRODUCTION  
PIPELINE SYSTEM. KUDOS TO YOU, SIR OR MADAM!**