**Shading Outline**

**Hotkeys**

* 5: flat shaded mode
* 6: texture shaded mode
* 7: texture and lighting preview mode

**Tips:**

* Many of the shaders you’ll use will look similar, but you might want them to have different attributes. Make sure you name ALL of your shaders something descriptive. Example: window\_mat, table\_mat, etc.
* Using separate texture files for color, bump, and spec can give you increased control in achieving your desired surface.

**Shading Basics**

* Shading tells Maya what type of surface an object has and how it reacts with light
* Shader:
  + Set of properties that defines the material of the model’s surface
  + Determines how the material reacts to light.
  + Includes color, shininess, transparency, and more
* Texture:
  + One attribute of a shader
  + An image mapped to a 3D object
  + Can change things like color and pattern, but also things like depth and roughness
* Shaders and textures **are NOT the same**!
* Shaders have material attributes
  + Common ones are translucence (light absorbed & diffused), transparency (light passed through), etc
* Lambert
  + Lambert1 is default
  + NEVER CHANGE THIS
  + Matte (not shiny), flat shader
* Phong
  + Sharp highlights; good for shiny things (ceramic, glass, etc)
* Blinn
  + Broad highlights; metallic and plastic surfaces
  + Similar to Phong, but calculated differently

**The Hypershade**

* Click on the blue circle or go to **Windows → Rendering → Hypershade**
* Browser:
  + All materials that exist in your scene are here
* Material viewer:
  + Gives you a glimpse of what the shader looks like unrendered
  + Can switch to rendered view, but **not recommended**
* Node Editor:
  + This is what makes up your shader
  + Looks scary, but once you know the basics it’ll be fine
  + Each node adds something different
  + Ie: Surface Shader node tells Maya what kind of surface the object has

**Rendering**

* A render is a mathematically calculated representation of your scene using shading and lighting
* Use mental ray! Other renderers exist, but don’t worry about them.

**Demo**

* Glass cup:
  + **Right Click** → **Add New Material** → **aiStandardSurface**
  + Name the shader something descriptive and adjust Transmission, IOR
* Milk:
  + **Right Click** → **Add New Material** → **aiStandardSurface**
  + Name it something descriptive
* Lampshade:
  + Open the **Hypershade**
  + **Create → aiStandardSurface**
  + **2D Textures → Ramp**, link **Ramp** to **aiStandardSurface**
  + Select lampshade in viewport → **Right Click** the aiStandardSurface node→ **Assign Texture’s Material to Viewport Selection**
* Oreos:
  + Make an **aiStandardSurface**
  + Attribute Editor → Geometry → Bump mapping **→** Select **oreo\_bump\_map.tiff**
  + Play around with bump depth
* Plate:
  + Make an **aiStandardSurface**
  + Attribute Editor → Geometry → Bump Mapping → Select **plate\_bump.jpg**

**Terms**

**Material / Shader:**

* Defines the substance of an object’s surface. Materials give your objects varying qualities of color, transparency, shine, reflection, etc.

**Procedural Texture:**

* A texture generated completely within Maya.

**File Texture:**

* A Texture defined by an image file.

**Projection mapping:**

* This mapping technique projects the texture through 3D space like a slide projector. When you create a projected 2D texture, it behaves like a 3D texture (it has height, width, and depth).

**3D Texture:**

* Usually a procedural texture that projects through an object. 3D textures can be moved rotated and scaled interactively in a scene.

**Place 2D Texture Node:**

* A Maya utility that contains the placement information Maya uses to map a texture onto an object.

**Place 3D Texture Node:**

* A Maya utility that contains the placement information Maya uses to map a 3D texture onto an object.

**Shading Group:**

* A collection of materials, textures, and lights that describe all the necessary attributes required to shade or render an image.

**Ramp:**

* A highly useful 2D texture that allows for color gradient creation and manipulation.

**Layered Shader:**

* A variable shader container that is made up out of layers of other shaders. It’s similar to layering in Photoshop- so it’s actually recommended to do the layering in Photoshop and save it as a single texture.

**Color:**

* The main color of the material texture.

**Color Balance:**

* Corrects the color or intensity of a texture.

**Color Gain:**

* The scaling factor applied to the texture’s outColor channel. For example, you can color-correct a texture that appears too green by setting the Color Gain to a shade of blue. The default color is white (no effect).

**Default Color:**

* If you map a texture to a material in such a way that it that does not cover the entire surface, the file node’s Default Color shows through. To select a different color, click the color bar to open the Color Chooser. To change the texture’s coverage, use the placement options.

**Color Offset:**

* Offset factor applied to the texture’s outColor channel. For example, you can brighten a texture that appears too dark by setting the Color Offset to a shade of gray. The default color is black (no effect).

**Alpha Gain:**

* Only has an effect if the texture is used as a bump or displacement. Scaling factor applied to the texture’s outAlpha channel. The default value is 1 (no effect).

**Alpha Offset:**

* Only has an effect if the texture is used as a bump or displacement. Offset factor applied to the texture’s outAlpha channel. For example, if the Alpha Gain value is -1 and the Alpha Offset value is 1, the outAlpha channel is inverted. The default value is 0 (no effect).

**Filter:**

* Applies a selected amount of blur to your texture. Filter is useful to reduce flickering or aliasing in final renders. If the highest amount of clarity is needed, turn this off.

**Ambient Color:**

* As the Ambient Color becomes lighter, it affects the material’s Color by lightening it and blending the two colors. If there are ambient lights in the scene, the color and brightness of those lights is used to control how much the ambient color contributes to the final color of the material.

**Incandescence:**

* Simulates the color and brightness of light that a material appears to be emitting. (Incandescent objects do not illuminate other objects in Maya Software Renderer.)

**Bump:**

* Also known as Bump-map, bump mapping makes the surface appear rough or bumpy. A bump map does not actually alter the geometry of the surface. Bump Depth controls the intensity of the effect.

**Diffuse:**

* Gives the material the ability to reflect light in all directions. The Diffuse value acts like a scaling factor applied to the Color setting—the higher the Diffuse value, the closer the actual surface color is to the Color setting.

**Specular:**

* The bright highlight on a material. Often indicates the shiny or glossiness of an object. Also reveals the location of the main source of light. Also known as “hot spots”

**Eccentricity:**

* Controls how big your specular highlights (also called 'hot spots') will be. The range is 0 to 0.9999, with larger values making larger highlights. Smaller values make objects appear more finely polished.

**Specular Roll Off:**

* controls the ability of a surface to reflect its surroundings (the environment, other objects, or the Reflection Map, if any), when viewed at wide angles.

**Translucence**

* The materials ability to transmit and diffuse light. Simulates the absorption of light.

**Intro to Photoshop Resources**

*These are very basic introduction resources to Photoshop. Helpful if you have never used Photoshop before*:

[Learn the basics of Photoshop in 25 minutes](http://www.lifehacker.com.au/2011/02/learn-the-basics-of-photoshop-in-under-25-minutes/)

[Intro to Photoshop PDF](http://it.rockefeller.edu/pdf/documentation/photoshop.pdf)

[Intro to Photoshop CS4 Video](http://www.youtube.com/watch?v=GIJ_QlBLM_M)