STUDY MATERIAL

MEDIA (415)

JOB ROLE: Texturing Artist

(QUALIFICATION PACK: Ref. Id. MES/Q2503)

CLASS – X

Media & Entertainment Skills Council

CONTENT:

Unit 1: Surfaces and Materials

1.1 Main menu bar of 3D software (character's and objects that are developed on 3D)

Basics

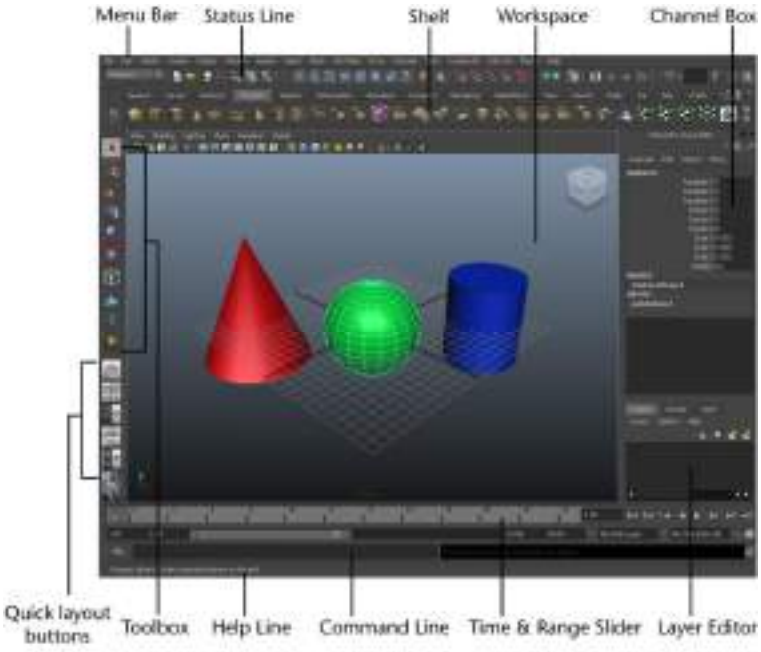
Maya is the premier application for creating compelling 3D digital content, including models, animation, visual effects, games, and simulations.

The work you do in Maya generally falls into these categories:

- Creating models. Polygons, Non-Uniform Rational B-Splines (NURBS), and subdivision surfaces are different object types with different ways of modeling. Each has its own strengths, and different artists prefer working with different types.
  - Polygons let you model a surface by building up and reshaping a number of simple surface facets.
  - NURBS let you easily create smooth, curving surfaces with high-level control.
  - Subdivision surfaces let you edit surfaces at a high level with minimum overhead data, while still letting you work with subsections of the surface as if they were made from polygons.
- Character rigging. Most animations involve ñcharacters,ò articulated models such as a person, an animal, robot, or anything else that moves by articulation. Maya lets you define internal skeletons for characters and bind skin to them to create realistic movement with deformation.
- Animation. Just about everything you can think of in Maya is keyable or able to be animated.
- Dynamics, fluids, and other simulated effects. Maya includes a comprehensive suite of tools for simulating real world effects such as fire, explosions, fluids, hair and fur, the physics of colliding objects, and more.
- Painting and paint effects. Maya includes an incredible system for using a graphics tablet (or the mouse) to paint 2D canvases, paint directly on 3D models, paint to create geometry, scriptable paint, and virtually limitless other possibilities.
- Lighting, Shading, and Rendering. When you want to render a still image or movie of your scene or animation, you can create them using your choice of renderers.

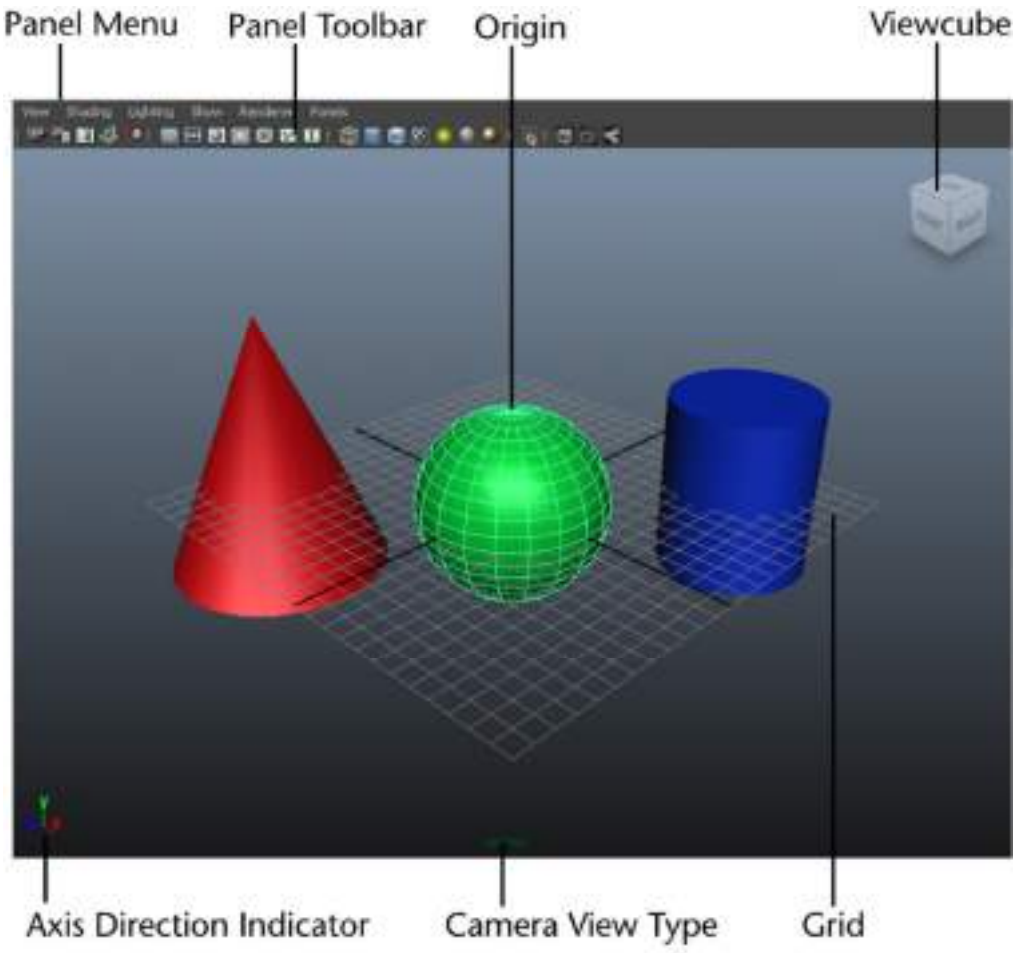
Now that Maya is running, you first need to understand what you are seeing. There are a lot of items displayed in the Maya user interface.

The best way to begin is to learn the fundamental tools and then learn additional tools as you need them. Begin by learning some of the main tools.



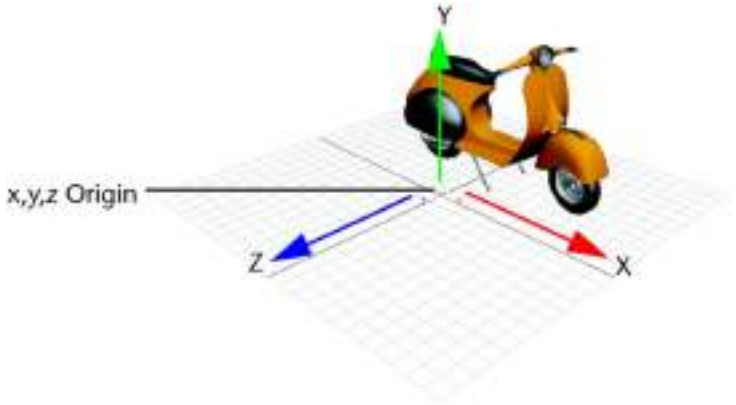
The Maya workspace

The Maya workspace is where you conduct most of your work within Maya. The workspace is the central window where your objects and most editor panels appear.



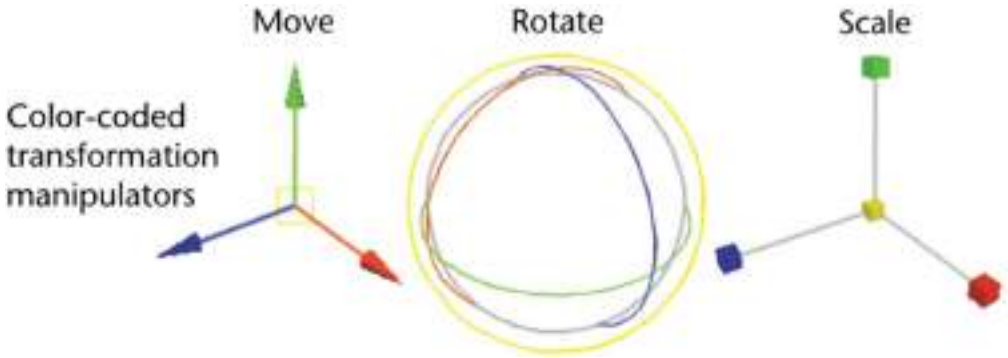
When you start Maya for the first time, the workspace displays by default in a perspective window, or *panel*. There are the other components of the default perspective view panel:

- The panel is labeled *persp* at the bottom to indicate that you are viewing the Maya scene from a perspective camera view.
- The panel has its own menu bar at the top left corner of the panel. These menus allow you to access tools and functions related to that specific panel.
- The grid is displayed with two heavy lines intersecting at the center of the Maya scene. This central location is called the *origin*. The origin is the center of Mayaôs 3D world, and with all objectôs directional values measured from this location.



In Maya, like many other 3D applications, the three dimensions are labeled as the X, Y, and Z axes. The origin is located at X, Y, Z position of 0, 0, 0. The grid also lies along the X, Z plane. We refer to this as a *plane* because you might visualize an imaginary, flat, two-dimensional square laying along this 3D position.

Maya labels the X, Y, and Z axes with a color scheme: red for X, green for Y, and blue for Z. Many tools that you use in Maya use this color scheme to indicate that you are accessing a particular item that relates to X, Y, and Z in some way.



The axis indicator shows in which direction, X, Y, or Z, you are viewing the Maya scene. The axis indicator is color coded in the red, green, and blue color scheme and appears in the lower left corner of a view panel.

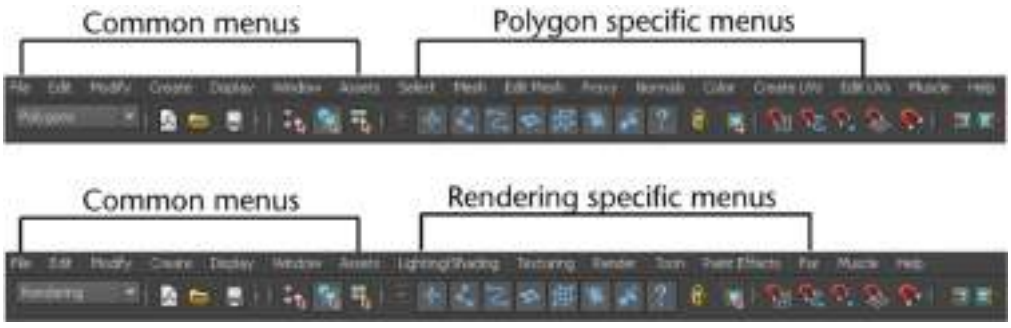
This is extremely useful if you are new to 3D, as many of the instructions in this manual and the Maya Help assume you know where you are viewing the scene in relation to the X, Y, Z axes.

Main Menu bar

Tools and items are accessible from pull down menus located at the top of the user interface. In Maya, menus are grouped into menu sets. These menu sets are accessible from the Main Menu bar.

The Main Menu bar appears at the top of the Maya interface directly below the Maya title bar and displays the chosen menu set. Each menu set corresponds to a *module* within Maya: Animation, Polygons, Surfaces, Rendering, and Dynamics. Modules are a method for grouping related features and tools.

You switch between menu sets by choosing the appropriate module from the menu selector on the Status Line (located directly below the Fileand Edit menus). As you switch between menu sets, the right-hand portion of the menus change, but the left-hand portion remains the same; the left-hand menus are common menus to all menu sets. The left-hand menus contain File, Edit, Modify, Create, Display, Window, and Assets.



To select a specific menu set

1. On the Status line, select Animation from the drop-down menu.

   The Main Menu changes to display the menu set that relates to the Animation module. In particular, menu titles such as Animate, Deform, Skeleton, Skin, and so on, appear.
2. Using the menu selector, choose Polygons from the drop-down menu.

   The main menu changes to display the menu set for Polygons. Menu titles such as Select, Mesh, Edit Mesh, and so on, appear.

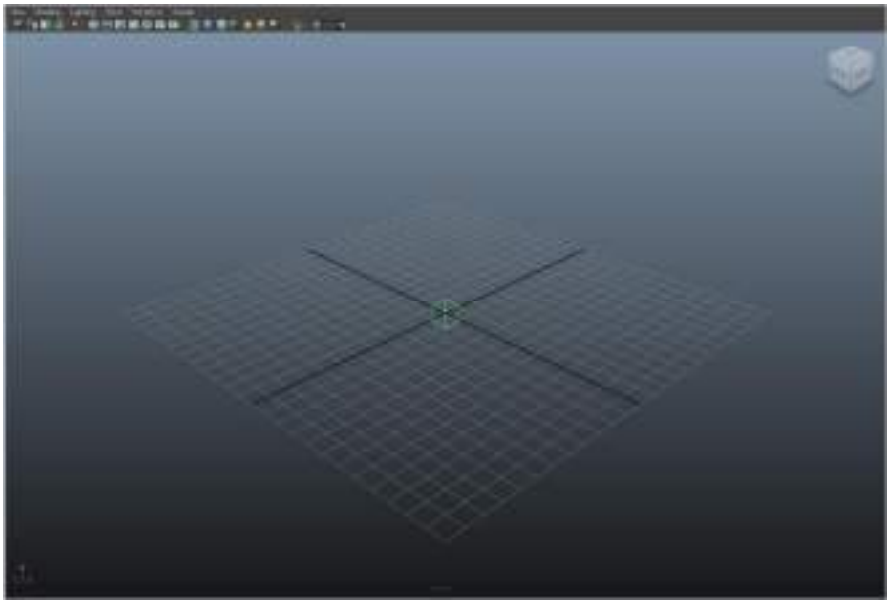
   For now, leave the menu set at Polygons. You will use this set in the next step.

To create a primitive 3D object from the Polygons menu set

1. Select Create > Polygon Primitives > Interactive Creation and ensure that a check mark does not appear beside this item.

   For this lesson, you wonâ€˜t use this option.
2. From the Main Menu Bar, select Create > Polygon Primitives > Cube.

   Maya creates a 3D cube primitive object and places it at the center (origin) of the Maya workspace.

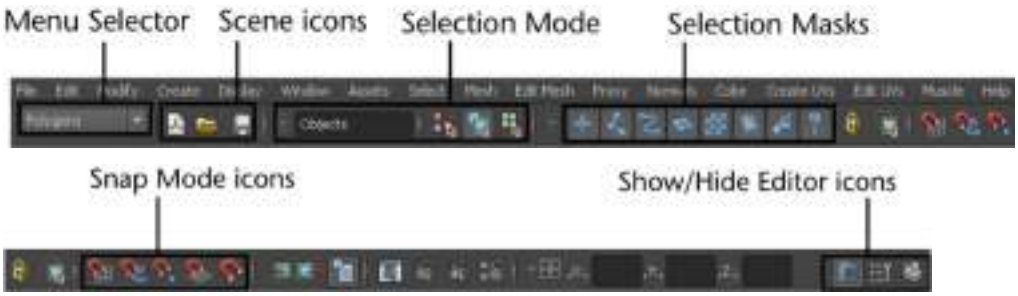


Status Line

The Status Line, located directly below the Main Menu bar, contains a variety of items, most of which are used while modeling or working with objects within Maya. Many of the Status Line items

are represented by a graphical icon. The icons save space in the Maya interface and allow for quick access to tools used most often.

In this lesson, you learn about some of the Status Line areas.



You've already learned the first item on the Status line: the Menu Selector used to select between menu sets.

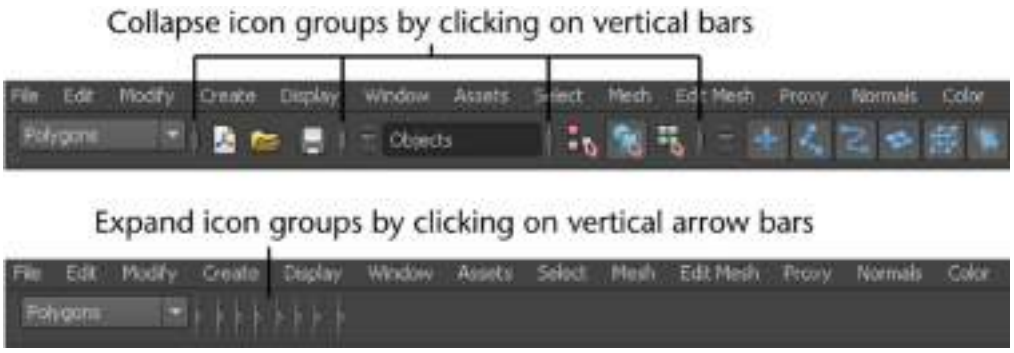
The second group of circled icons relate to the scene and are used to create, open, and save your Maya scenes.

The third and fourth group of buttons are used to control how you can select objects and components of objects. You will learn more about selection of objects in later lessons.

The fifth group of icons are used to control the Snap Mode for objects and components. You will begin to use these tools in a later lesson in this chapter.

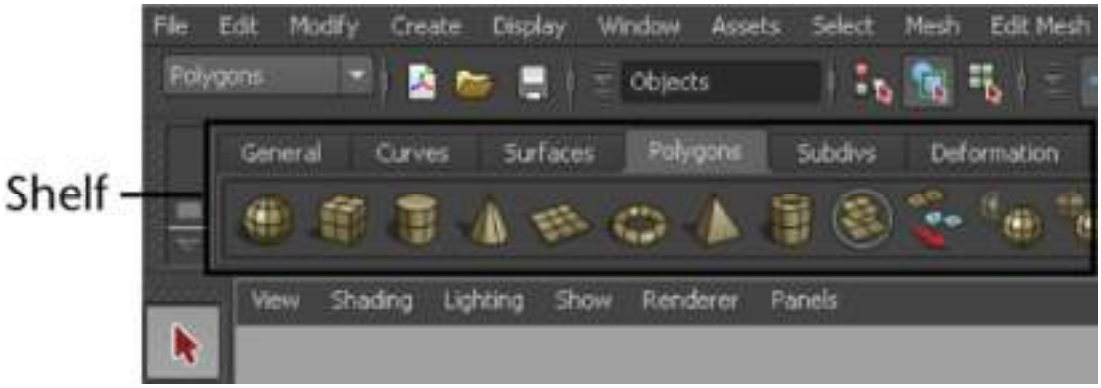
The last section comprise three buttons that are used to show or hide editors, including the Attribute Editor, Channel Box, Layer Editor, and Tool Settings. The default display shows the Channel Box and the Layer Editor. When you create an object, like the cube for example, information about that object displays in these editors. You will learn how to use these editors later in this chapter.

For better organization on the Status Line, all of the icon buttons are broken into groups that you can expand and collapse, as shown.



Shelf

The Shelf is located directly below the Status line. The Maya Shelf is useful for storing tools and items that you use frequently or have customized for your own use. You can keep the tools and items you use most frequently in a location that provides handy access. Maya has some of the Shelf items pre-configured for your use.



To create an object using a tool from the Shelf

1. From the Shelf, select the Surfaces tab in order to view the tools located on that shelf.

2. Select Create > NURBS Primitives > Interactive Creation to ensure that a check mark does not appear beside the item.

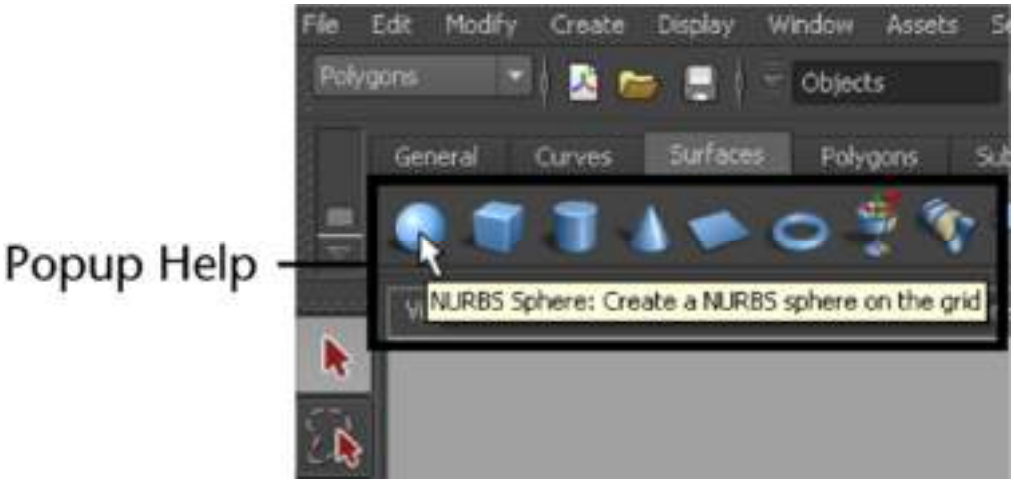
   For this lesson, you wonôt use this option

3. From the Shelf, select the NURBS sphere icon located at the left end by clicking on it.

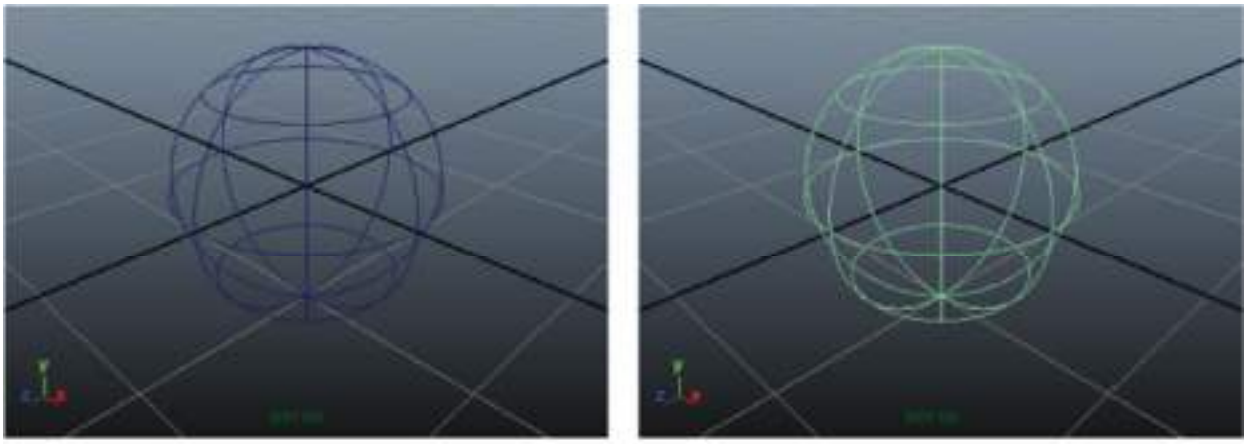
   Maya creates a sphere primitive object and places it at the center of the Maya workspace in the same position as the cube.

   TIP:

   You can determine if this is the correct tool prior to choosing it by first placing your mouse cursor over the icon, the name or description of it appears in a popup window directly over it.

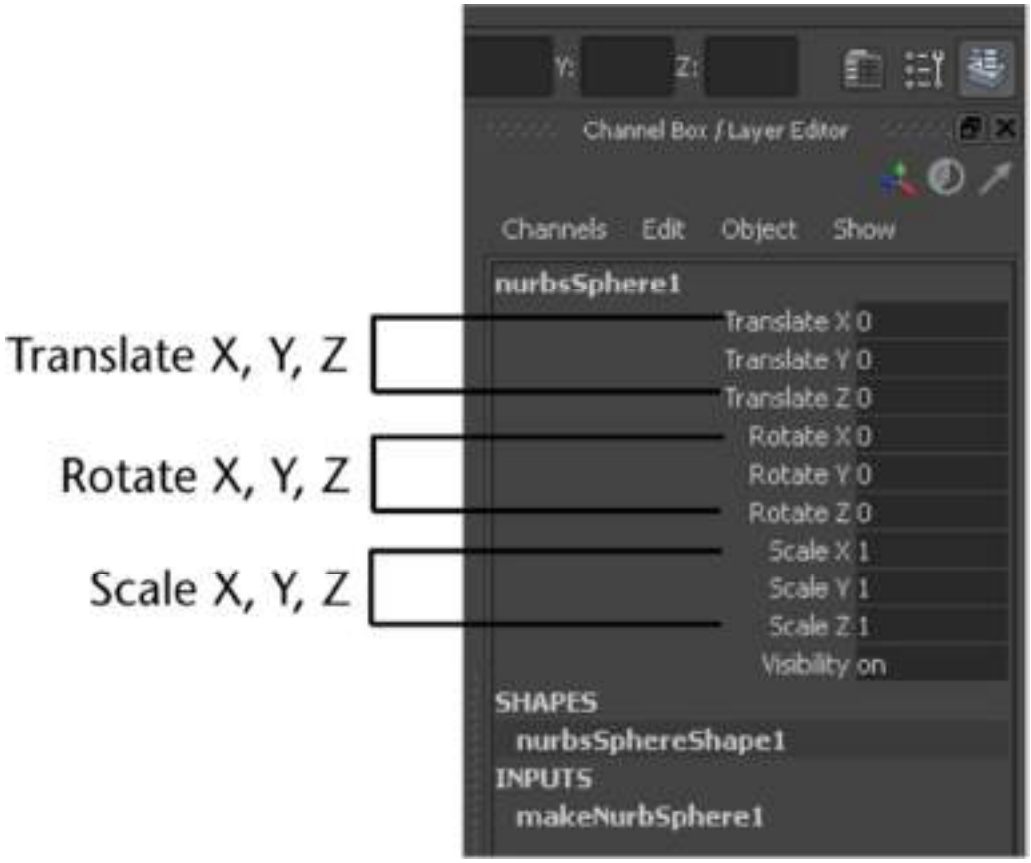


In your scene view the wireframe outline of the cube you created earlier in the lesson has changed color to navy blue, and the sphere is displayed in a bright green color. The sphere is now the *selected* object and the cube is no longer selected. In Maya, when the object displays like this, we refer to it as being *selected* or *active*.



Selection of objects and components is a way of indicating to Maya that this particular item is to be affected by the tool or action you will subsequently choose. As you work with Maya, you will be selecting and deselecting items a lot. You will learn how to select and deselect objects later in this chapter.

Some numerical information appears in the *Channel Box* editor on the right hand side of the user interface. This information relates to X, Y, and Z, translation, rotation, and scaling for the active object. The X, Y, and Z Translate numerical values are currently set to 0. This indicates that the sphereôs location is at the origin. The Channel Box is useful for viewing and editing this type of basic information. You will use the Channel Boxlater in this chapter.



To hide or show the Channel Box

1. To hide the Channel Box, click the Show/Hide Channel Box icon from the right end of the Status line.

   The Channel Box disappears, and the perspective scene view expands slightly. With the Channel Box hidden, you have more working area in your scene view.

2. To show the Channel Box, click the Show/Hide Channel Box icon on the Status line. The Channel Box appears in the scene view.

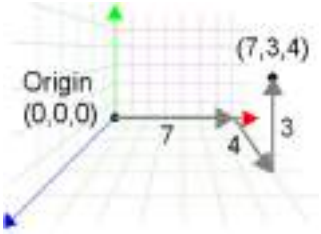
Texture Artists are responsible for the creation of textures, colours and organic surface qualities required for computer-generated creatures and hard-surface models used in production. Texture Artists work closely with Modelers and Look Development Artists to create photo-real assets for high end visual effects films.

3D coordinates

The most basic visual entity is the point. The point has no size, but it has a location.

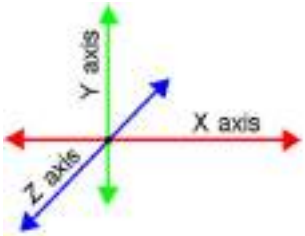
To determine the location of points, we first establish an arbitrary point in space as the origin.

We can then say a pointôs location is so many units left (or right) of the origin, so many units up (or down) from the origin, and so many units higher (or lower) than the origin.



These three numbers give us the 3D coordinates of the point in space. For example, a point 7 units right (x), 4 units down (z), and 3 units above (y) the origin has the XYZ coordinates (7,4,3).

To specify points on the opposite side of the origin, we use negative numbers. In the example, a point at (-5, -2, -1) would be 5 units left of the origin, 2 units up, and 1 unit below.



In computer graphics, we donôt really say the point is ñleft/rightò, ñup/downò, or ñhigher/lowerò. Instead we call the three dimensions the X axis, the Z axis, and the Y axis.

Y-up and Z-up

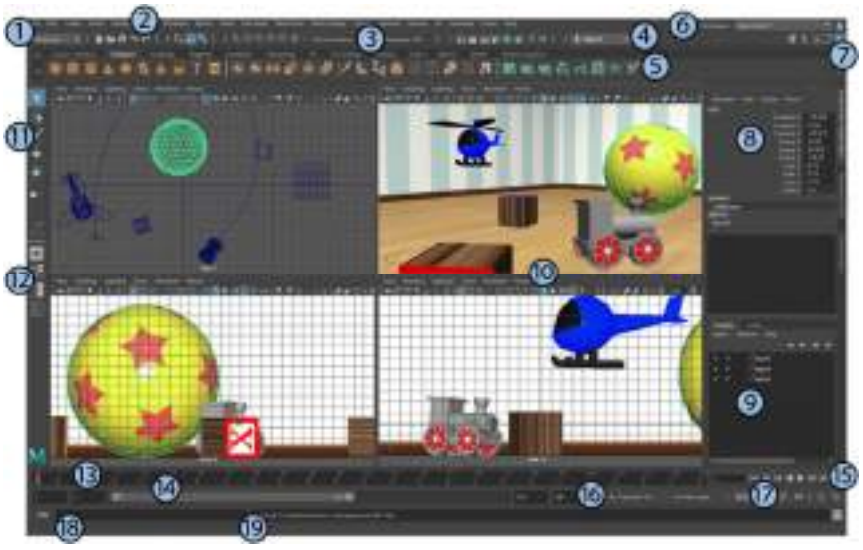
In animation and visual effects, the tradition is to use Y as the ñupò or elevation axis, with X and Z as the ñgroundò axes. However, some other industries traditionally use Z as the up axis and X and Y as the ground axes.

In Maya, you can switch the up axis between Y and Z.
Select Windows > Settings/Preferences > Preferences, then click Settings in the left pane. For more information, see Settings preferences.

Interface overview

This section is a brief summary of the main Maya interface. Numbered headings below refer to the numbered interface elements in the figure.

- If you can't find the menu you're looking for, it may be that the correct menu set is not open - see Menus and menu sets. You can also choose Help > Find Menu and enter the name of menu or command you're looking for.
- You can show or hide elements (panels) in the main window using the Windows > UI Elements menu.
- You can hide all the interface elements to maximize viewing space and instead use the quick command features: the hotbox, Maya Hotkeys, and Marking menus.
- You can resize most panels by dragging their edges when a double-headed arrow cursor appears.
- You can rearrange the panels to suit your preferences by docking them in different areas of the Maya window. For more information, see Dock and undock windows and panels.
- To zoom in on the view under the mouse pointer, such as the View Panel or Graph Editor, press Shift + Spacebar. This collapses all other panes docked in the main window. If the mouse pointer is over a floating window or another part of the interface, such as the Channel Box or Tool Settings, it affects the last view you clicked in. Press Shift + Spacebar again to restore the previous viewing configuration.
- For a full-screen view of the pane with the focus, press Ctrl + Spacebar. This works the same way as Shift + Spacebar for zoom-in view, but it also hides UI elements such as the Status Line, Shelf, Time Slider, and so on. Press Ctrl + Spacebar again to restore the previous viewing configuration.



1. Menu Sets

Menu sets divide the type of menus available into categories: Modeling, Rigging, Animation, FX, and Rendering. Maya's first seven menus on the main menu are always available, and the

remaining menus change depending on the menu set you choose. See Menus and menu sets for information.

2. Menus

The menus contain both tools and actions for working in your scene. The main menu is that the top of the Maya window. There are also individual menus for the panels and option windows. You can also access the menus in the main menu in the hotbox, which you can open by holding down the space bar in a view panel. See Menus and menu sets for information.

3. Status Line

The Status line contains icons for some commonly-used general commands, such asFile > Save, as well as icons for setting up object selection, snapping, rendering, and more. A quick Selection field is also available for you to set up for numeric input. Click the vertical dividers to expand and collapse groups of icons.

4. User Account menu

Log in to your Autodesk account. Click for more options, such as to manage your license or purchase Autodesk products. Trial versions also show many days are left.

5. Shelf

The Shelf contains icons for common tasks, organized by tabs based on category. The real power of shelves, however, is that you can create custom shelves, and then make tools or command shortcuts that are quickly accessed from there with a single click. See Shelves for information.

6. Workspace selector

Select a custom or predefined arrangement of windows and panels designed for different workflows. Shown here is the Maya Classic workspace. For more information, see Workspaces.

7. Sidebar icons

The icons at the right end of the Status line open and close tools that you will use frequently. From left to right, the icons display the Modeling Toolkit, the HumanIK window, the Attribute Editor, the Tool Settings, and the Channel Box/Layer Editor(which is open by default and shown here).

In the Maya Classic workspace, these tools open as tabs in the pane below, except for the Tool Settings which open in a floating window. Use the tabs to switch between open tools, or click the current tab to collapse the whole pane. Click on any tab in a collapsed pane to restore it. You can also drag the tabs to change their order, or right-click on the tabs for more options.

8. Channel Box

The Channel Box lets you edit attributes and key values for selected objects. The Transform attributes are shown by default, but you can change which attributes are displayed here.

9. Layer Editor

There are two types of layers that are displayed in the Layer Editor:

- Display Layers are used to organize and manage objects in a scene, such as for setting their visibility and selectability.
- Animation Layers are used to blend, lock, or mute multiple levels of animation.

In all cases, there is a default layer where objects are initially placed upon creation.

10. **View panel**
    The View panel offers different ways of viewing the objects in your scene with a camera view. You can show one or several view panels, depending on the layout you're using. You can also display different editors in the view panel. The Panel Toolbar in each view panel gives you access to many of the frequently used commands found in the Panel menus.

11. **Tool Box**
    The Tool Box contains tools that you use all the time to select and transform objects in your scene. Use the QWERTY hotkeys to use the Select tool (**Q**), Move tool (**W**), Rotate tool (**E**), Scale tool (**R**), and Show Manipulators (**T**), as well as access the last tool used (**Y**) in the scene.
12. **Quick layout/Outliner buttons**
    The upper three Quick Layout Buttons below the Tool Box let you switch between useful View panel layouts with a single click, and the bottom button opens theOutliner . See Panels and layouts for information on how to create custom layouts.
13. **Time Slider**
    The Time Slider shows you the time range that is available as defined by the range slider, below. The time slider also displays the current time, and the keys on selected objects or characters. You can drag the red playback cursor in it to "scrub" through animation, or use the playback controls at the right end.
14. **Range Slider**
    The Range Slider lets you set the start and end time of the scene's animation. You can also set a playback range if you want to focus on a smaller portion of the whole animation.
15. **Playback controls**
    The Playback Controls let you move around time and preview your animation as defined by the Time Slider range.
16. **Anim/Character menus**
    The Animation or Character menus let you switch the Animation Layer and the currentCharacter Set. There are also icons for Auto Key and Animation preferences.
17. **Playback options**
    Use the Playback options to control how your scene play backs animation, including setting frame rates, looping controls, and auto keying, as well as gives you quick access to the Time Slider preferences.
18. **Command Line**
    The Command line has an area to the left for inputting single MEL commands, and an area to the right for feedback. Use these area if you are familiar with Maya's MEL scripting language.
19. **Help Line**
    The Help Line gives a short description of tools and menu items as you scroll over them in the UI. This bar also prompts you with the steps required to use a tool or complete a workflow.

Menus and menu sets

There are seven menus always available
in Maya: File, Edit, Create, Select, Modify, Displayand Windows.

All other menus change depending on the menu set you
select: Modeling, Rigging, Animation, Dynamics, Rendering. Each menu set is designed to support a particular workflow.

You select the menu set you want to work with from the drop-down list in the Status bar.

To switch between menu sets, use the drop-down menu in the Status Line, or use hotkeys. The default hotkeys are:

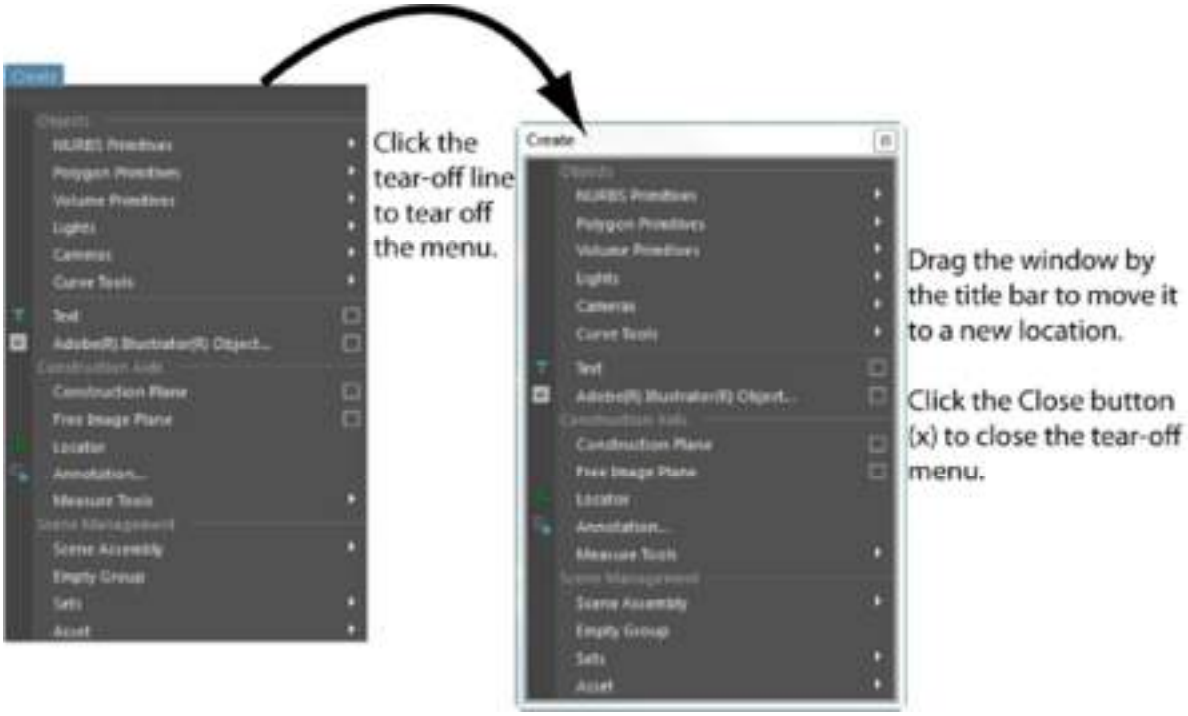
- F2 (Modeling)
- F3 (Rigging)
- F4 (Animation)
- F5 (FX)
- F6 (Rendering)

You can create custom menu sets that contain your choice of menu items - see Custom menu sets.

Note: To toggle the display of the menu bar, press Ctrl+M. With no menu bar visible, you can still use the Hotbox to choose commands.

Tear-off menus

You can display menus as separate windows. This is helpful when you use a menu repeatedly. Pull down the menu and click the tear-off line at the top. Tear-off menus always display on top.



Select menu items

You can select items from menus in different ways in Maya:

- The main menu at the top of the Maya window - see Menus and menu sets.
- Shelves, where the most frequently used menu items are also available as icons; for example, common commands from the Rigging menu set are available as icons in the Rigging shelf - see Shelves.
- The hotbox - see Select actions from the hotbox
- Marking menus - see Marking menus

Actions and Tools

Almost all menu items are actions, but there are also many tools.

- When you select an **action** menu item, that action is performed on the selected objects or components.

  Some actions work differently depending on the order in which you select the objects. For example, you first select all the objects you want to constrain, and then select the constraining object last when you create a constraint.

  If the order is important, instructions about the selection order appear in the help line at the bottom of the Maya window.

- When you select a **tool** menu item, that tool is activated, which you can then use on objects or components. Instructions for using the tool appear on the help line when it's active.

  The tool stays active until you exit it by selecting another tool.

Many items in the Curves and Surfaces menus can be converted from actions to tools (or vice versa) - see Switch operations between actions and tools.

Setting Options before selecting a menu item

For many menu items, you can set up options before executing it. When options are available, a ❐ box is displayed next to the name of a menu item. See Set or reset the options for a menu item for more information.

Quickly repeating the last menu item

You can quickly repeat your last action from a menu item in Mayaôs main menu, or Panelmenu with the middle-mouse button. For example, if your last action was to open the Windows > Animation Editors > Graph Editor, then middle-click the Windows menu to reopen the Graph Editor. This also applies to sub-menus.

Middle-click on Panel Menus toggles radio or checkbox selections, where available.
Note: You cannot use the middle-click repeat with Panel > Renderer menu items.

Set or reset options for a tool or menu item

Many tools have options, shown in the menu as a box ❐. This option box lets you adjust and fine-tune individual settings for each tool.

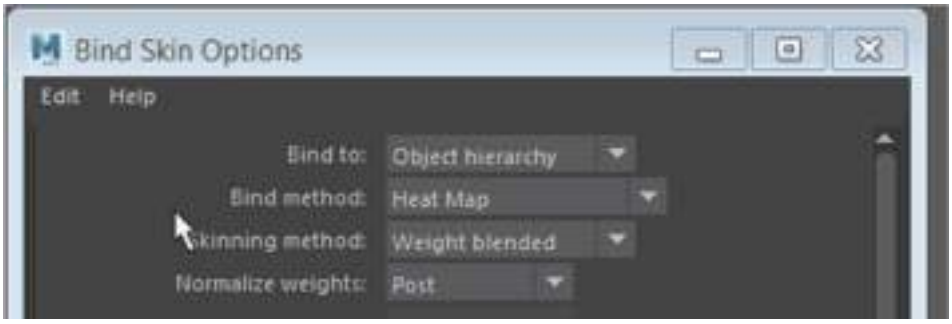
- Click the ❐ box next to the name of a menu item to open the actionôs options window.
- Double-click a tool to show the Tool Settings panel.

To reset a tool or action to its original (ñfactoryò) options

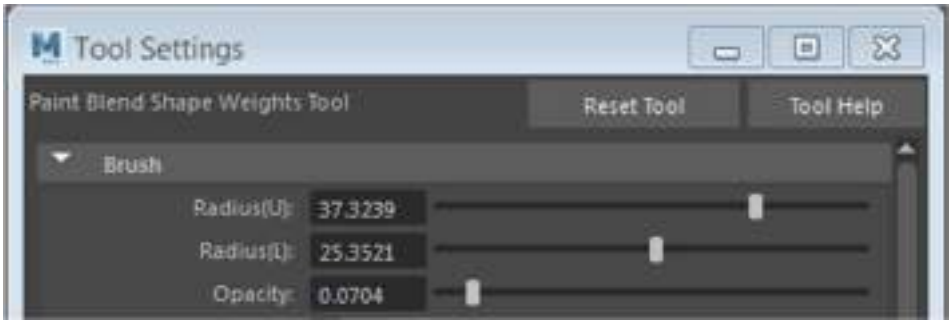
You can return menu items to their default settings by clicking **Reset**.

Do one of the following:

- In an option window, select Edit > Reset settings.



- In a Tool Settings editor, click Reset Tool.



Select Actions from the Hotbox

The hotbox contains every action available in the Maya interface. It appears when you hold down the space bar in a view.

The hotbox has three main functions:

- It contains every menu and menu item. This is useful if you want to quickly use an action from another menu set without switching menu sets.

- You can use the hotbox to select actions even if youôve hidden the menu bar (press Ctrl+M) and other UI elements to save space.
- The hotbox provides five customizable marking menus you can show by clicking inside, above, below, left, or right of the Hotbox Controls option.

To select an action from the hotbox

1. Hold the space bar in a view to show the hotbox.

   The hotbox remains on screen as long as you hold the space bar.

2. Click a menu and drag while you select an option, or click an empty area anywhere around the hotbox to show additional marking menus.

   Tip: Clicking the tear-off line at the top of a marking menu opens it in a separate window.

Marking Menus

Marking menus are used throughout the Maya interface. When you right-click an object, a marking menu appears that lets you select a selection mode and other actions that are in context to the type of object. Some marking menus appear when you hold a key and press a mouse button.

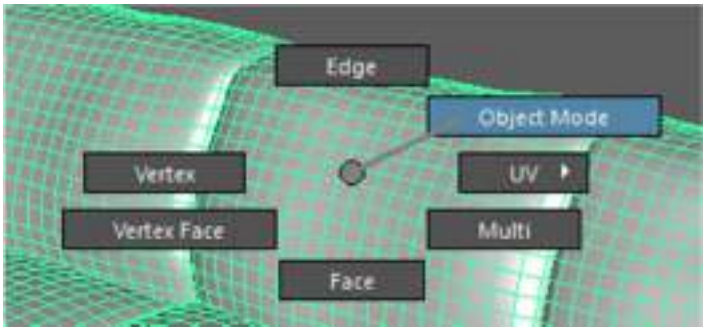
Marking menus are very fast for experienced users because once you get used to showing them and the positions of their items, you can select the items using very quick gestures with the mouse or tablet pen, sometimes so fast the entire menu wonôt even display.

To select an item from a marking menu

1. Do one of the following:
   - Right-click anywhere in your scene when an object is selected, and release the mouse button.

     The marking menu remains on the screen, letting you move your cursor over the item you want to select.

   - Right-click anywhere in your scene when an object is selected and continue holding your mouse button and drag in the direction of the item you want to select. It doesn't matter how far you drag or if you hit the item exactly. This allows you to make the drag very quickly. Dragging over an item with a submenu attached shows the submenu.



Note: You can assign marking menus to hotkeys. Hold the key and press the mouse button to show the marking menu.

Polygon / NURBS marking menus

Right-clicking a polygon or NURBS object in the scene brings up a marking menu of many commonly used commands.

Menu Item	Effect
Components	The upper radial section of each object type displays options to change the current component selection mode for that object. Note: Objects remain selected even when switching between various object and component modes.
Shape node	Allows you to display the appropriate object's shape node without changing the current selection.
Select	Selects the current object.
Select All	Selects all objects in the scene.
Deselect All	Clears the current selection.
Select Hierarchy	Selects the current object and anything under it in the DAG.
Invert Selection	Selects anything currently unselected in the DAG and vice versa.
Select Similar	When in component mode, Select Similar selects polygonal components (vertices, edges, and faces) of a similar type to the current selection. When in object mode, this option selects other objects of the same node type in the scene.
Make Live	Turns the current object into a Live surface that other objects will then automatically snap to.
DG Traversal	Allows you to navigate up and down the DG into the current object's History (upstream) and Future(downstream) without having to open the Node Editor.

Menu Item	Effect
Inputs	Allows you to select and edit any / all input (upstream) connections to the current object's shape node.
Outputs	Allows you to select and edit any / all output (downstream) connections to the current object's shape node.
Paint	Provides quick access to multiple paint modes, including: Paint Select, 3D Paint, Sculpt Geometry, and Vertex Color painting (not available for NURBS curves).
Metadata	Allows you to visualize and modify metadata associated with the current object.
Actions	Provides quick access to Templating, (controlling the object's selectability), Unparenting (down to the root level), and Bounding Box display actions.
UV Sets	Provides quick access to options related to an object's (possibly) multiple UV sets (polygons only).
Color Sets	Provides quick access to options related to an object's (possibly) multiple color sets (polygons only).
Scene Assembly	Provides quick access to various options related to Scene Assembly for creating large complex scenes.
Material Attributes	Opens the current object's shader node in the Attribute Editor.
Assign New Material	Opens the Assign New Material window.
Assign Favorite Material	Allows you to assign commonly used shaders based on your Favorite list in the Hypershade. to the current object.
Assign Existing Material	Allows you to assign the current object any shader that already exists in the scene.
Remove Material Override	Removes any material overrides created on a render layer, reverting back to the master layer's material shader.

Convert Selection marking menus

Ctrl + right-clicking an object provides a menu of selection conversion commands that mirror those found in the Select > Convert Selection menu as well as Contiguous Edges. The available options differ depending on the current object type.

Create Polygon marking menus

Shift + right-clicking the scene without a selection provides a menu of polygon primitives and creation tools.

Polygon Tools marking menus

Shift + right-clicking with a polygon object selected brings up a marking menu of many commonly used polygon tools.

Menu Item	Effect
Target Weld Tool	Activates the Target Weld Tool, which allows you to merge vertices or edges interactively.
Sculpt Tool	Activates the Sculpt Tool, which moves vertices in a direction determined by the average of all normals within the boundary of the tool cursor.
Fill Holes	Fills all holes in the geometry with new faces.
Multi-Cut	Activates the Multi-Cut Tool, which allows you to divide edges and faces by inserting new vertices / edges.
Insert Edge Loop	Activates the Insert Edge Loop, which allows you to create new edge loop perpendicular to the existing edges.
Append to Polygon Tool	Activates the Append to Polygon Tool, which allows you to add polygons to an existing mesh.
Soften/Harden Edge	Manipulates vertex normals to make all edges appear soft or hard.
Extrude	Extrudes the selected components.
Offset Edge Loop Tool	Activates the Offset Edge Loop Tool, which allows you to insert

Menu Item	Effect
	new edge loops on either side of selected edges.
Smooth	Smooths the current mesh by adding new polygons.
Subdiv Proxy	Smooths the current mesh by adding polygons and placing it inside the original, non smoothed mesh, which becomes the proxy.
Crease Tool	Activates the Crease Tool, which allows you to create transitions between hard and soft edges.
Project Curve on mesh	Creates a new curve that is the projection of a selected curve on the selected mesh surface.
Split mesh with projected curve	Splits or splits and detaches edges on a polygon surface using a projection from the selected curve.
Mirror	Provides the options found in the Mesh > Mirror menu, to mirror the selected mesh across an axis.
Mapping	Provides options to apply a default UV map to the selected faces.
Triangulate Faces	Converts the selected faces to triangles to ensure proper rendering.
Quadrangulate Faces	Converts the selected faces to quads to ensure proper rendering.
Separate	Separates the selected polygon into the individual polygon shells (if any exist) that make it up.
Combine	Combines the selected polygon shells into a single object.
Booleans	Provides the options found in the Mesh > Booleansmenu, to model based on the intersection points of two meshes.
Reduce	Retopologizes the selected object in an attempt to reduce the overall number of polygons.
Cleanup	Opens the Cleanup Options , which allow you to remove unwanted geometry or tesselate faces that may be valid in Maya

Menu Item	Effect
	but not elsewhere.
Connect Tool	Activates the Connect Tool allowing you to connect components by inserting edges between them.
Quad Draw Tool	Activates the Quad Draw Tool, which allows you to draw new polygons by placing dots in the scene.
Polygon Display	Allows you to toggle various display settings based on the component type currently selected.

UV marking menus

Shift + right-clicking a polygon object while in UV selection mode brings up a marking menu of many commonly used UV tools.

Menu Item	Effect
Mapping	Allows you to project new UVs onto the mesh.
3D Cut and Sew UV Tool	Allows you to create or merge UV shell seams directly in the viewport.
3D Grab UV Tool	Allows you to drag UVs directly in the viewport.
Cut UVs	Separates the selected UV edges.
Sew UVs	Attaches the selected UV edges.
Delete UVs	Removes the selected UVs.
Create UV Shell	Creates a UV shell(s) out of each set of adjacent selected UVs.
Merge UVs	Merges the selected UVs (assuming they belong to the same UV shell).
Auto Seams	Automatically cuts seams into the shell pertaining to the selected

Menu Item	Effect
	UVs.
Texture Borders	Displays texture borders in the viewport.
UV Editor	Opens the 2D UV Editor.
UV Set Editor	Opens the UV Set Editor.

UV Shell marking menus

Shift + right-clicking a polygon object while in UV Shell selection mode brings up a marking menu of many commonly used UV shell tools.

Menu Item	Effect
Mapping	Allows you to project new UVs onto the mesh.
3D Cut and Sew UV Tool	Allows you to create or merge UV shell seams directly in the viewport.
3D Grab UV Tool	Allows you to drag UVs directly in the viewport.
Unfold	Unfolds the object's UV shell.
Optimize	Evens out the space between UVs.
Layout	Spreads out an object's UV shells to make the best use of 0-1 UV space.
Flip	Changes the orientation of the UV shell. Useful if a texture appears backwards.
Auto Seams	Automatically assigns / cuts seams into the UV shell.
Texture Borders	Displays texture borders in the viewport.
UV Editor	Opens the 2D UV Editor.

Menu Item	Effect
UV Set Editor	Opens the UV Set Editor.

NURBS curves marking menus

Shift + right-clicking a NURBS curve brings up a marking menu of many commonly used NURBS commands.

Menu Item	Effect
Add Points Tool	Activates the Add Points Tool, which allows you to extend certain types of curves (such as CV, EP, and Pencil)q.
Open / Close Curves	Separates or connects the first and last points of the selected curves.
Reverse Curve	Reverses the curve direction by renumbering the points.
Convert NURBS to Bezier	Converts the selected NURBS curve to a Bezier curve.
Bezier Curve Tool	Activates the Bezier Curve Tool, allowing you to modify or extend the selected Bezier curve.

Transform marking menus

Ctrl + Shift + right-clicking your scene when different transformation tools are active, or holding the shortcut key for that tool and left-clicking the scene, opens a marking menu full of various settings related to that particular transformation tool.

Common Transform marking menus
The following marking menus are common to the Select Tool, Move Tool, Rotate Tool, and Scale Tool.

Menu Item	Effect
Selection Constraints	Lets you select components based on a specific type of constraint (i.e. edge loops only or border edges only).

Menu Item	Effect
Transform Constraints	Lets you select a transform constraint.
Smart Duplicate	Lets you Shift + drag to create duplicates.
Smart Extrude	Lets you shift + drag to extrude components.
Preserve UVs	Maya automatically transforms UVs in the UV space relative to the transformations taking place in the scene view (not available for Select Tool).
Preserve Children	Maintains the position of child objects when you move a parent object (not available for Select Tool).
Tweak Mode	Turns Tweak Mode on and off (not available for Select Tool).

Symmetry

Menu Item	Effect
Symmetry	Turns Object symmetry on.
Topology q/ World / Object	Sets the symmetry space.
X Axis / Y Axis / Z Axis	Lets you choose whether to reflect your selection along the X-axis, Y-axis or Z-axis.

Select

Menu Item	Effect
Marquee	Turns Marquee select on and off.
Pre-selection Highlight	Turns Preselection Highlight on and off.
Highlight Nearest Component	When enabled and Maya is in component mode, automatically highlights the component (according to the active component selection setting) closest to the mouse cursor for selection.

Menu Item	Effect
Highlight Backfaces	When enabled, backfacing components are highlighted for preselection and are selectable. When this option is disabled, backfacing components are still selectable, but they are not highlighted for preselection.
Asset Centric	Turns Asset Centric selection on and off.
Soft Select	Opens the Soft Select marking menu.
Camera Based Selection	Turns on Camera Based Selection.
Clear Selection	Deselects all selected components.

Soft Select

Menu Item	Effect
Soft Select	Turns Soft Selection on and off.
Object / Global / Surface /Volume	Sets the Falloff Mode for Soft Selection.
Color Feedback	Turns color feedback for Soft Selection on and off.

Select Tool marking menus

The following marking menus give you access to options associated with the Select Tool. You can also access these marking menus by holding Q + clicking in your scene.

Menu Item	Effect
Paint Select	Changes the selection mode to Paint Select.
Lasso	Changes the selection mode to Lasso Select.

Move Tool marking menus

Holding W + clicking in your scene opens a marking menu of options associated with the Move Tool. Most of the options can also be found in the Move Tool Settings.

Menu Item	Effect
Axis / World / Object / Component	Sets the Move Axis (coordinate system) for the Move Tool.
Keep Spacing	Maintains relative spacing when snap settings are on.
Update Triad	Determines whether the manipulator is updated during manipulation or when the mouse button is released, when moving components along their normals.
Move Options	Opens the Tool Settings.

Axis

Menu Item	Effect
Live Object Axis / Normal / Parent / Along Rotation Axis	Sets the Axis Orientation for the Move Tool.
Custom	Sets the Axis Orientation to a Custom axis orientation based on a specified point, edge, or face.

Snap

Menu Item	Effect
Discrete Move	Lets you move components by specified increments. You can modify the increments in the Tool Settingseditor.
Face Center / Vertex	Lets you move and snap to a live polygonõs components. Both can be turned on simultaneously.
Relative Mode	Lets you move components relative to their initial orientation or scale.

Rotate Tool marking menus

Holding E + clicking in your scene opens a marking menu of options associated with the Rotate Tool. Most of the options can also be found in the Rotate Tool Settings.

Menu Item	Effect
Object / World/Component /Gimbal / Custom	Sets the Axis Orientation for the Rotate Tool.
Custom	Sets the Axis Orientation to a Custom axis orientation based on a specified point, edge, or face.
Rotate Object Center	Lets you rotate object components around the objectôs pivot point.
Free Rotate	When on, dragging the area inside the rotation manipulators (the center) rotates the object or component. When off, you can only rotate the object or component by dragging the rotation manipulators.
Relative	Lets you rotate or scale components relative to their initial orientation or scale.
Rotate Options	Opens the Tool Settings.

Scale Tool marking menus
Holding R + clicking in your scene opens a marking menu of options associated with the Scale Tool. Most of the options can also be found in the Scale Tool Settings.

Menu Item	Effect
Axis / World /Object/Component	Sets the Axis Orientation for the Scale Tool.
Snap Scale	Lets you scale components by specified increments. You can modify the increments in the Tool Settingseditor.
Relative	Lets you rotate or scale components relative to their initial orientation or scale.
Scale Object Center	Lets you scale object components around the objectôs pivot point.
Prevent Negative Scale	Stops all single axis scaling operations on components at 0.

Menu Item	Effect
Scale Tool Settings	Opens the Tool Settings.

Axis

Menu Item	Effect
Live Object Axis / Normal / Parent / Along Rotation Axis	Sets the Axis Orientation for the Scale Tool.
Custom	Sets the Axis Orientation to a Custom axis orientation based on a specified point, edge, or face.

Input / Output marking menus

Holding A + clicking in your scene opens a marking menu of options related to incoming and outgoing connections to the currently selected objects.

Menu Item	Effect
Enable All Outputs / Disable All Outputs	Enables / Disables all outgoing values from the selected node.
Delete History / Delete Non-Deformer History	Clears the appropriate type of construction history.
Select All Inputs / Select All Outputs	Selects incoming / outgoing connections to the selected node.
Freeze Transformations	Resets the selected object's current transformations to zero.

Component Marking Menus

Shift + right-clicking your scene when in component selection mode opens a marking menu specific to the type of component (vertices, edges, or faces) currently being selected.

Common Component marking menus
The following marking menus are common to the Vertex, Edge, and Face component modes.

Menu Item	Effect
Merge	Provides options for merging multiple selections of the same component into one.
Paint Select	Activates Paint Selection mode for the current component type.
Multi Cut	Activates the Multi-Cut Tool, which allows you to divide edges and faces by inserting new vertices / edges.
Delete	Deletes the selected component (vertices and edges only).
Normals	Presents a number of options to modify the selected components normals (vertices and faces only).
Extrude	Extrudes the selected components.
Crease Tool	Activates the Crease Tool, which allows you to create transitions between hard and soft edges (vertices and edges only).
Connect Components	Connects the selected vertices, edges, or faces (in the form of their border edges) to the last selected vertex or edge.
Detach Components	Separates components into multiple overlapping components.
Transform Component	Activates a Manipulator Tool based on the last selected component.
Connect Tool	Activates the Connect Tool allowing you to connect components by inserting edges between them.
Polygon Display	Allows you to toggle various display settings based on the component type currently selected.

Vertex marking menus
Shift + right-clicking the scene in Vertex component mode opens a marking menu of vertex tools and options.

Menu Item	Effect

Menu Item	Effect
Average Vertices	Averages the distance between the selected vertices.
Chamfer Vertex	Chamfers the selected vertices.
Apply Color	Assigns color data to the selected vertices.

Edge marking menus
Shift + right-clicking the scene in Edge component mode opens a marking menu of edge tools and options.

Menu Item	Effect
Flip/Spin Edge	Flips or spins edges to opposite corners of a face.
Bevel Edge	Expands the selected edge into a new face based on the current Bevel Options.
Soften/Harden Edge	Manipulates vertex normals to make connected edges appear soft or hard.
Offset Edge Loop Tool	Activates the Offset Edge Loop Tool, which allows you to insert new edge loops on either side of selected edges.
Insert Edge Loop	Activates the Insert Edge Loop, which allows you to create new edge loop perpendicular to the existing edges.
Slide Edge Tool	Lets you reposition a selection of edges or entire edge loops on a polygon mesh.
Edit Edge Flow	Adjusts the position of the selected edges to fit the curvature of the surrounding mesh.
Add Divisions To Edge	Allows you to split an edge using multiple vertices.
Bridge	Creates faces connecting the selected border edges.
Fill Hole	Automatically creates a three or more sided face to fill an open

Menu Item	Effect
	area bordered by the selected edge.

Face marking menus
Shift + right-clicking the scene in Face component mode opens a marking menu of face tools and options.

Menu Item	Effect
Poke Face	Creates a vertex at the center of the selected face(s) and adds vertices to properly triangulate them.
Bevel Face	Expands the selected face's edges into a new faces based on the current Bevel Options.
Wedge Face	Extrudes an arc out of the selected face until it is within a certain Arc angle of the selected edge.
Smooth Faces	Adds new polygons to smooth out vertices and edges bordering the selected faces.
Assign Invisible Faces	Removes all shading from the selected faces (but does not remove the face itself).
Add Divisions To Faces	Subdivides selected faces into additional faces.
Triangulate Faces	Converts the selected faces to triangles to ensure proper rendering.
Quadrangulate Faces	Converts the selected faces to quads to ensure proper rendering.
Reduce Faces	Retopologizes the selected faces in an attempt to reduce the overall number of polygons.
Bridge Faces	Creates faces connected the selected faces' opposite border edges.
Extract Faces	Disconnects the selected faces from the mesh.
Duplicate Face	Creates a copy of the selected faces.

Menu Item	Effect
Target Weld	Activates the Target Weld Tool, which allows you to merge vertices or edges interactively.
Mapping	Provides options to apply a default UV map to the selected faces.

Texturing artist: Roles and Responsibilities
Texturing artist in the Media & Entertainment Industry is also known as a Shading artist

Brief Job Description

Individuals at this job are responsible to add textures to models to create photo-realistic models that can be used for animation

Responsibilities:

- Collaborate with the CG Supervisor and Lead Texture Artist to execute the required look of CG characters and objects
- Continual and efficient communication with the Look Dev and Modelling departments
- Quality control of texture maps prior to publishing to ensure consistency
- Meeting schedules and set deadlines while maintaining the highest standards
- Communicating with Production and Leads regarding schedules and deadlines
- Sharing techniques, reference material and ideas with the team
- Continuing to become familiar with new tools, software, data and other related technology

Essential Skills:

- The ability to work within a team of other Texture Artists or independently
- A commitment to creative collaboration within the team and with other departments
- Proactive and excellent communication, organisation and interpersonal skills
- Creative problem solving skills

- The proven ability to work well under pressure
- Open to direction and able to embrace change
- Attention to detail
- Reliable with good time keeping and the ability to meet set deadlines

Unit 2: Shading and Texturing

Surface shading

In the real world, what an object is made of is one of two main factors that determine the appearance of its surface (the other is light). This is because when light hits the objects, some of the light is absorbed and some of it is reflected. The smoother the object, the shinier it is; the rougher the object, the more matte it is.

In Autodesk® Maya®, the appearance of a surface is defined by how itôs *shaded*. Surface shading is a combination of the basic material of an object and any textures that are applied to it.

In Maya, *materials* (also called *shaders*) define an objectôs substance. Some of the most basic attributes of materials include color, transparency, and shine. For more information on materials in Maya, see Surface, displacement, volumetric materials .

Factors beyond basic color, transparency, and shine that determine the appearance of an objectôs surface (such as more complex color, transparency, shine, surface relief, reflection, or atmosphere) are defined by textures. For more information on textures, see 2D and 3D textures, Procedural textures, and File textures.

About backgrounds

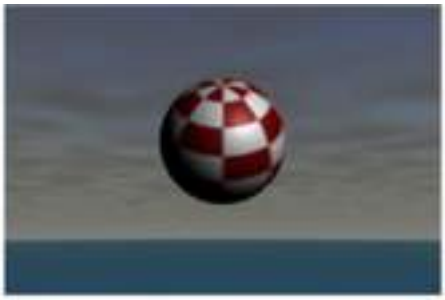
Typically you render the objects in a scene against a black background and composite the rendered images later with an appropriate background using compositing software. However, you can insert a background:

- to avoid having to model background objects or scenery, but want them represented, 2Dly, in your scene (especially if you donôt have access to compositing software).

- as a temporary reference (especially for rotoscoping or motion matching) for modeling or animating objects in the scene.

Basic color and texture backgrounds

Color backgrounds flood the background with a solid color.



Texture backgrounds use a 2D, 3D or Environment texture to simulate a 3D environment.

Color backgrounds

A color background floods the background of the scene with a solid color (for example, black, white, or red).

Create a basic color background

To create a color background

1. In the **Environment** section of the cameraôs **Attribute Editor** (**View > Camera Attribute Editor**), set the **Background Color** attribute.

   For more information on a cameraôs Attribute Editor, see Attribute Editor in the Basics guide.

Texture backgrounds

A texture background uses a 2D, 3D, or environment texture on an image plane to simulate a 3D background, or *environment*.

Create a texture background

To create a texture background

1. In the **Environment** section of the cameraôs **Attribute Editor** (**View > Camera Attribute Editor**), click the **Create** button to the right of the **Image Plane** attribute.

   Maya creates an image plane and connects it to the camera.

2. Set the **Type** attribute for the image plane to **Texture**.
3. Click the texture button for the **Texture** attribute.

   The **Create Render Node** window appears.
4. Select the texture you want to use as a background (for example, an **Environment Texture**).

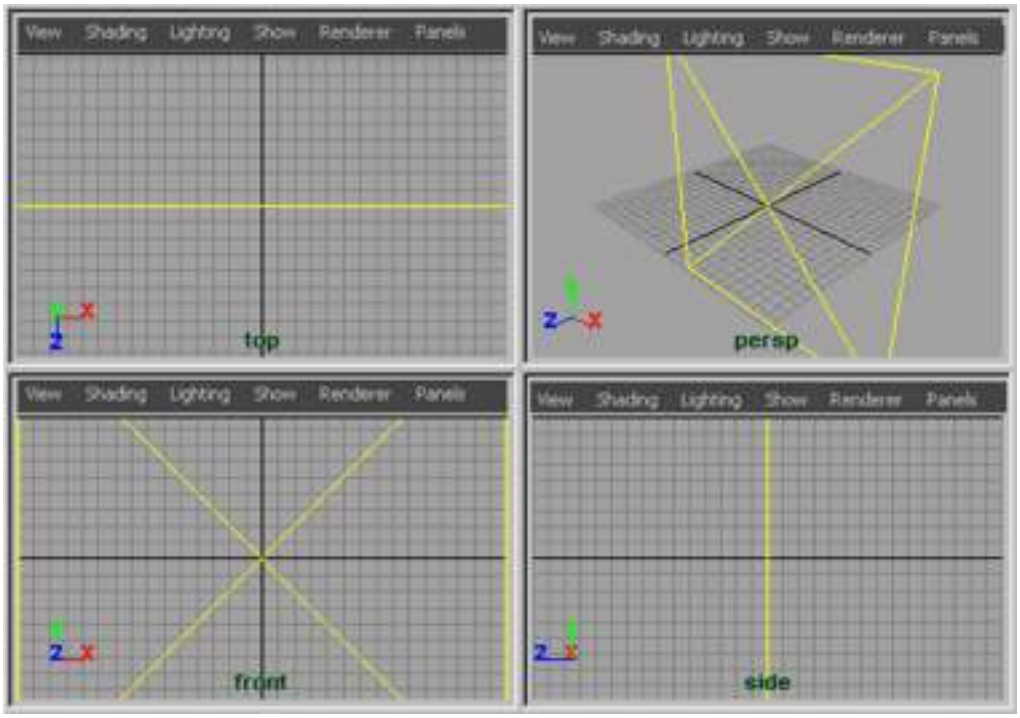
   Maya creates the texture and connects it to the image plane.

Create, edit, or position an image plane

To create an image plane

1. Select **View > Image Plane > Import Image** from the current view.
2. Browse to the file you want and click **Open**.

   A placement icon appears in either the current view or all views, depending on the **Display** mode you set (in all views by default), and the **Image Plane Attribute Editor** opens.
3. Select an **Image File** or **Texture** from the **Type** drop-down list, then click the folder icon next to **Image Name** to load an image plane into the view.



   For a description of image plane attributes, see Image plane

To edit an existing image plane

1. Select **View > Image Plane > Image Plane Attributes** from the current view and choose any of the cameraôs image planes you want to edit.

   The selected image planeôs attributes display in the **Attribute Editor** (unless the **Attribute Editor** has been hidden)

Tip

Right-click the arrow key of the image plane attribute in the camera to display a list of the image planes per camera.

To position an image plane

1. Do one of the following:

   - Use the **Placement** attributes to position an image plane relative to the camera.
   - Use the **Placement Extras** attributes to control which portion of an image file is visible on the image plane.

Apply color and shading to an object

After you have created your model, you can add color and shading to it by doing the following:

- Create a material and assign it to your object
- Set a color for the object
- Map a texture to any of the material attributes
- Adjust the material attributes; for example, its specularity, transparency, and so forth

Create a material and assign it to your object

Right-click your object in the viewport and select Assign New Material. Select any of the available shaders from the editor that appears. In this example, a Phong shader is created and assigned to the body of the dinosaur model.

Set a color for the object

You can set a color for your object by clicking the Color value swatch to edit the color using the Color Chooser.

Alternatively, you can map a texture to the Color attribute of your material, as demonstrated in the *Map a texture to any of the material attributes* section below.

Map a texture to any of the material attributes

You can map a texture to any of the material attributes that appear with a  icon beside it.

For example, you can add color to your model by mapping a file texture to the material's Color attribute, or add surface detail by mapping a normal map to the Bump Mappingattribute to give the appearance of a rough surface.

1. Click the  icon beside the Color attribute and select File.

   A File texture node is created. Click the browse icon beside Image Name to navigate to your texture file.

   Press 6 for textured mode in the viewport to see the texture applied to the dinosaur.

2. Similarly, click the  icon beside the Bump Mapping attribute and select File.

   Select the file node in the Attribute Editor and click the browse icon to navigate to your normal map.

3. Display your normal map in tangent space or object space.

   In this example, the bump on the model's body is not very realistic. To correct this, select the bump2d node, then select Use As > Tangent Space Normals.

   Note: A  icon indicates that a texture has been mapped to an attribute.

Adjust the material attributes

You can further refine the shading of your model by adjusting any other material attribute.

For example:

- Increase the size of the specular highlights by adjusting the Cosine Power attribute
- Give the dinosaur a metallic, shiny skin by changing the Specular Color to a lighter grey

The attributes that you can adjust depend on the shader that you have assigned to the material. Different attributes are available for the Blinn shader, for example, as compared to the Lambert shader.

Create layered shaders

You can layer shaders when you want to use more than one material for an object. Layered shaders let you create the appearance of variations in the material qualities of the surface by combining two or more material nodes that each have their own qualities. Layered shaders render more slowly than other materials, so consider using Layered textures instead to achieve similar results.

Layered textures with the Layered Shader node

The Layered Shader node has an attribute called *compositing flag* that causes the shader type to layer materials or layer textures. You can use this to layer textures with the Layered Shader node. However, using the Layered Texture node is recommended because you can set many more options. See Layered textures for more information.

If you choose the texture option for the compositing flag, you must plug the whole network into a material (for example, Phong or Blinn).

For a description of this flag and other attributes of the node, see the Layered Shader node reference.

To create a layered shader (example)

1. Create a Layered Shader in the Hypershade.
2. Select the Layered Shader node and open the Attribute Editor.
3. Create a Lambert shader and drag to the area with the green swatch in the Attribute Editor.
4. Create a Phong and do the same.

The leftmost shader is the topmost material. Youôll have to have some level of transparency to see the shader underneath. So, for this example, youôll need to map the Lambertôs transparency channel with something to see the shiny Phong underneath. Then assign the shader to an object.

Textures

In visual arts, a texture is any kind of surface detail, both visual and tactile. In Maya, you create surface detail with textures connected to the material of objects as texture maps. Materials define the basic substance of an object, and textures add detail.

You can connect textures to almost any attribute of a material; the most common ones being color, transparency and shine (specularity). For more information on material attributes, see Common surface material attributes and Common surface material Specular Shading attributes.

In addition, you can also add detail to the appearance of an objectôs surface by adding Surface relief. Do this by connecting textures as bump maps or displacement maps.

A set of 2D and 3D textures are provided in Maya. In addition, you can create a Filetexture and connect to it your own image file.

2D and 3D textures

Texture nodes are one type of render node that, when mapped to the material of an object, let you define how the surface of an object looks when rendered.

Texture node(s) (with material nodes) feed into the Shading Group node, which tells the renderer how to shade the surface.

Texture nodes are procedural textures generated by Maya or bitmap images imported into Maya that you can use as texture maps for material attributes. Texture maps on various attributes such as color, bump, and specularity affect the appearance of the material. For more information about texture maps,

2D textures

2D textures wrap around an object, like gift wrapping, or stick to a flat surface, like wallpaper.

3D textures

3D textures project through objects, like veins in marble or wood.

With a 3D texture, objects appear to be carved out of a substance, such as rock or wood. You can scale, rotate and move 3D textures interactively in a scene view to achieve the desired results.

Environment textures

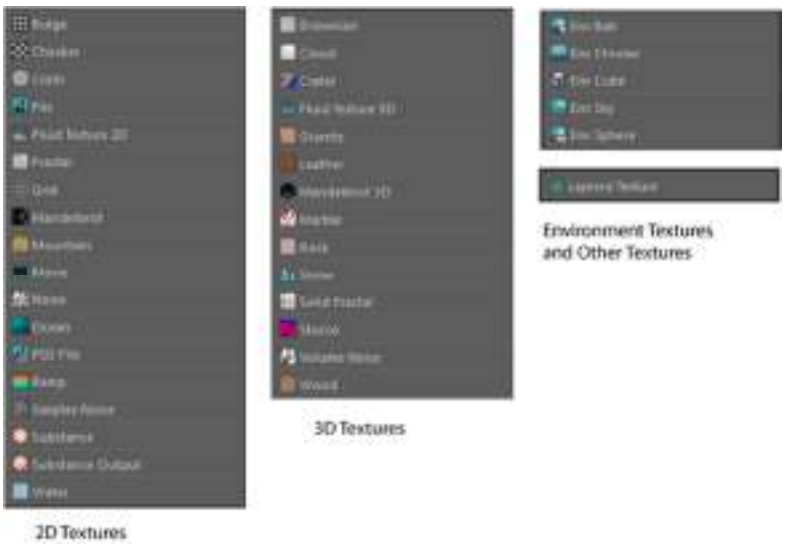
Environment textures are commonly used either as backgrounds for objects in your scene or as reflection maps.

Layered textures

There are two ways to layer textures in Maya: using the Layered Shader with the texture compositing flag, or with the Layered Texture Node.

Though the workflow for using the Layered Texture node is similar to the Layered Shader, using the Layered Texture node is recommended because you can set many blend modes.

Overview of texture nodes



Shared 2D texture attributes

For texture-specific attributes, see the 2D texture name: Bulge, Checker, Cloth, File, Fluid Texture 2D, Fractal, Grid, Mountain, Movie,Noise, Ocean, Ramp, Water.

Color Balance

Corrects the color or intensity of a texture.

Exposure

Adjusts the brightness of the image. The modified colors are used for rendering, as well as for display in Viewport 2.0.

Note: Exposure is available only for File texture nodes.

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 nodeôs Default Color shows through. To select a different color, click the color bar to open the Color Chooser. To change the textureôs coverage, use the placement options.

Color Gain

Scaling factor applied to the textureôs 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).

Color Offset

Offset factor applied to the textureôs 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 textureôs 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 textureôs 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).

Alpha Is Luminance

Off by default. The alpha (mask) output depends on the luminance of the color channels. Bright areas of the texture are more opaque when compositing, and dark areas are more transparent.

Note:

You cannot use Alpha Is Luminance for Cloth, Ramp, or Stencil textures.

Shared 3D texture attributes

Color Balance

Corrects the color or intensity of a texture.

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 nodeôs Default Color shows through. To select a different color, click the color bar to open the Color Chooser. To change the textureôs coverage, use the placement options.

Color Gain

Scaling factor applied to the textureôs 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).

Color Offset

Offset factor applied to the textureôs out Color channel. For example, you can brighten a texture that appears too dark by setting the Color Offset to a shade of grey. 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 textureôs out Alpha 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 textureôs out Alpha channel. For example, if the Alpha Gain value is -1 and the Alpha Offset value is 1, the out Alpha channel is inverted. The default value is 0 (no effect).

Alpha Is Luminance

Off by default. The alpha (mask) output depends on the luminance of the color channels. Bright areas of the texture are more opaque when compositing, and dark areas are more transparent.

Note:

You cannot use Alpha Is Luminance for Cloth, Ramp, or Stencil textures.

Effects

Filter

Filter attributes scale the size of the filter and let you specify the amount of blur in the texture map. Use it as an anti-aliasing technique used to refine file textures, reduce flickering, or to achieve special effects.

By default, Filter is set to a value of 1.0 to help prevent such aliasing effects. The effect of Filter is related directly to eye space. As the object moves further away from the eye, the more the texture blurs.

Filter Offset

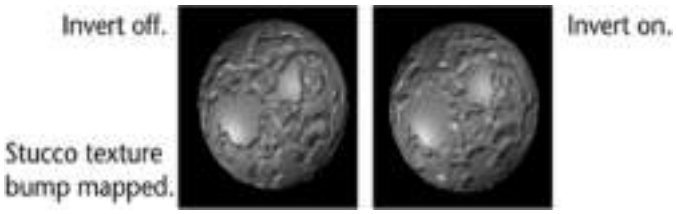
Controls the texture blur in texture space (not eye space). Use Filter Offset for a blurred effect instead of anti-aliasing. Maya adds a constant value to the Filter setting. The default value is 0. Increasing the value increases the texture blur. For example, 1.00 completely blurs the texture.

Tip:

A Filter and Filter Offset of 0.00 results in no blur effect, but a small amount of blur can help reduce moiré and aliasing effects in texture maps.

Invert

Reverses all texture colors (black becomes white, white becomes black, and so on). Invert is off by default. For example, you can change a bump or displacement mapôs raised regions to depressions and vice versa by setting Invert on or off.



Local, Wrap

Wrap repeats or tiles the texture completely over the object. If off, everything outside the 3D placement cube displays the textureôs default color. Wrap is on by default.

Tip:

Some nodes, such as the Reverse utility, repeat themselves to achieve the effect of Wrap, so that it extends infinitely. Others, such as a Marble texture, extend outwards without repeating.

To adjust texture placement on all objects at once, turn Local on, transform the texture placement icon, then turn Local off to see the results. Turning on Local also means that if you transform any of the objects during an animation, the 3D texture transforms accordingly.

Blend

Controls how much of the textureôs Default Color is mixed into the texture Color. A value of 0 means the Default Color does not affect the texture Color. As you increase the Blend value, more and more of the Default Color mixes in. This attribute does not work unless Wrap is turned off and Local is turned on.

To blend colors and textures using the Blend slider

1. Change the Default Color (in the Color Balance section of the textureôs Attribute Editor), or map another texture to the Default Color.
2. Make sure Invert and Wrap are off and turn Local on.
3. Drag the slider to change the Blend value.

Color Remap

Applies a color map to the texture and lets you add or subtract colors from a textureôs default settings. Maya maps the U value to the original textureôs hue, and the V value to the original textureôs intensity.

To remap a texture

1. Click the Insert button under the Color Remap section. The texture colors change and a Remap Ramp Attribute Editor appears. Adjust the Ramp texture colors and attributes if necessary.

UVs

UVs (pronounced U-VEEZ) are two-dimensional texture coordinates that reside with the vertex component information for polygonal and subdivision surface meshes.

UVs exist to define a two-dimensional texture coordinate system, called *UV texture space*. UV texture space uses the letters U and V to indicate the axes in 2D. UV texture space facilitates the placement of image texture maps on a 3D surface.

UVs are essential in that they provide the connection between the surface mesh and how the image texture gets mapped onto the surface mesh. That is, UVs act as marker points that control which points (pixels) on the texture map correspond to which points (vertices) on the mesh. Textures applied to polygon or subdivision surfaces that do not possess UV texture coordinates will not render.

Although Maya creates UVs by default for many primitive types, youôll need to rearrange the UVs in most cases, because the default arrangement will usually not match any subsequent edits to the model you may make. In addition, the location of the UV texture coordinates do not automatically update when you edit a surface mesh.

In most cases, you map and arrange UVs after you have completed your modeling, but before you assign textures to the model. Otherwise, changing the model will create a mismatch between the model and the UVs, and affect how any textures appear on the model.

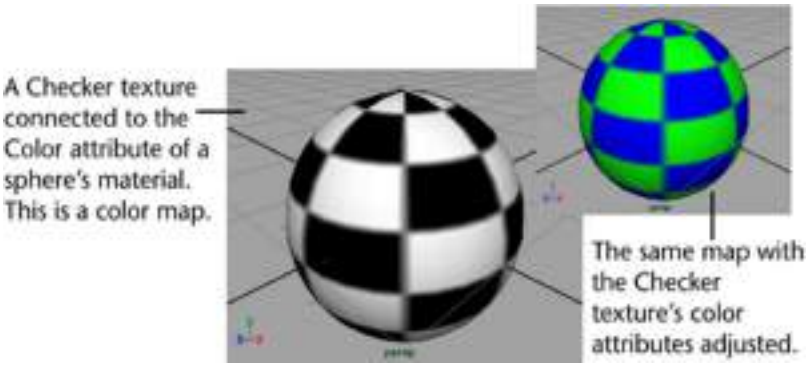
Understanding the concept of UVs and how to map them to a surface, and subsequently lay them out accurately is essential for producing textures on polygonal and subdivision surfaces when working in Maya. This is also important when you need to paint textures, fur, or hair onto a 3D model.

Note: For NURBS surface types the texture coordinates (UVs) that control the placement of a texture exist by default and are implicitly connected to the control vertices. When the control vertices get repositioned, so do the positions of the corresponding UV texture coordinates. Any textures mapped to the surface will adjust automatically.

Texture mapping

To apply a texture to an object, you map the texture to an attribute on the object's material. (Textures and materials are render nodes. The attributes to which the texture is connected determines how the texture is used and how it affects the final results.

Maya has a number of textures that you can map onto objects. For example, if you connect Mayaôs 2D black and white Checker texture to the color attribute of an objectôs material, you have applied a color map; the checkered pattern determines which parts of the object appear black and which appear white (or other colors if you adjust the textureôs color attributes).



If you connect the black and white Checker texture to the transparency attribute, you have applied a transparency map; the checkered pattern determines which parts of the object are opaque and which are transparent.

Commonly used texture maps

To map a texture, see Map 2D or 3D texture.

Color maps
By mapping a texture to the Color attribute of an objectôs material, you create a color map which describes the color of the object.

To learn more about how you can work with color, see Common surface material attributes.

Transparency maps
By mapping a texture to the Transparency attribute of an objectôs material, you create a transparency map which lets you make parts of an object opaque, semi-transparent, or entirely transparent.

To learn more about how you can work with transparency, see Common surface material attributes.

Specular maps
By mapping a texture to the Specular attribute of an objectôs material, you create a specular map which lets you describe how shine appears on objects (by controlling highlight).

To learn more about how you can work with highlight, see Common surface material Specular Shading attributes.

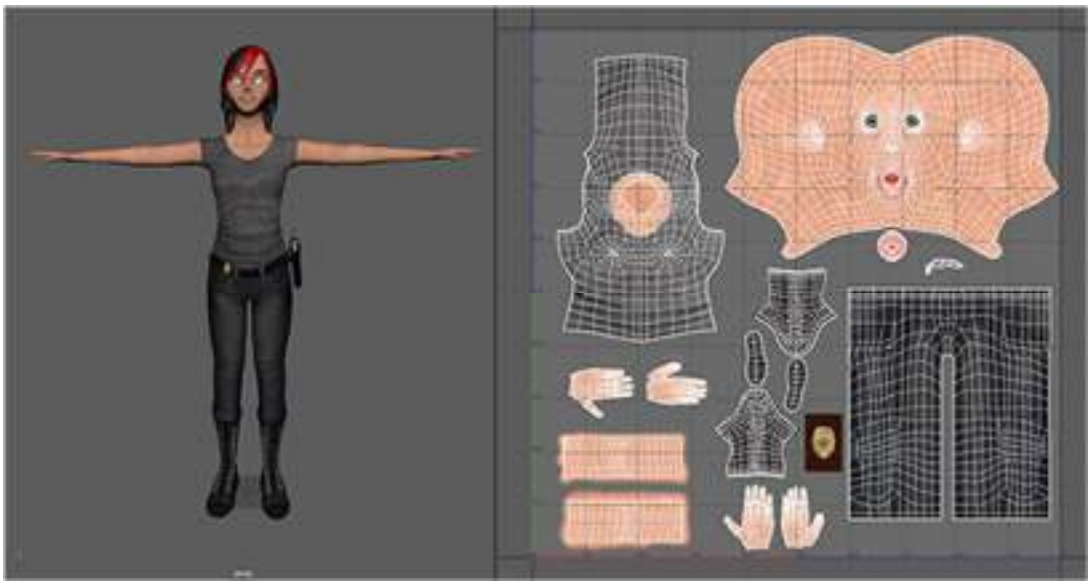
Reflection maps
By mapping a texture to the Reflected Color attribute of an objectôs material, you create a reflection map which lets you describe how an object reflects its surroundings.

Bump maps
By mapping a texture to the Bump attribute of an objectôs material, you create a bump map which lets you add the illusion of surface bump detail to a surface.

Displacement maps
Displacement maps let you add true dimension to a surface at render time, a process which may reduce or eliminate the need for you to create complex models.

UV mapping

The process of creating explicit UVs for a surface mesh is called *UV mapping*. UV mapping is a process whereby you create, edit, and otherwise arrange the UVs (that appear as a flattened, two-dimensional representation of the surface mesh, over top of the two-dimensional image to be used as a texture as it appears in the UV Texture Editor.



The UV mapping process results in a correlation between the image and how it appears as a texture when mapped onto the three-dimensional surface mesh. UV mapping is a critical skill to master for accurate and realistic textures on polygonal surfaces.

- You create UVs by mapping them onto your surface mesh. For more information see Mapping UVs.
- You view and edit UVs using the UV Texture Editor. You can display the texture image as a background image to let you more easily correlate the UVs to the texture.
- You use the tools in the UV Texture Editor to lay out and manipulate the 2D representation of UVs. For more information see Editing UVs.

Creating UVs

In Maya, UV texture coordinates (UVs) can be created for polygon surface meshes using the following UV mapping techniques:

- Automatic UV mapping

- Planar UV mapping
- Cylindrical UV mapping
- Spherical UV mapping
- User-defined UV mapping
- Best Plane mapping
- Camera UV mapping - see Planar UV mapping

Each UV mapping technique produces UV texture coordinates for the surface mesh by projecting them onto the surface mesh based on its inherent projection method. However, the initial mapping produced via the above UV mapping techniques does not usually produce the final UV arrangement that is required for a texture. As a result, you will often need to perform further editing operations on the UVs using the UV Editor. It is best to map UVs onto a model only when it is complete.

Note: Polygon and subdivision surface primitives have default UV texture coordinates that can be used for texture mapping. However, if you modify the default primitives in any way (that is, scale, extrude faces, insert or delete edges) you will need to map a new set of UV texture coordinates onto the object to suit your texture mapping requirements.

Bump maps

Bump maps are grayscale textures you map to objects to create the illusion of surface relief (elevations and depressions) on an otherwise flat object.

With bump maps, depressions and elevations look real because they donôt alter the geometry of the surface the way Displacement maps do. Bump maps just change the direction of the surfaceôs normals based on the bump mapôs Alpha Gain value.

Use bump maps to create very shallow reliefs. For example, you can make objects look like they are embossed, have shallow rolling hills, and so on.

Because bump maps are not true surface relief, they:

- cannot cast or receive shadows
- cannot be seen if you silhouette the mapped object
- take less time to render than displacement maps

  Note: File textures that are used for bump mapping are usually connected via their out Alpha attribute. If the corresponding texture image file does not provide an alpha channel, then the bump effect may be missing when using certain image formats.

  To avoid this, turn on the Alpha is Luminance attribute in the Color Balance section of the File Texture node. For more information, see File.

Tip:

- Map surface relief (bumps or displacements) to the Blinn surface material to reduce highlight roping or flickering. The soft highlights on Blinn surfaces are less likely to cause roping or flickering than the harder highlights on Phong surfaces.
- Although scratches are like little depressions, you can more easily achieve them with 2D textures.

Simple specular map made in Photoshop

Just like the bump map you can quickly make specular map in PS by changing a few parameters.

a.) Desaturation
To do this simply select Hue/Saturation(Ctrl+U)and set the value of Saturation to -100 or slightly less.

b.) Inversion
Unfortunately now all of the reflections would be in the hollows but we want to achieve just the opposite of that. Thatôs way you need to do inversion. Key combination Ctrl + i will do color inversions and already we can see that map is close to what you are expecting.

c.)Levels
You have to set the Levels that so the black areas will be really crisp and so are going to see the transitions between black and white points.

d.) Sharpen

Itôs always worth to make our map a little sharper. Just go to Filter-> Sharpen-> Smart Sharpen and play with the sliders. Immediately you have a real-time view in the window how the sharpening is changing. Of course you cannot overdo with this.

And this is how it looks like step by step.

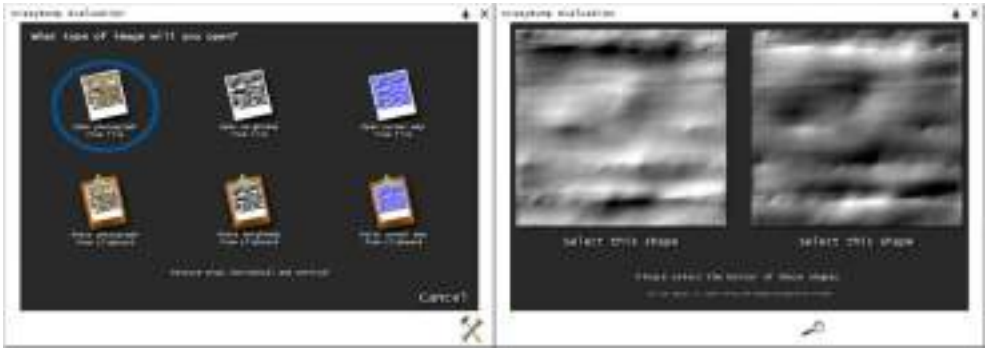
2.Crazy bump

Here is very simple work to do. We will do everything in analogy of the creating the bump map.

a.) Import a map

Now, you have to open your map. Select that option which you can see on the left in the picture below. Once have you chosen the map wait until Crazy Bump will stop thinking and then new

window will appear like on the right side in the picture. Whatôs going on? If you remember how the bump map works(you have to know it!), you should immediately guess that the program gives us a choice of what type of map we want. Map on the left has darker places so when you will choose that one , your map will give more concavity effect, and the map on the right is the inverse. In fact it doesnôt make a big difference which type you will choose, because in 3ds max you can set the right value of the map.



b.)Settings
First of all there is a fewer setup sliders than on bump card however that doesnôt change the fact that you can get great effect or screw up everything :D

Description of the parameters for the Specularity map

Slope influence

- here you can make that the holes will look deepen. I donôt recommend changing it from a zero value. Below you can view how map is changing while you are changing this and the other settings.

Texture influence

- Here you can change the influence of texture on the map. Why I would to change it from a zero value? Itôs a very good question :P Itôs only useful when you have a texture with a lot of pits and bulges, then you can make that the light will reflect only on the most sharp places.

Enhence detail

- responsible for the amount of detail to be included on the map.

Brightness

- higher value makes map will beé all shiny without taking into account the number of pits and bulger of diffuse map.

Contrast

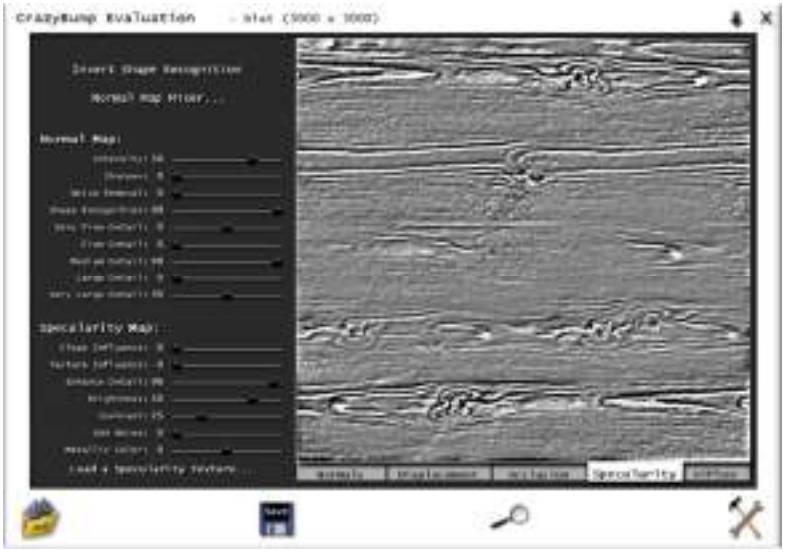
- with increasing contrast, collapse places will be more sharp. Sometimes this can be useful (for example on leather seat material) but usually the better way is just set a value in the range 15-25.

Add noise

- this can add noise to the map

Metallic color

- this can add metallic color to the map



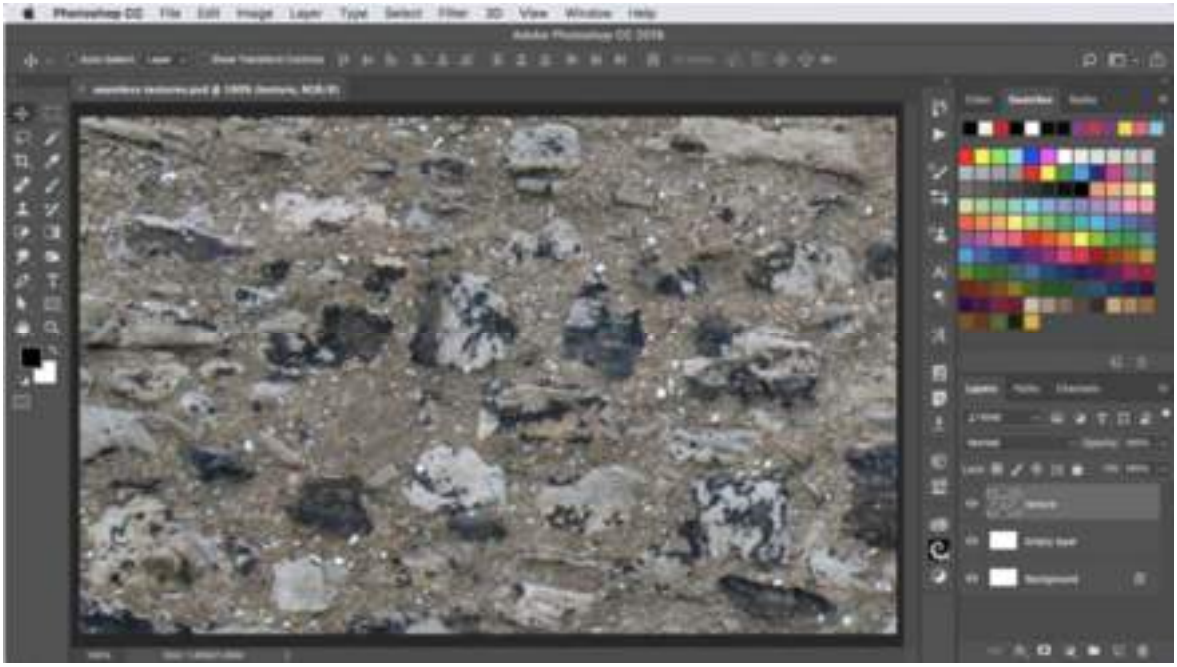
c.)Saving the file
Letôs choose save(floppy disc) -> save normals as -> and here we have to pick out the same typ of map like in the second method ï tiff format. Sometimes map doesnôt want to work (I read that on the internet). The way to avoid this is very simple, just reopen the file in Photoshop or another type of program and simply save it again and it will work correctly.

How to Create Seamless Textures in Photoshop

Whether youôre wrapping textures around 3D objects or simply filling a background, itôs likely youôll need to fill a larger space than your original texture block will allow. The problem is how to avoid the obvious joins where the texture repeats. Hereôs a simple solution that you can use to make any texture seamless.

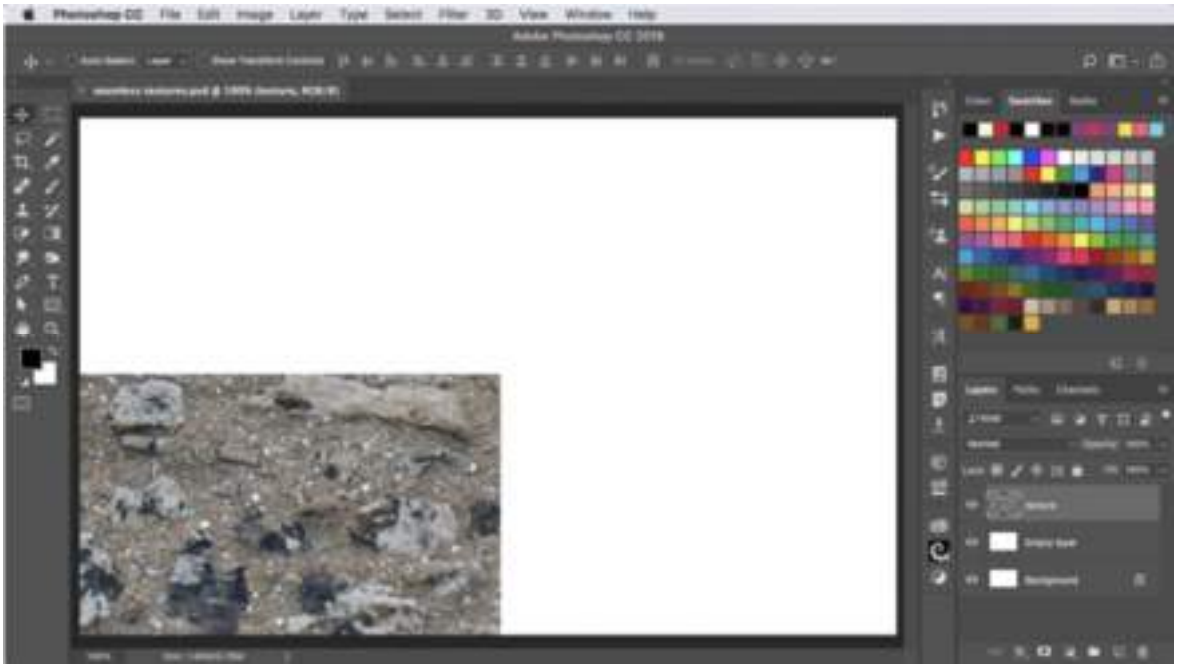
Step 1: The starting texture

Choose your texture, and crop it so that it fits the Photoshop window ï you donôt want any of it to hang off the canvas. If you have your Crop Tool set so that it doesnôt delete pixels, which is standard, then after youôve cropped Select All and then make a new layer from the selection. This will limit the new layer to just whatôs visible in the window.



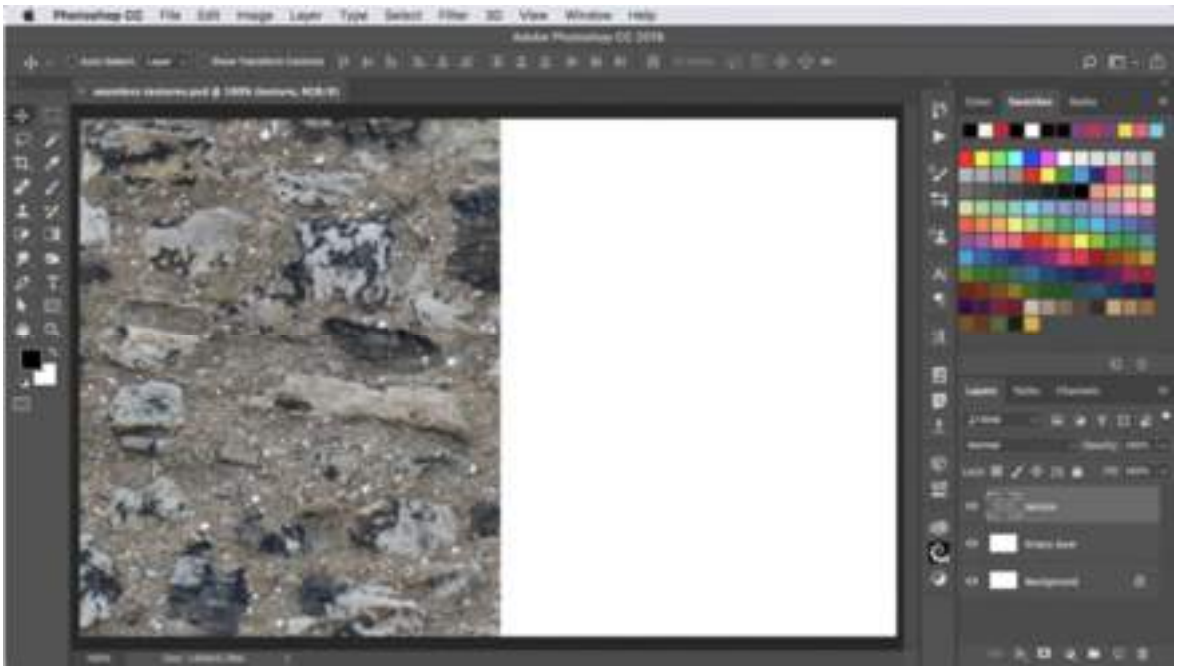
Step 2: Offset the texture

Drag the texture layer to the bottom left, so the corner of the texture is now more or less in the middle. You donôt have to do this precisely.



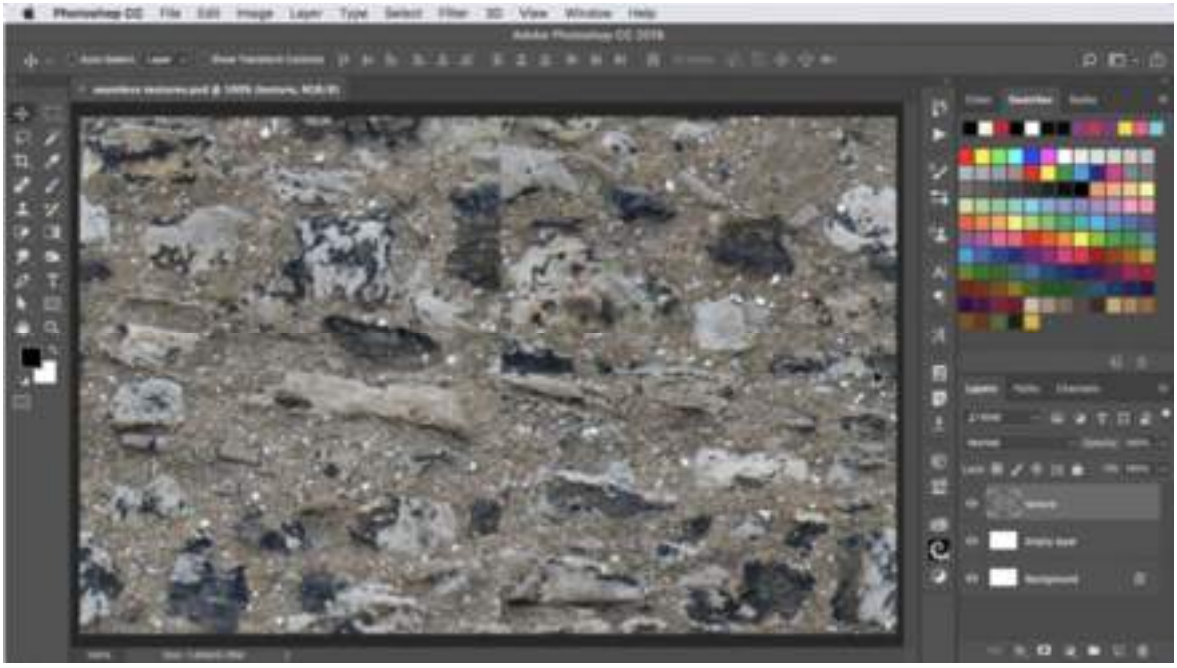
Step 3: Repeat the texture

Hold Option/Alt as you drag the texture up with the Move Tool to make a copy, holding Shift so it moves exactly vertically, until the bottom of the repeated texture meets the top of the existing one. Then use Command/Ctrl+E to merge these two layers together.



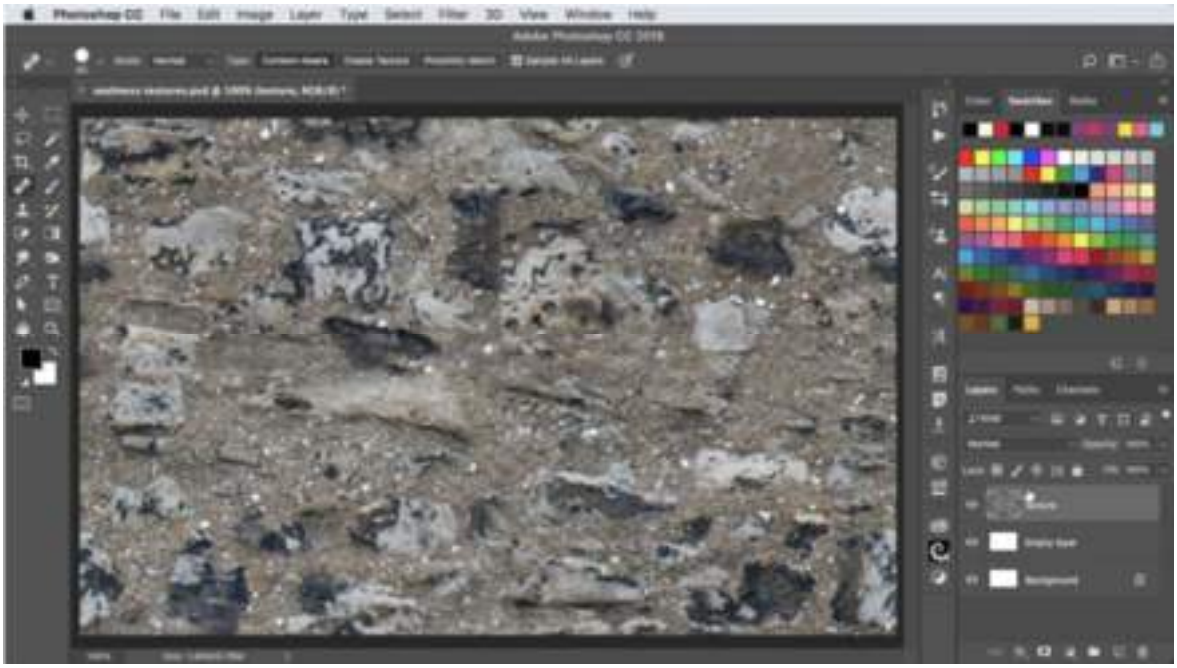
Step 4: Repeat again

Now drag the layer to the right, again holding Option/Alt and Shift to make a copy. Merge down once again. You'll now have offset the original texture so that the edges are in the middle. The joins are obvious here – but you know that where the texture goes off the top, it seamlessly repeats on the bottom, and the same for left and right.



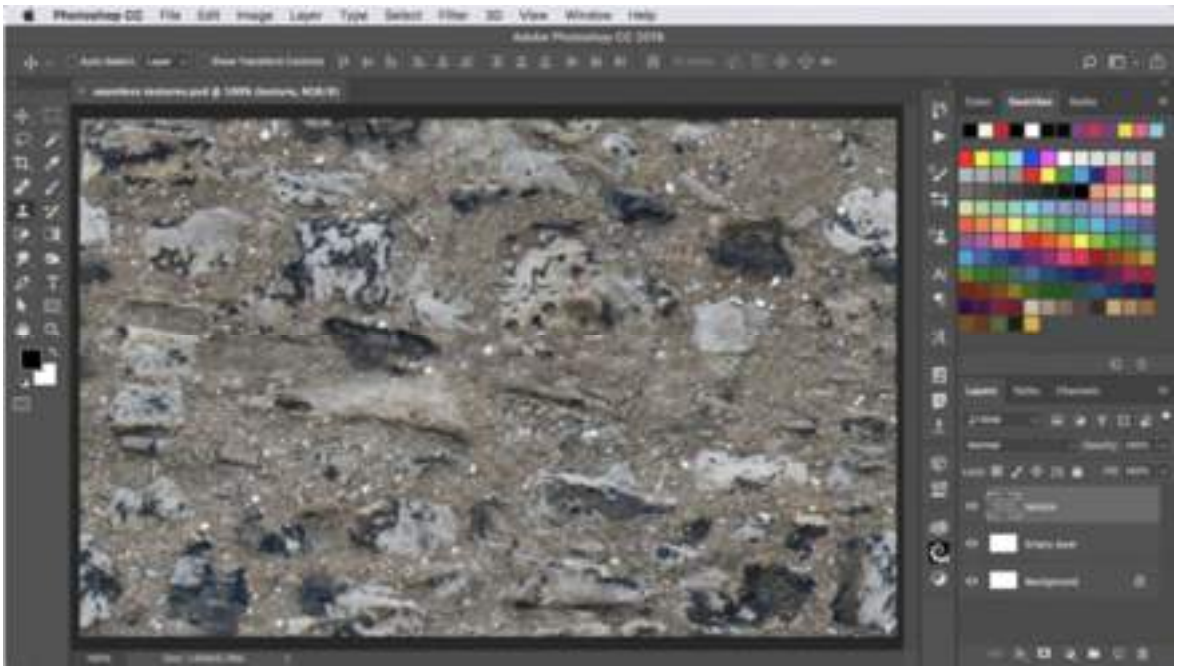
Step 5: Patch the joins

The easiest way to begin is to use the Spot Healing Tool, dragged vertically down the centre and horizontally across. This will be a great start, although you're not there yet.



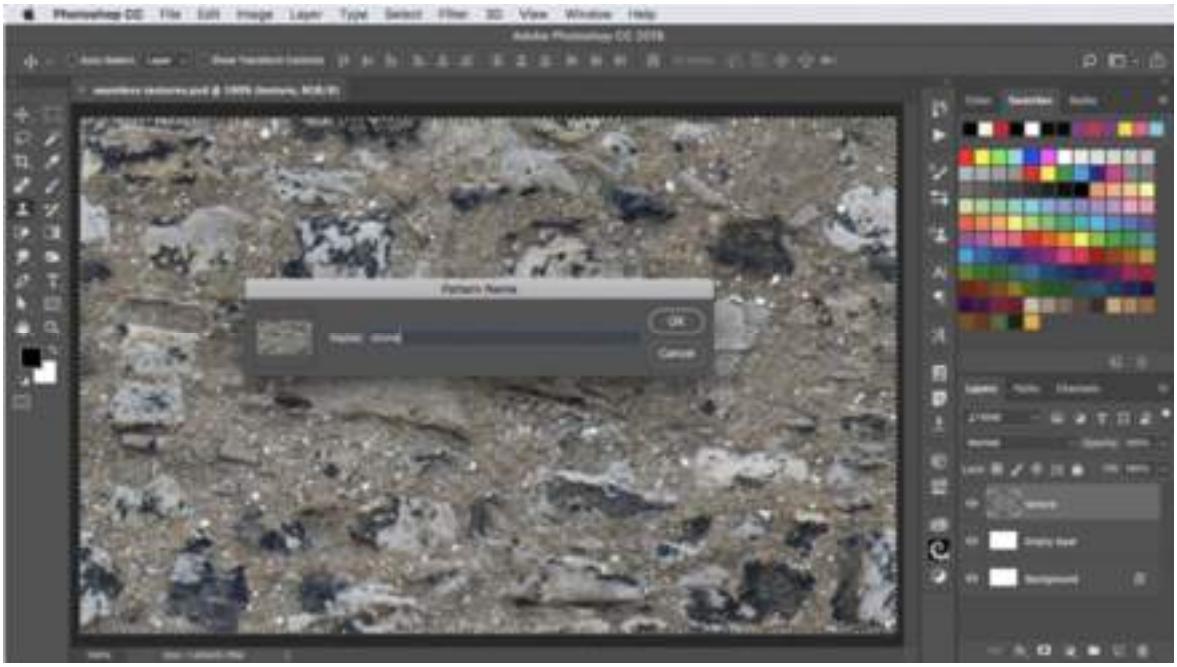
Step 6: Fix the errors

After using the Spot Healing Tool you'll probably be left with some unwieldy patches – such as the black stone at the top of this image, which looks too cut-off on the right. Switch to the Clone Tool, and use it to sample clear patches of background to cover up any anomalies.



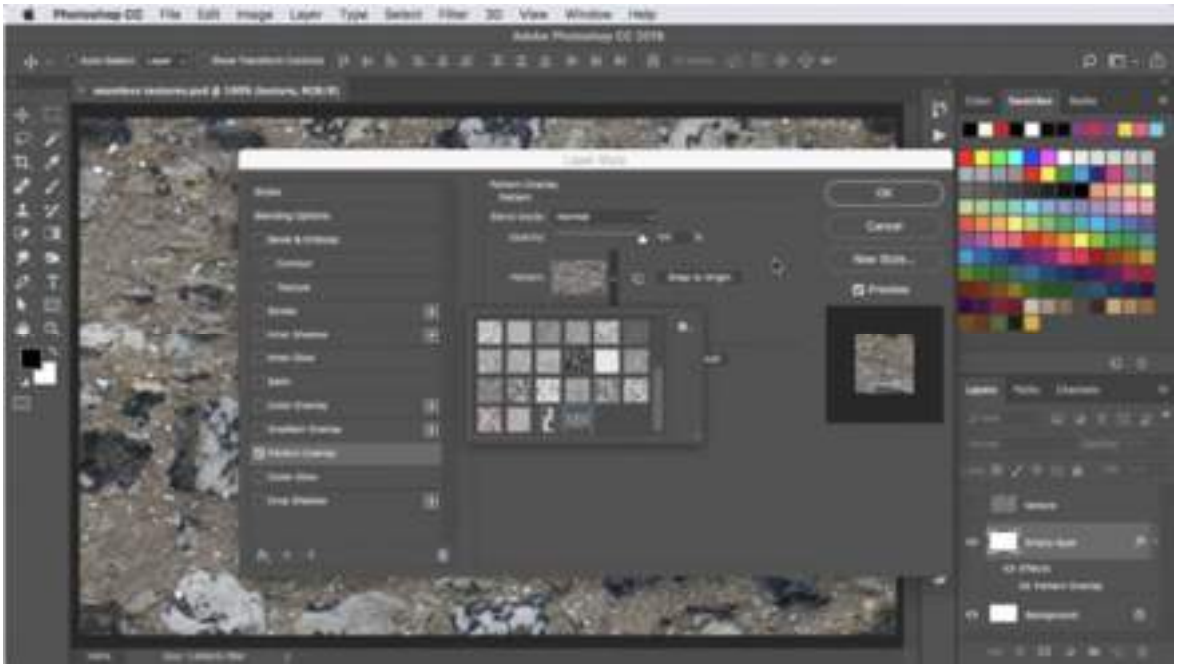
Step 7: Save the texture

Select All, then go to Edit > Define Pattern. Give the new pattern a name, and click OK. You'll now be able to use it in any of your Photoshop work.



Step 8: Try it out

The easiest way to test the new texture is to make a new layer, filled with any flat color, and choose Layer > Layer Style > Pattern Overlay. The new texture will be the last one in the list. Once it fills the layer, move the dialog out of the way, and you'll be able to drag it around to check that it really is seamless. You can reduce the scale as well, if you like, to check the repeats.



Unit 3: Texturing in Photoshop and Autodesk MAYA

1. Create colourmap

Process of creating diffuse map in Photoshop

The diffuse map is a tilable (usally) image which gives the color infomation, but does not contain lighting or height information for the texture. It is stored as dds with dxt1 or dxt3 compression for use in Doom 3 and as 24 bit TGA (with or without RLE) for the hires repository.

If your image has lighting baked in (shadows/highlights), you should remove it.

Photoshop

Inspect the source image. If you're going to tile it, try to find a regular repeating area. This is only to make your job easier. You can tile anything, really, but it depends on how much work you want to give yourself.

After you've chosen a rough tile-able area, crop that area out, and size your image to the desired size ratio. Do not go lower than 1024 resolution at this stage of the work, or you'll start losing picture quality quickly. So set it to 2048X1024, or 1024X1024, etc. The reason we need to fix the size ratio (not the final size) at this stage is for the next step.

Set the offset

Go to Filter->Other->Offset. You want to set the horizontal and vertical to be exactly half of your cropped picture's width and height. That will make the opposite edges of the texture meet each other in the middle of the view, so you can make it really tile-able.

Make the seams disappear

See those seams running right down the middle of the pic, vertically and horizontally? You have to make them disappear. Get to know the clone tool. (Google...) There are many other ways to shuffle pixels too, but I'll leave the specifics up to you. This is usually the hardest, most time consuming step.

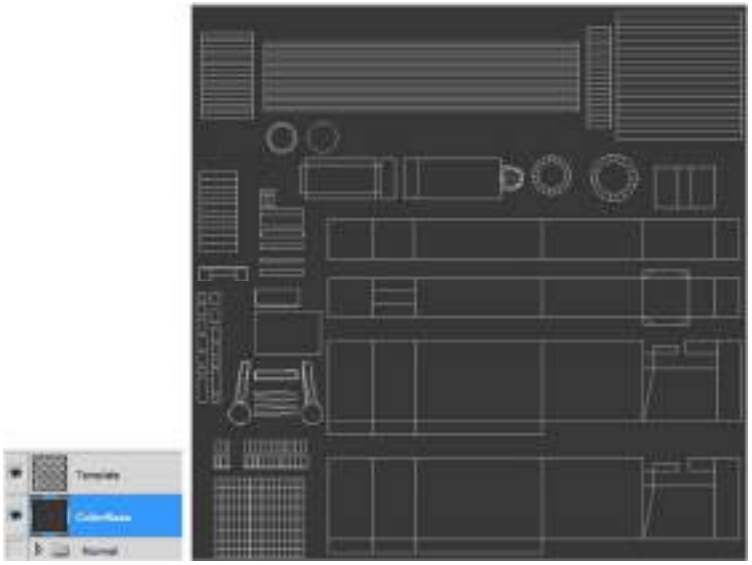
Once you've blended the lines away, run the Offset filter again to restore the correct layout of your pic, and save it out in a nice high quality (but not too big to manage) format. This is the "diffuse" image. We're using 24bit TGA for TDM.

Preparing the Diffuse Map in Photoshop

Open the Normal map project.

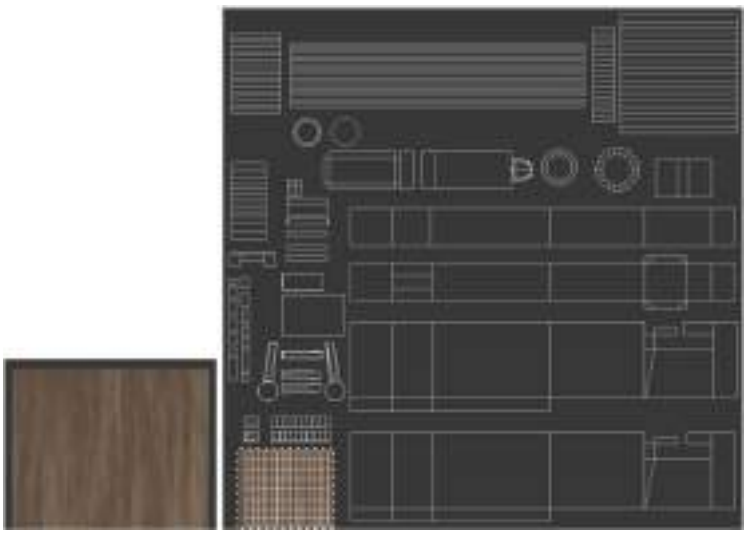
Add a new layer above the Normal group. Name it ColorBase. Change the foreground color to a dark gray.

Turn on the Template layer. Go to the ColorBase layer, and fill it with the foreground color.

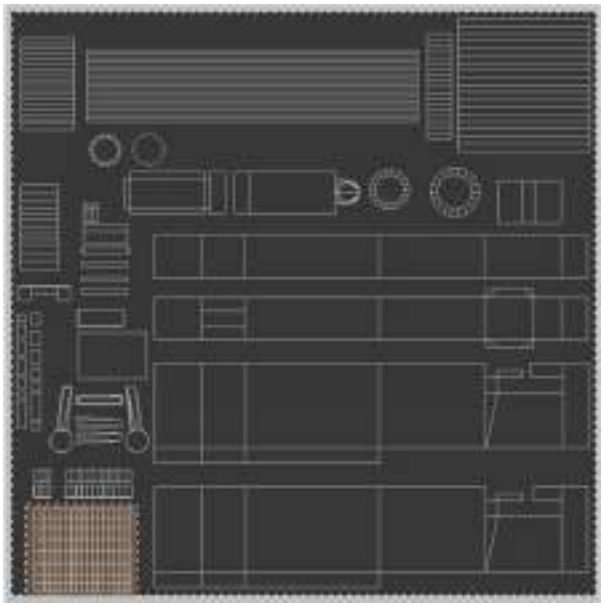


Pick a dark brown color for the foreground, and light brown color for the background. 

On the ColorBase layer, make a selection over the handle grips mesh. Go to Filter/Render/Fibers. This will fill in a wood texture for the handles.



Go to Select/Inverse. This will select all the other pieces which we want to be gray.

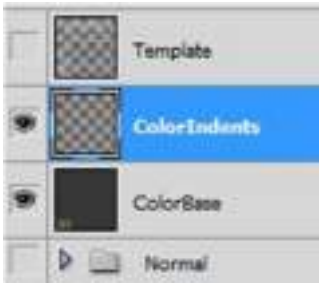


Keep the selection on and go to Filter/Noise/Add Noise/0.25%. This will add a bit of texture.

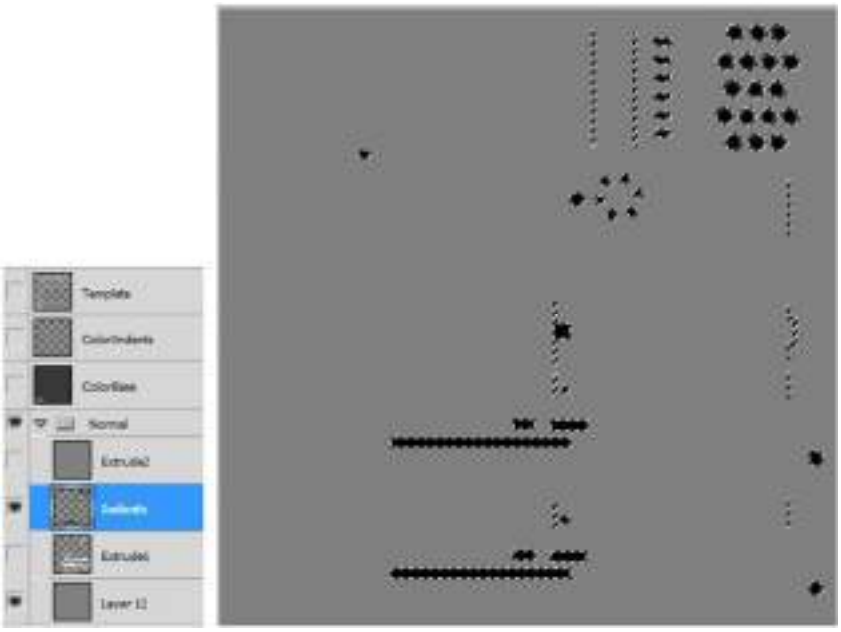
Save your project as a .PSD file. Turn off the Template layer. Flatten the rest of the layers. Then Save Asé Diffuse.TGA

Now check your model in 3ds Max. It is still plain looking, but we will fix that with some layer style effects.

Layer Style Effects
Add a new layer. Call it ColorIndents.

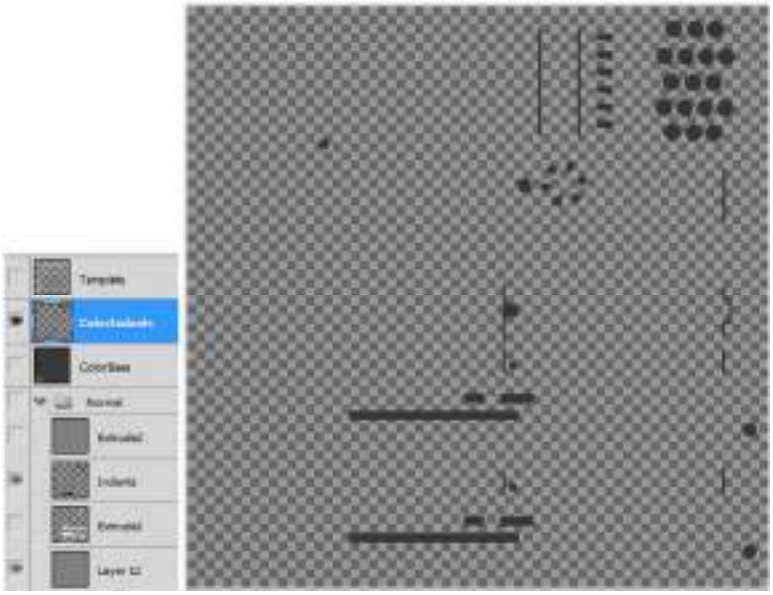


Open the Normal group. Go to the Indents layer in the Normal group. Use the MagicWand tool and click the empty background. Then go to Select/Inverse. The Indents are all selected.



Turn off the Normal group, go to the ColorBase layer and go to menu and Edit/Copy. We now have a copy of the ColorBase texture inside the selections.

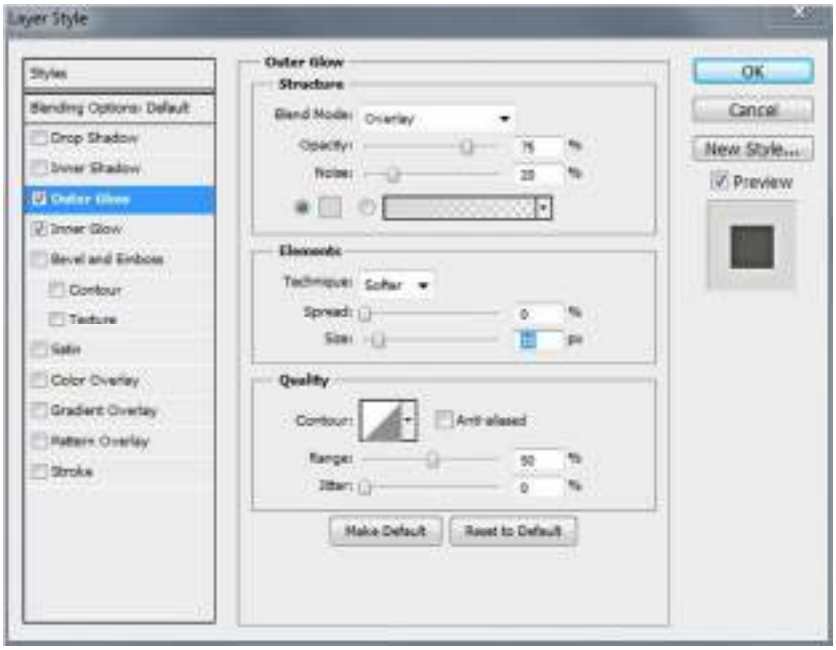
Go to the ColorIndents layer. Then go to Edit/Paste Special/Paste in Place. Merge the pasted layer into the ColorIndents layer. Now we have the ColorIndents layer filled.



Turn on the ColorBase layer and the ColorIndents layer. The pieces blend in. We will use Layer Style Effects to the indented areas to add more color to the texture.

While on the ColorIndents layer, go to Layer/Layer Style/Inner Glow. Pick a brown color to simulate dirt. Blend Mode = Overlay. Size = 10. Noise = 25.

Then go to Layer/Layer Style/Outer Glow. Pick a bright grey color to simulate chipped paint. Blend Mode = Overlay. Size = 10. Noise = 20.



Finally go to Filter/Blur/Blur More. This will smooth the edges of the indented areas.

Now we have the texture for all the Indented areas.

Create two new layers: ColorExtrude1 and ColorExtrude2.

Follow these steps:
ColorExtrude1 layer:

#1. Get the selection of extruded pieces from Extrude1 in the Normal group of layers.

#2. Go to the ColorBase layer and Copy.

#3. Go to ColorExtrude1 and Paste in Place.

#4. On the ColorExtrude1 layer add an Inner Glow for chipped paint, and an Outer Glow for dirt.

#5. Filter/Blur/Blur More.

ColorExtrude2 layer(the rivets):

#1. Get the selection of extruded pieces from Extrude2 in the Normal group.

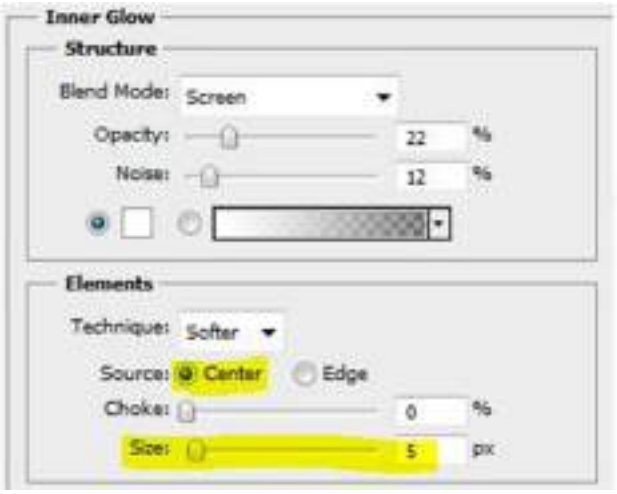
Turn off Anti-alias 

#2. Go to the ColorBase layer and Copy.

#3. Go to ColorExtrude2 and Paste in Place.

#4. On the ColorExtrude2 layer add an Inner Glow for chipped paint, and an Outer Glow for dirt.

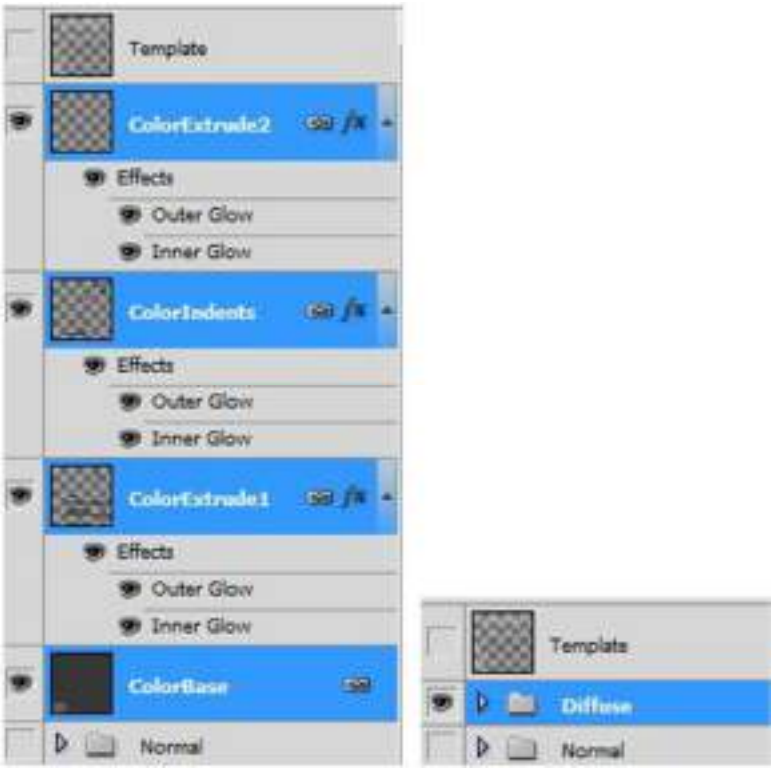
For the rivets, we want the Inner Glow to come from the Center, Size=5.



#5. Donât blur.
Almost finished the Diffuse(Color) map.

Ctrl-click all the layers below the Template layer and above the Normalgroup.

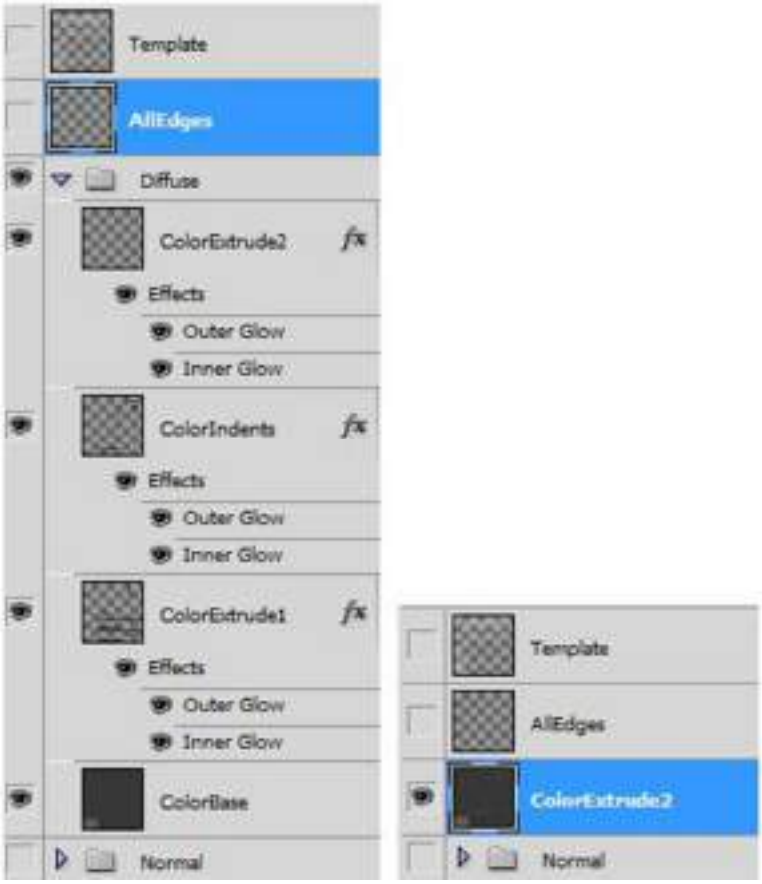
Then right click and go to Link Layers. Under Layers on the menu, Group the layers and rename it Diffuse.



Highlight All Edges

Create a new Layer called Alledges. Put it below the Template layer.

Open the Diffuse group, and turn off all other layers. Merge the Visible layers.



Select the entire screen. Go to Copy on the menu. We just want a copy of this diffuse image.

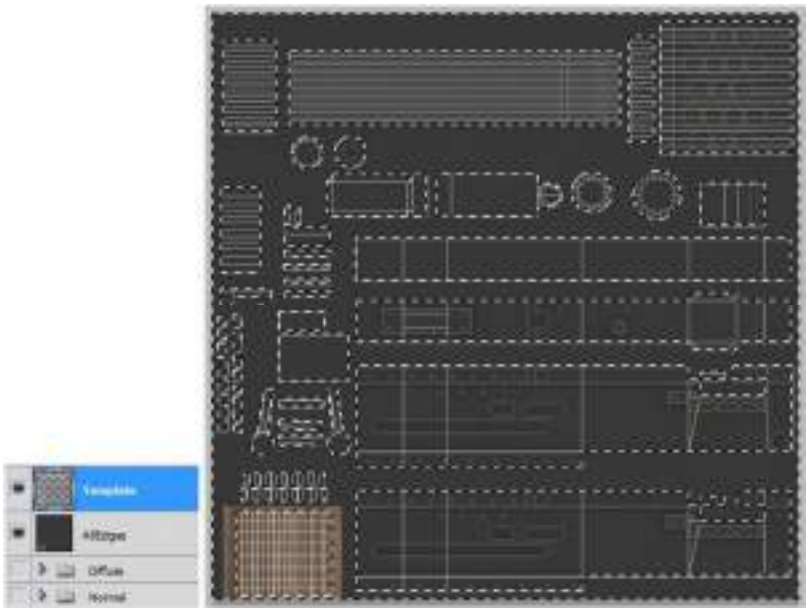
Get the Diffuse group of layers back again. We want to keep the Diffuse group if we decide to make any changes there.

So, CTRL+ALT+Z until you are back the Diffuse group. Now go to the AllEdges layer and then Paste from the menu.

Now we have a copy of the flattened Diffuse group in the AllEdges Layer.

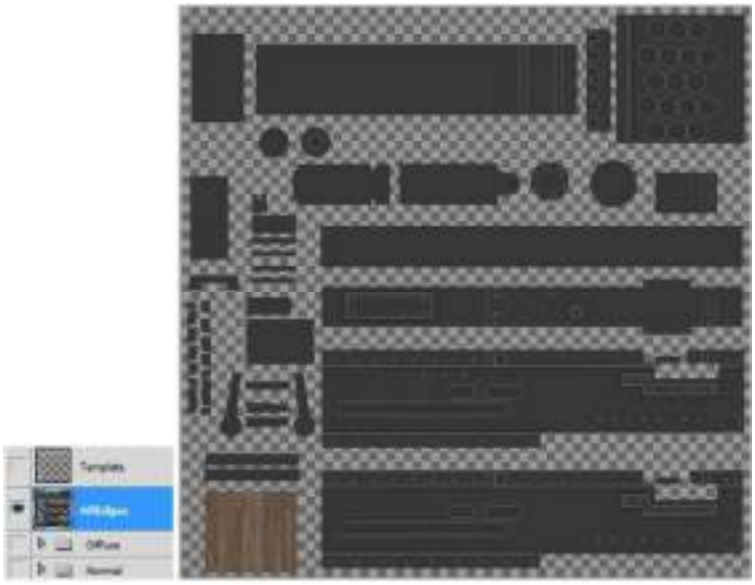
Uncheck Anti-alias. 

Go to the Template layer and use the Magic Wand tool to click anywhere outside the Template pieces.



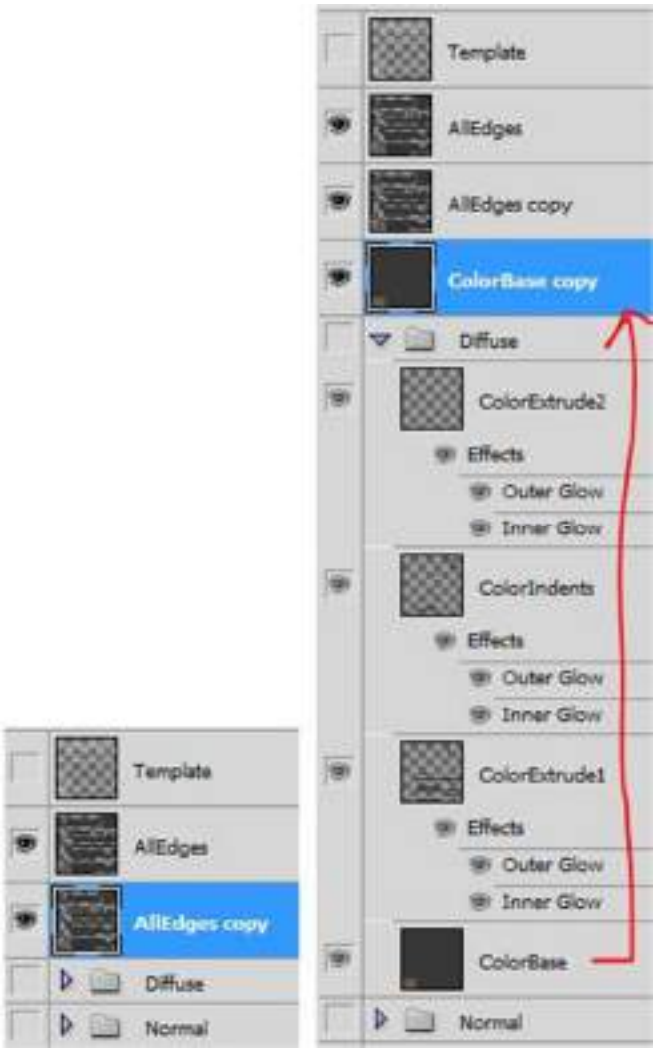
Go back to the AllEdges layer and press Delete. Now we have all the pieces for the gun model.

We just have to add a light gray color to all the edges.



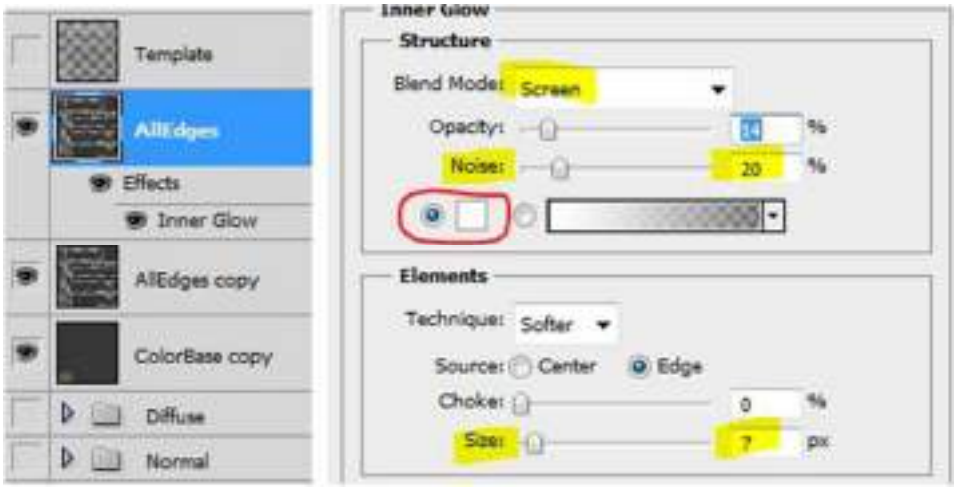
Make a Duplicate copy of the AllEdges layer.

Go to the Diffuse group and make a Duplicate copy of the ColorBase layer and drag it under the AllEdgescopy layer.



Go back to the AllEdges layer. On the menu go to Layer/Layer Style/Inner Glow. White color, Noise=20, Size=7.

All the pieces have a light gray edge.

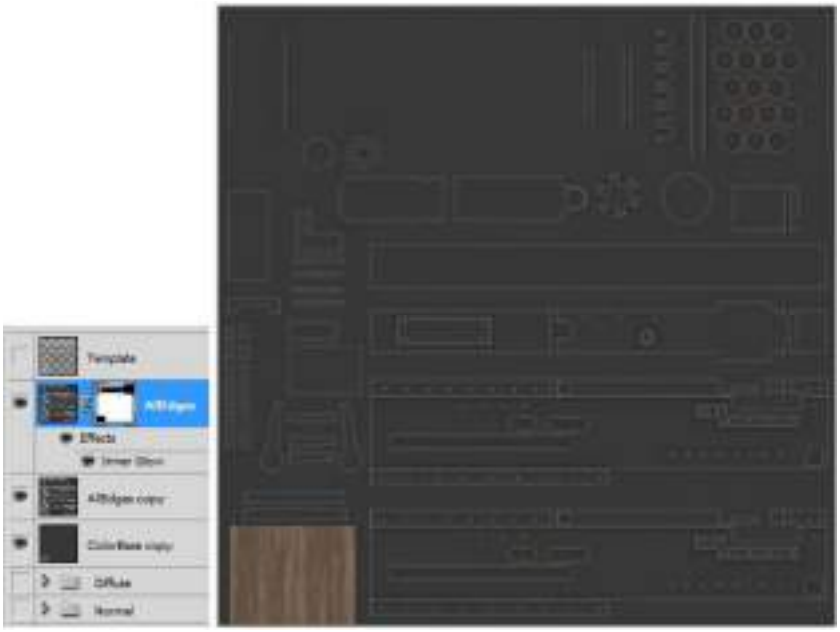


Add a layer mask to the AllEdges layer. Go to Layer/Layer Mask/ Reveal All.

Now use the Pencil tool. Size=25. Make the foregroundcolor black. 

On the AllEdges layer, click the layer mask, then use the pencil to erase edges we donât want to show on the model.

The edges to erase are mostly on the barrel pieces, and the line indent areas on the gun box.

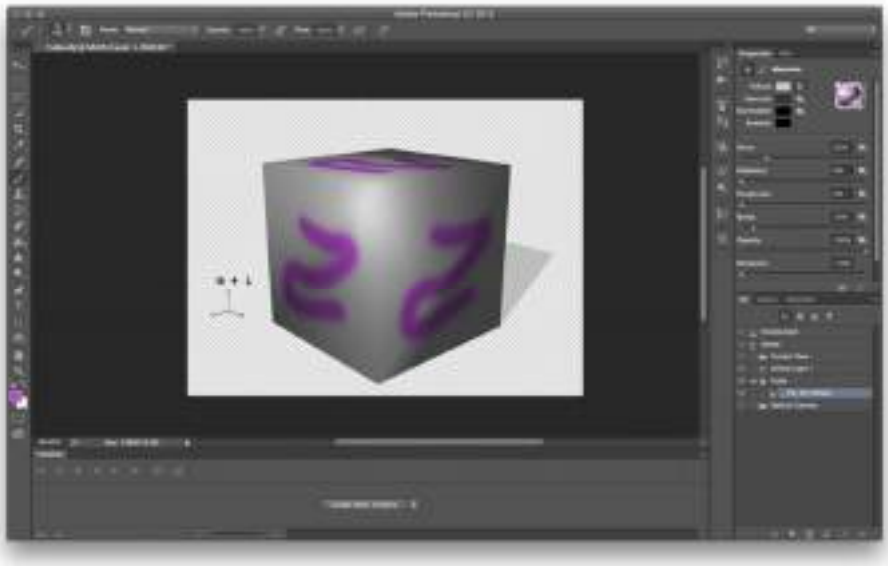


This is the Final Diffuse image.

Save your project as a .PSD file. Turn off the Template layer. Flatten the rest of the layers. Then Save Asé Diffuse.TGA

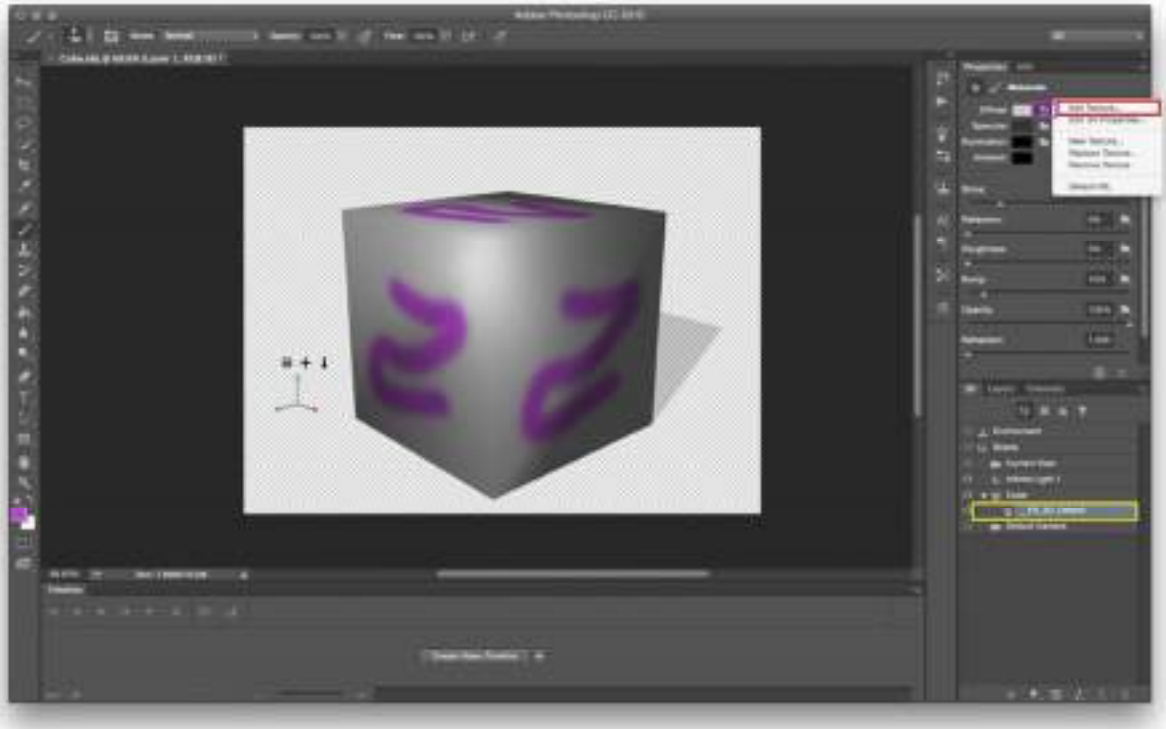
Un rapping the 3D Polygon Object

Within Photoshop the standard brush tool can be used to paint directly onto the 3D geometry and project the paint marks onto the texture map.

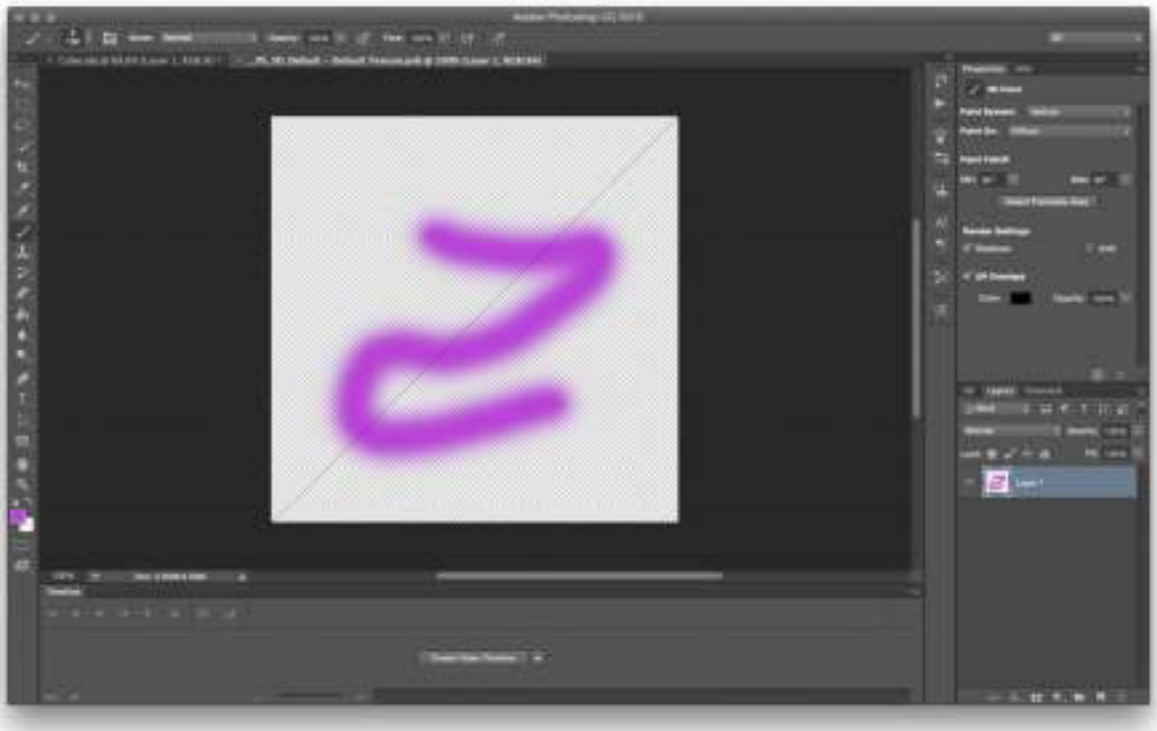


Painting on one face of this particular object will result in the paint appearing on every side. This can be quite confusing to why it happens. If the material for cube is opened, itôs fairly obvious why.

To access the materials for a 3D Object in Photoshop, click on the material object in the 3D menu (marked yellow) and select to open/edit the Diffuse texture (marked in red) from the folder (marked in purple)



It turns out that we only see one face, the reason that we see this result on all faces is that each of the other faces takes the texture from a single definition.



3D Texture maps are controlled by something called UVôs or UVW (in some cases). A UV is a collection of reference points that link texture back to the original Polygons. The U and V are simply references for an X and Y coordinates reference, but are represented in a 2D fashion, this is called un-wrapped geometry. These 2D representations will make texturing and painting much simpler and more controllable. In the case of the cube there are six faces, so therefore six UVôs exist. however, the UVôs in this example are all positioned in the same place, thatôs why we only see one, but in reality there are six overlapping.

This might be want you need to paint the cube for your texture, but if you need to have different designs, patterns and textures on each face, then this wonôt work for you and will need to be corrected.

Photoshop CC can read the UVôs that have been created from a 3D Package and also has a way to automatically correct the UVôs by choosing óGenerate UVsô from the 3D Menu. This again, might be ok for the texture that you would like to paint. However, if you would like to get full control of the UVôs, then you will need to unwrap them using a dedicated 3D package.

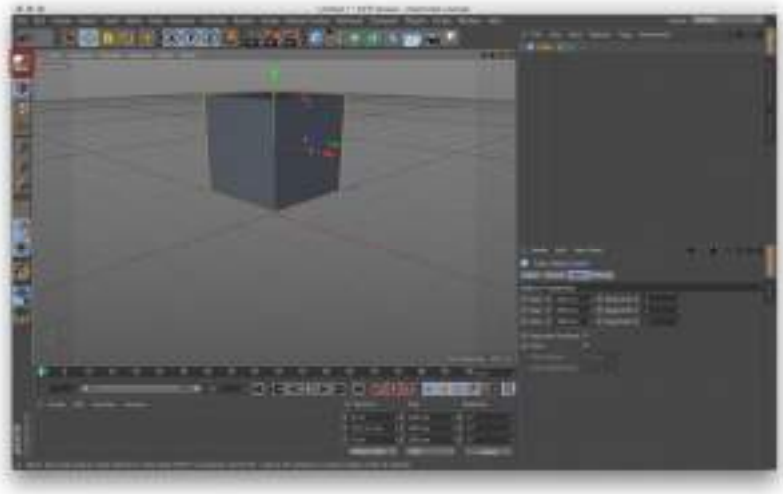
There are many different 3D packages out there and one is Cinema 4D and that is whatôs explained here. **N. B.** You will need Cinema 4D Body Paint to do UV unwrapping with your models.

Within Cinema, you can see the same object that existed in Photoshop CC above. **N.B.** This is a very simple tutorial and not the only way to perform the unwrapping.

When you unwrap, you will want to think about how the textures will be laid on the final object.

The first thing inside Cinema is to make the object editable, clicking the ôMake Editableô button in cinema to do this (marked in red below)

N.B. Make Editable essentially converts the object from parametric (you can still change parameters) to polygons. This is typically done when want to edit the points/polygons by hand, edit the UVW map, etc.



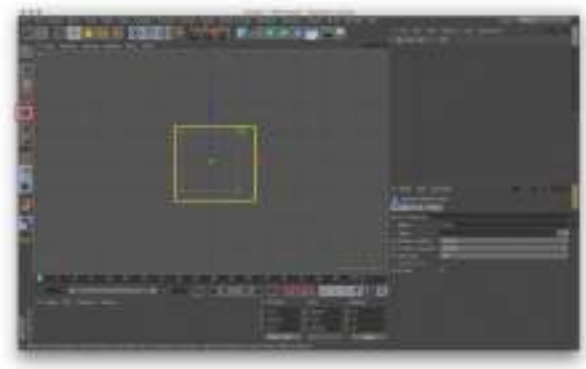
The next step is to define the points that will be used to refer the object on the UVW map. For the cube, move the Cinema view port into top mode.

Each window has a window selector in the top right (as shown in red below). When on the perspective mode as in above, clicking this button (marked in red below), will take you into multi view mode, then clicking on the same button on the required view will show it in full screen.

Move Cinema into the Points view (by clicking on the points mode (marked in red).

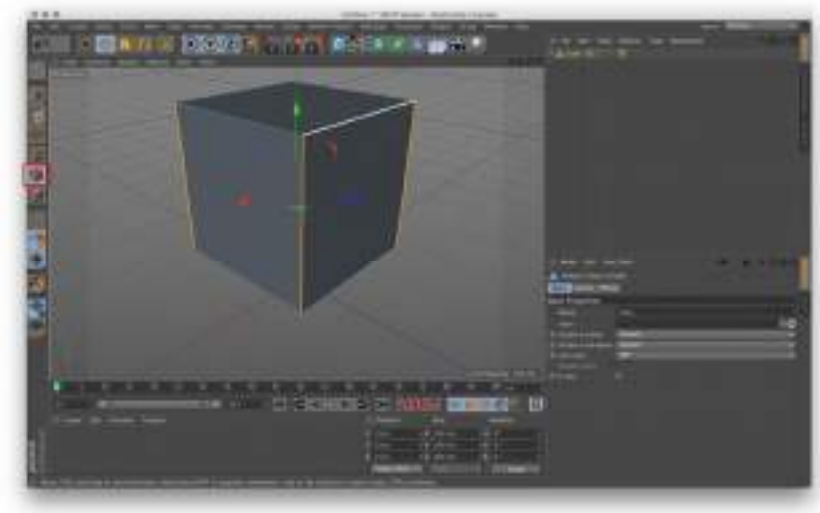
On the top view, hold the SHIFT key down and click on each corner of the square.

N.B. Points refer to Vertices. Vertices/Points are the collections that hold the polygons/edges of the model together.

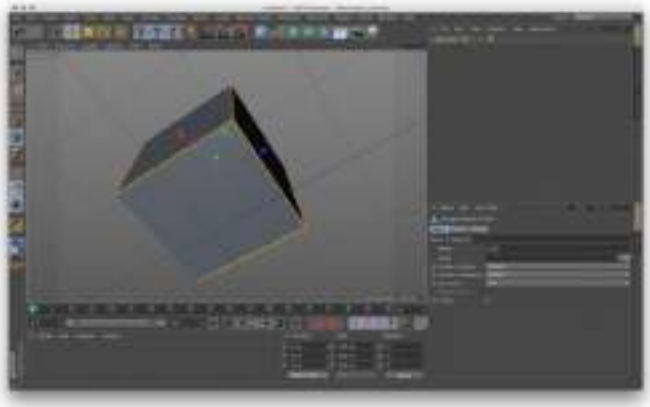


Now move back to perspective mode in the viewport.

The 2D representation of the 3D model (or the UVôs) is a flattened version, so obviously when converting a 3D object to a 2D representation it will need to be cut in certain places. By selecting the edge tool (marked in red), will tell Cinema how to cut the model and lay it down on a 2D surface (Similar to when a tailor makes a suit). In the case below, each vertical edge of the cube is selected (using the SHIFT key), Cinema will cut the model on each edge.

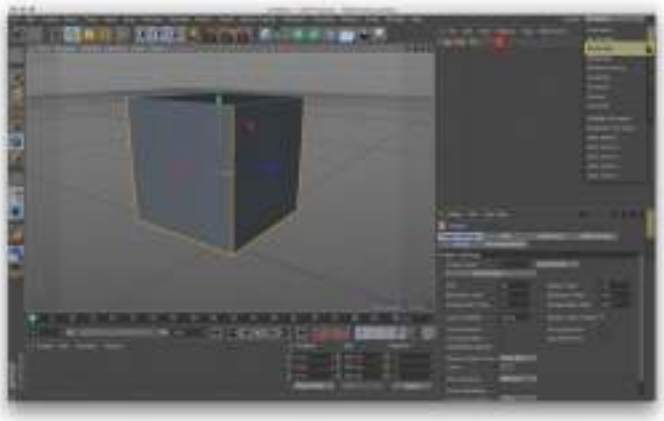


To unwrap this model as a conventional representation, we need to specify the bottom and how that will be cut, bearing in mind how it will be unfolded. We will just specify three sides to cut, leaving the 4th connected to the uncut faces. (Holding the SHIFT key will ensure that these are selected as a collection, if the wrong edge is selected, then pressing CMD/CTRL will allow you to remove a single edge from the collection).



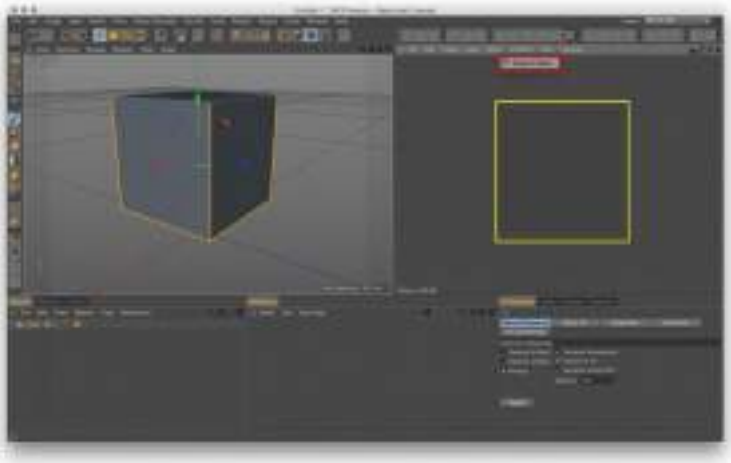
Now, we can unwrap the model into the 2D UV.

The object marked in Red shows that the model has a UV map assigned to it. To access this, change the view port to be in BP UV



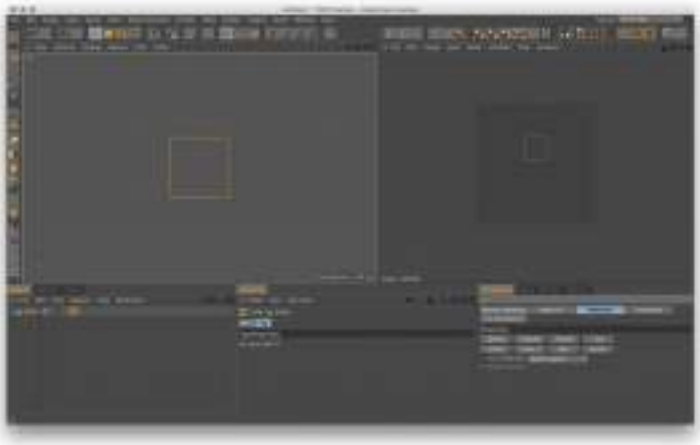
Edit.

When inside the BP UV Edit, you can select ôUV Mesh / Show UV Meshõ, and in this case, the lines shown in the yellow box below, will be the same as what Photoshop is showing.



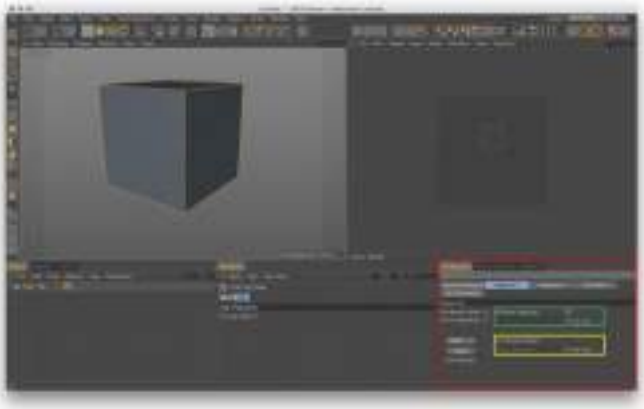
Move Cinema into the top view, as we are now going to specify on the UV where the selected points are. To start specifying the UV, click the UV property (marked in red), then move the viewport into UV mode (marked in yellow). As long as a UV property exists the area marked in purple will become active).

There are many variataions to the next step, but for this we are specifying the points, so just click the Projection / Frontal. This will take the points and represent them on the UV (show below).



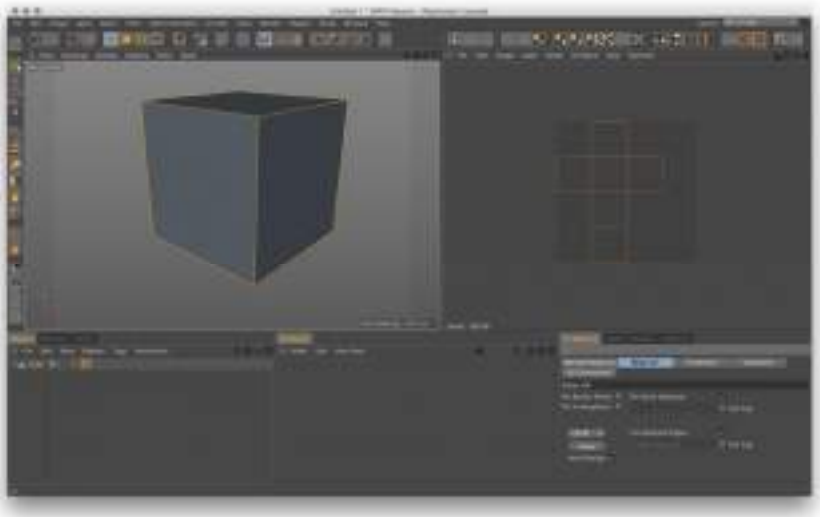
Move cinema into perspective view and click the Relax UV tab.

Make sure the óPin Point selectionôis turned on (but the use tag is turned off), as we will use the active selection, not a saved selection. And make sure that óCut Selected Edgesôis turned on (but the use tag is turned off), for the same reason as just mentioned. Also, make sure that LSCM is selected, as well as having Auto re-align turned on.

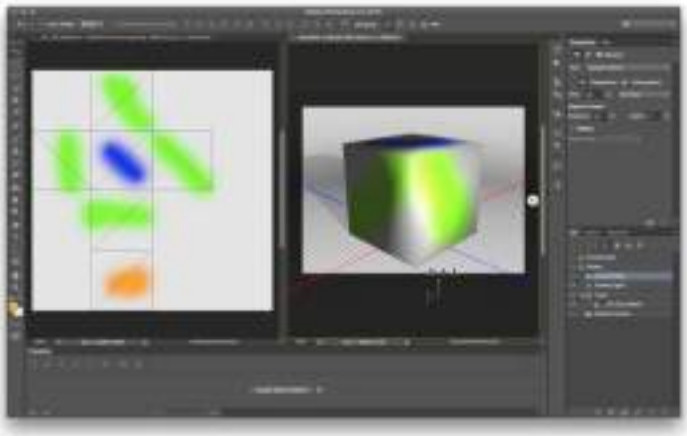


Then click on Apply!

Hopefully the 2D UV will be shown on the right hand side, which will have collapse all six surfaces



Save the Object and export as either Collada 1.4 or OBJ from Cinema 4D, then open into Photoshop CC. Now painting on the 3D model or on the 2D UV map by using the standard Photoshop CC brush tool, should be much easier and each side can be painted independently.



2. Create bump map and use de saturate command

Creating bump in MAYA map in MAYA

Bump maps are grayscale textures you map to objects to create the illusion of surface relief (elevations and depressions) on an otherwise flat object.

With bump maps, depressions and elevations look real because they donôt alter the geometry of the surface the way Displacement maps do. Bump maps just change the direction of the surfaceôs normals based on the bump mapôs Alpha Gain value.

Use bump maps to create very shallow reliefs. For example, you can make objects look like they are embossed, have shallow rolling hills, and so on.

Because bump maps are not true surface relief, they:

- cannot cast or receive shadows
- cannot be seen if you silhouette the mapped object
- take less time to render than displacement maps

Tip:

- Although scratches are like little depressions, you can more easily achieve them with 2D textures.

How to Sharpen Images

There are hundreds of suggestions, tips, and methods for sharpening images. My favourite technique for sharpening uses Photoshop to create a high pass layer and then layer masks to control where and how much sharpening is applied.

A high pass layer works in the same way an unsharp mask works on film: the high pass layer creates slightly blurry halos around edges in the original image, thus increasing the contrast at edges. The difference between high pass sharpening and most other methods of sharpening is that high pass sharpening does not actually adjust or change any pixels in your original image. Also, because high pass exists as a separate layer, you can adjust the layerôs **Opacity** and **Blending Modes** to control the strength of sharpening over the entire image. You can then use masks to control where sharpening is applied within the image and to make localized changes in the strength of sharpening.

Another advantage to sharpening with a high pass layer is you can save the layer with the Photoshop file and go back later and change the settings and areas where sharpening has been applied. This is a huge advantage when working with an image that you might finish for web viewing and printing, or printing on different papers.

Letôs get started.

Step 1: Evaluate Your Image

Iôm going to sharpen the image below. I want to bring out the details in the back left corner (in the circle) and prevent the details in other places (at the arrows) from becoming overly sharp. If I let the artwork at the back of the window display become too sharp, the background will distract from the foreground. If I let the edges of the eyes in the centre mask become too sharp, the mask will look painful to wear. Overall, Iôll need to prevent the colours from clumping and the details from breaking down as a result of too much sharpening.

Step 2: Stamp New Layer or Duplicate Your Image Layer

Sharpening is usually the last or almost the last thing you do when preparing an image, and you want to be sure that you are applying sharpening to a finished, complete image. Therefore, before making your sharpening layer, ensure you have a duplicate layer of your completed image.

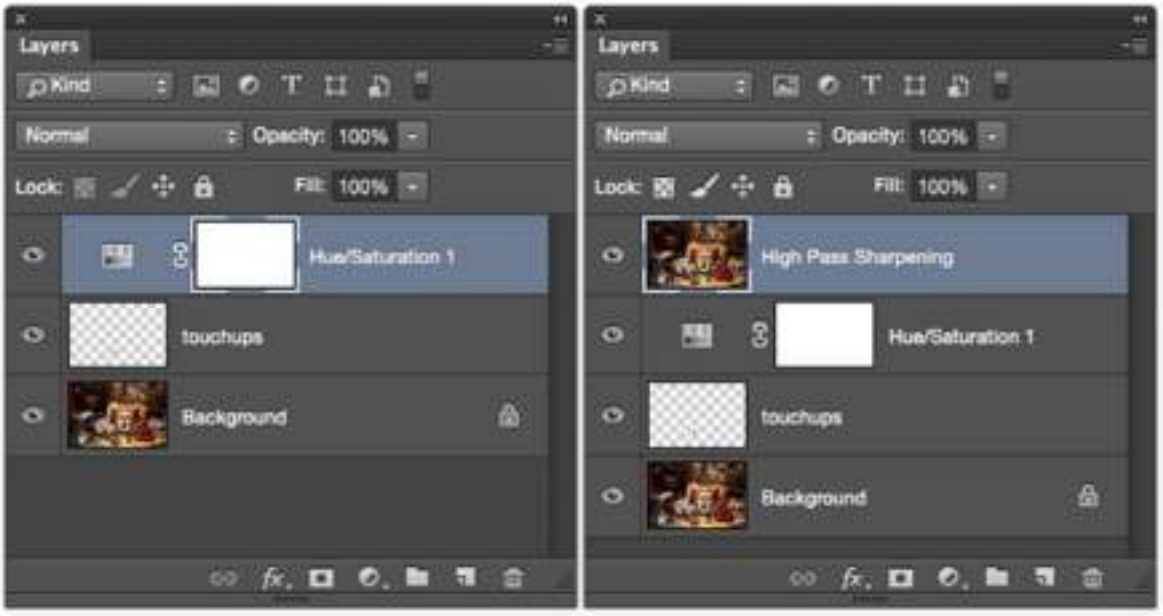
If your work is all on one layer, then just duplicate that layer (**Command-J/Control-J**). If, however, youôve been working on a few layers, then merge the layers together into a *new* layer. In Photoshop, this is called **Stamp New Layer**.

To **Stamp New Layer**, check that all layers you want included in your final image are visible (turned on). Click on (select) your topmost layer and then stretch your fingers to use **Command-Alt-**

Shift-E/Control-Alt-Shift-E to activate the **Stamp Visible** command *and* make that stamp a new layer. (There is no menu item for this command.)

You now have a flattened version of your final image while preserving all of your independent layers. In addition to allowing you to sharpen without making changes to your image, creating this layer allows you to still access your original layers to make further changes, should you wish.

To keep your work organized, rename your new merged layer ñHigh Pass Sharpening.ò

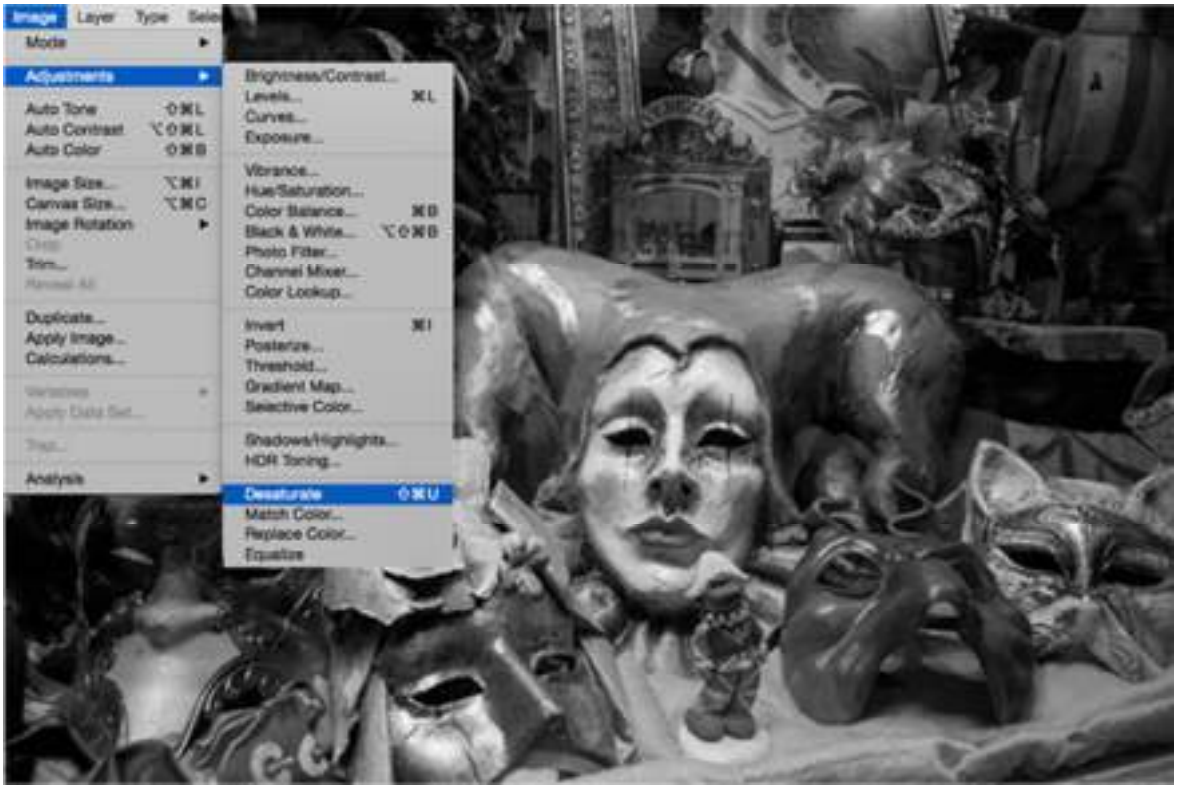


Step 3:Desaturate the High Pass Layer

A disadvantage to sharpening with a high pass layer is the potential for increasing or adding noise to a photo. With other sharpening tools such as **Unsharp Mask**, you can control noise problems with adjustments to the different values set in the tool. With the high pass option, you control noise by doing three things:

- Ensure your image capture is as clean as possible. This means using a tripod if not shooting at a high shutter speed, choosing the lowest ISO possible, and using the correct exposure.
- Deal with any noise while processing your image.
- Desaturate the high pass layer. Even when working on a colour image, the colour information in a high pass layer is irrelevant, so weôre going to remove that information right from the top to ensure that extra information doesnôt add noise.

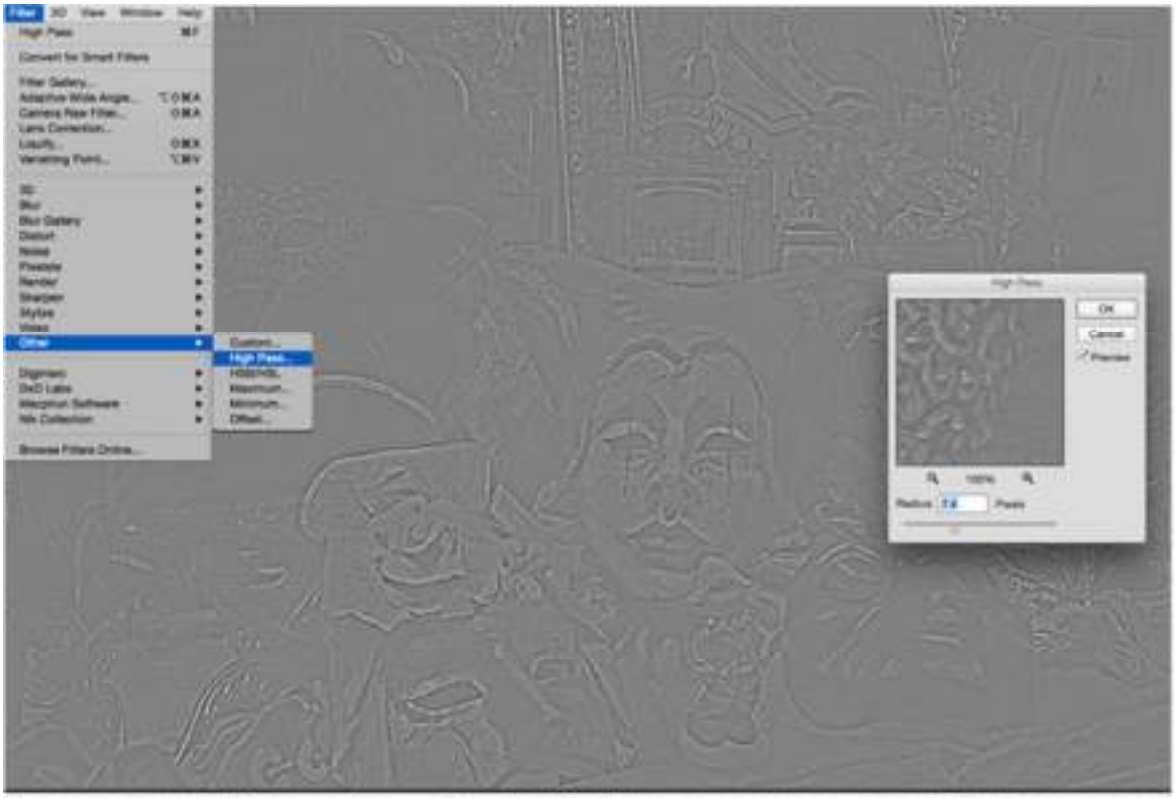
Because we donôt need to preserve an adjustment layer, desaturate the high pass layer by going to **Image** > **Adjustments** > **Desaturate** or use the shortcut **Command-Shift-U/Control-Shift-U**.

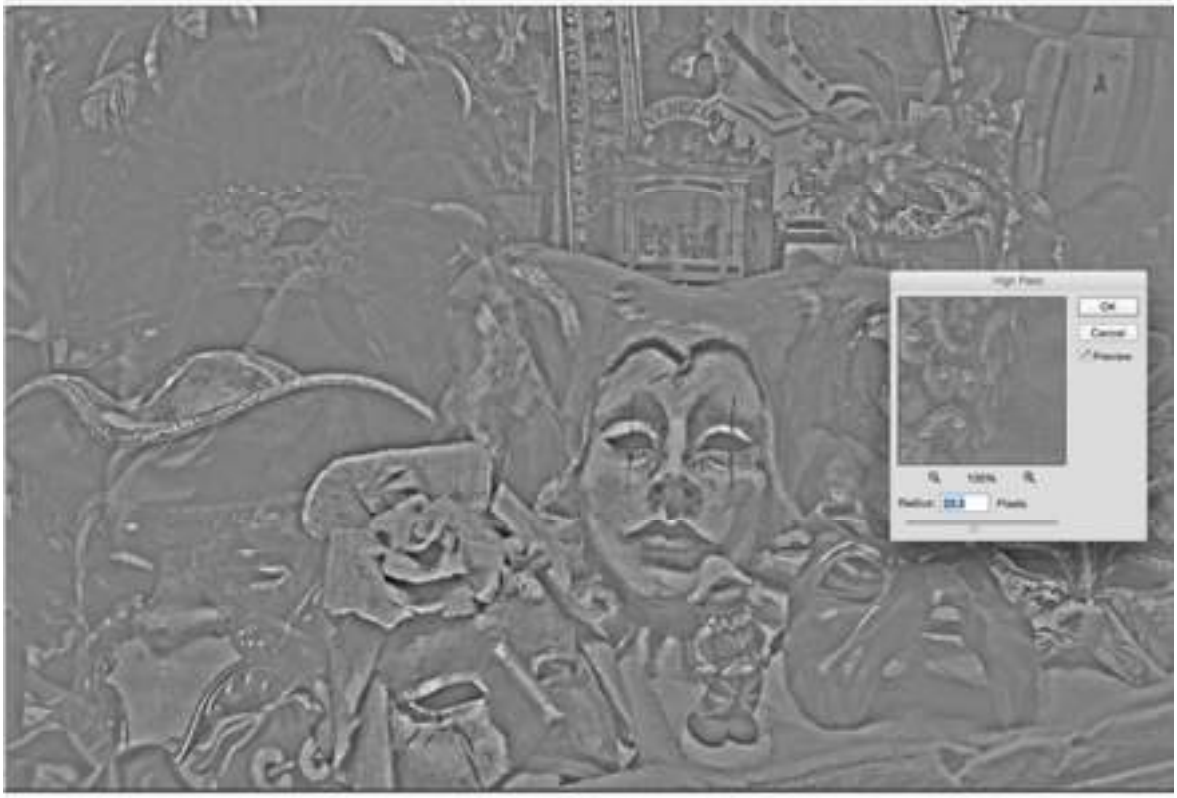


Step 4: Apply the High Pass Filter

To apply the high pass filter to your sharpening layer, go to **Filter** > **Other** > **High Pass**.

This will bring up a dialogue box with a Radius slider. You want to increase the **Radius** slider (increase the number of pixels affected) until the details in the image just begin to pop. You'll find you need more Radius when you're working with high resolution images. Don't be surprised if you need around 10 to 20 pixels or more. Select **OK**.


Filter
3D
View
Window
Help
High Pass
Convert for Smart Filters
Filter Gallery...
Adaptive Wide Angle...
Camera Raw Filter...
Lens Correction...
Liquify...
Vanishing Point...
3D
Blur
Blur Gallery
Distort
Noise
Pixelate
Render
Sharpen
Stylize
Video
Other
Digimarc
DxO Labs
Macphun Software
Nik Collection
Browse Filters Online...
Custom...
High Pass...
HSB/HSL
Maximum...
Minimum...
Offset...
High Pass
OK
Cancel
Preview
100%
Radius: 7.0 Pixels


High Pass
OK
Cancel
Preview
100%
Radius: 23.3 Pixels


High Pass
OK
Cancel
Preview

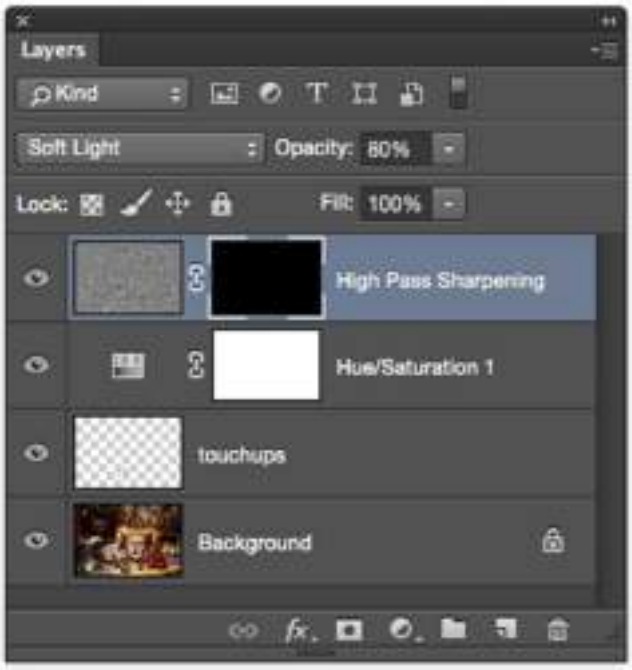
top image has not been sharpened enough; the details appear to be behind a veil. The middle image has been sharpened too much; large patches of colour on the centre mask - which are not edges - are popping. The bottom image has been sharpened correctly for the area that needs the most sharpening (the back left of the image). In that area, the details are just beginning to pop through the layer of grey.

Step 5: Set the Layer's Blending Mode

Change the layer's blending mode in the blending options drop down menu to **Soft Light**. As you become more familiar with using high pass sharpening, experiment with **Hard Light** and **Overlay** blending modes as well.

Step 6: Adjust the Layer Opacity

You will likely find that you now have a bit more sharpening than you need. That's okay; starting with 100%, adjust the **Layer Opacity** down to get the amount of sharpening you need. Aim for an opacity that gives you the right amount of sharpening in the area of your image that needs the most sharpening.



Step 7: Mask the Layer As Needed

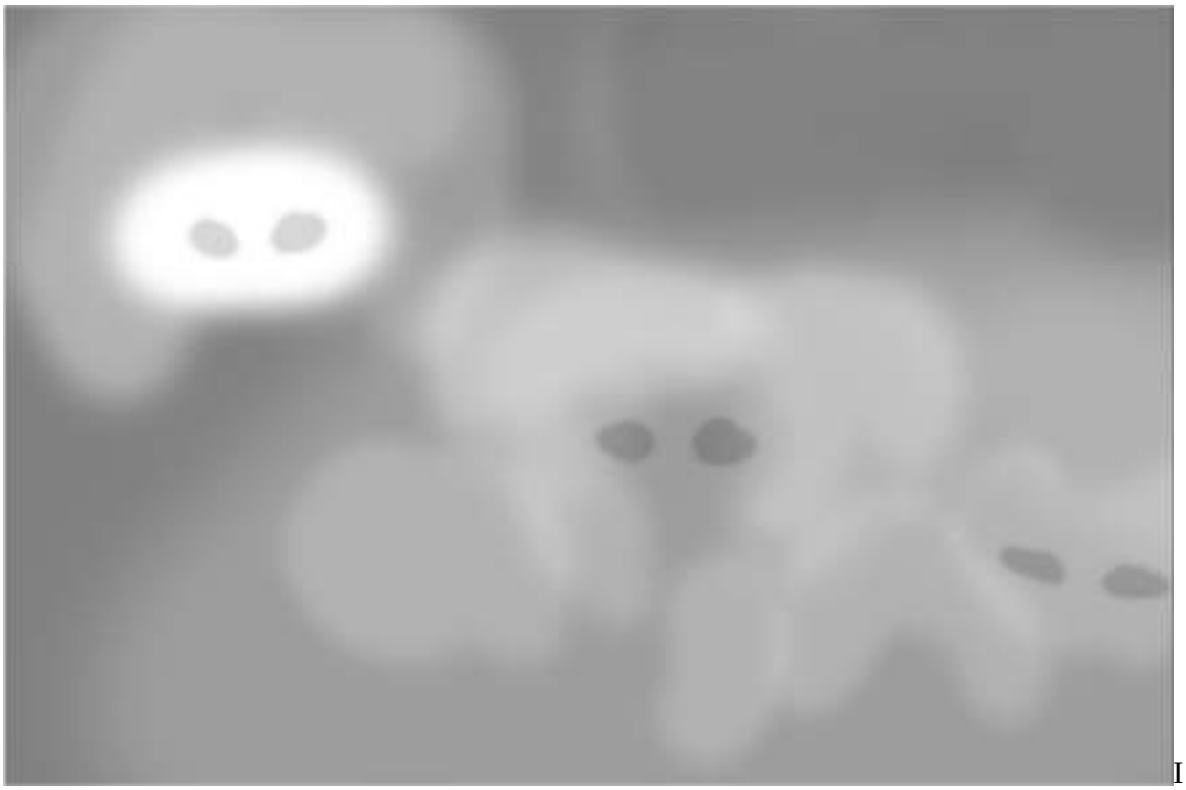
Add a layer mask by clicking on the **Layer Mask** icon at the bottom of your **Layers** window, or by going to **Layer** > **Layer Mask**.

Depending upon how much sharpening you're going to need, you have three options:

- If you need sharpening in many places, add a white layer mask (**Reveal All** or click on the **Layer Mask**icon a the bottom of the **Layers** window), then paint out what you don't need with a black brush.
- If you need sharpening in just a few places, add a black layer mask (**Hide All** or **Alt-click** if you're adding a mask with the **Layer Mask** icon) and paint in what you need with a white brush.
- If you will both add and take away sharpening, add a white layer mask (**Reveal All** or click on the Layer Mask icon a the bottom of the Layers window), then fill the mask with 50% grey. (Set the Foreground colour to 50% grey and with the layer mask active, use **Alt-Delete** to fill the mask.) Paint in what you do need with a white brush and paint out what you don't need with a black brush.

To begin adding or removing sharpening, ensure your colours are set to the default Foreground and Background (**D**). Use a very soft brush (0% **Hardness**) at a medium or larger size. Paint in or out sharpening as you need. Change the **Opacity** of your brush to control how much sharpening you paint in or out.

Turn on and off visibility of the high pass layer while you work in order to check the changes you've made. It's better to not apply quite enough sharpening than to over sharpen an image. Avoid creating edges that become unnaturally razor sharp or causing colours to clump. The dreaded sharpening halos are not as obvious with high pass sharpening as they are with other sharpening tools, so you may not see them before you notice the other two changes.



I chose to fill my mask with 50% grey and then both paint in and out sharpening as I needed. As I finished, I

realized that I wanted a bit more general sharpening across the whole image, so I lowered the opacity of the layer mask, effectively applying more sharpening over the whole image.

Finishing Up

If you discover after youôve sharpened that you need to make other changes in your image, you can still work on the adjustment layers beneath without having to redo the sharpening. You will only have to redo the sharpening layer if you change the actual content of your image by, for example, cloning.

Once I finished sharpening my image, I concluded that my image was slightly oversaturated, so before outputting my final image, I made an adjustment in the Hue/Saturation layer that was beneath the High Pass Sharpening layer.

3. Create specular map

Use of specular maps

By mapping a texture to the Specular attribute of an objectôs material, you create a specular map which lets you describe how shine appears on objects (by controlling highlight).

Common surface material Specular Shading attributes
Some surfaces are shinier than others (for example a wet fish has a shinier surface than a dry leaf). Depending on how shiny a surface is, it reflects light in different ways.

Shiny objects reflect light directly; matte objects diffuse light. Specular highlights show the places on the object where the light sources are reflected at consistent angles; reflections on an object show, among other things, light bounced from surrounding objects.

Specular highlights depend directly on the view (camera), not the position of the light, like diffuse shading does.

The size of a specular highlight on a surface makes the surface look either flat or shiny.

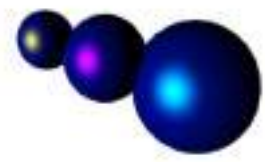
Note: Only materials with specular attributes (Anisotropic, Blinn, Phong , and PhongE) have surface highlights. The *specular highlight* is the white shiny glow on the material.

Tip:
The Blinn material is recommended for shiny surfaces in animations. Highlights on other specular materials, like Phong and PhongE, may flicker when animated.

For material-specific specular shading attributes, see the particular material.

Specular Color

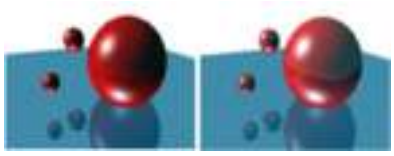
The color of shiny highlights on the surface. A black Specular Color produces no surface highlights. The default color value is 0.5.



Tip: For glossy plastic surfaces, use a whitish Specular Color. For metallic surfaces, use a Specular Color similar to the surface color.

Reflectivity

Gives the surface the ability to reflect its surroundings or the Reflected Color (similar to Specular Roll Off). The valid range is 0 to infinity. The slider range is 0 (no reflections) to 1 (clear reflections). The default value is 0.5.



Reflectivity values for common surface materials are car paint (0.4), glass (0.7), mirror (1), chrome (1).

Note:

- For the Anisotropic material, you must turn off Anisotropic Reflectivity to change this value.
- Real reflections are only calculated during raytracing.
- If you are doing raytracing and you want other objects in the scene to be seen in reflections, then for those objects you must ensure the Visible In Reflectionsattribute is turned on in the Render Stats section of the Attribute Editor. (It is on by default.)

Reflected Color

Represents the color of light reflected from the material. When raytracing, Maya multiplies the color with the light color reflected mirror-like from the surface. This can be used to tint a reflection.

If you are not raytracing, you can map an image, texture, or environment map to the Reflected Color attribute to create fake reflections, which is faster and uses less memory than raytracing. This is called reflection mapping.

Specular

Weight

The specular weight. Influences the brightness of the specular highlight.

0

0.5

1 (default)

Color

The color the specular reflection will be modulated with. Use this color to 'tint' the specular highlight. You should only use colored specular for certain metals, whereas non-metallic surfaces usually have a monochromatic specular color. Non-metallic surfaces normally do not have a colored specular.

Red

Green

Blue

Roughness

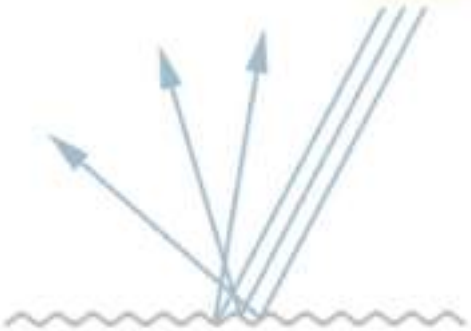
Controls the glossiness of the specular reflections. The lower the value, the sharper the reflection. In the limit, a value of 0 will give you a perfectly sharp mirror reflection, while 1.0 will create reflections that are close to a diffuse reflection. You should connect a map here to get variation in the specular highlight.

0.2 (default)

0.4

0.6

The 'microscopic' features of a surface affect the diffusion and reflection of light. This 'micro surface' detail has the most noticeable effect on specular reflections. In the diagram below, you can view parallel lines of incoming light commence to diverge when reflected from rougher surfaces when each ray hits a part of the surface with a different orientation. In summary, the rougher the surface becomes, the more the reflected light will diverge or appear 'blurred.'



'Microsurface' detail represented as a general measure of roughness (this surface would have a high Specular Roughness value).

The brightness of the Specular highlight is automatically linked to its size due to the *Standard Surface* Surface shader's energy conserving nature. In the example below, all of the materials are reflecting the same amount of light, but the rougher surface is spreading it out in multiple directions. However, with low amounts of roughness, the surface is reflecting a more concentrated amount of light.

0.1 (default)

0.4

0.6

To get variation in the highlights of the surface, a map should be connected to the *Specular Roughness*. This will influence not only the brightness of the highlight but also its size and the sharpness of the environmental reflection.
You may need to connect the file texture to a Range shader to see any results in the *Specular Roughness.*



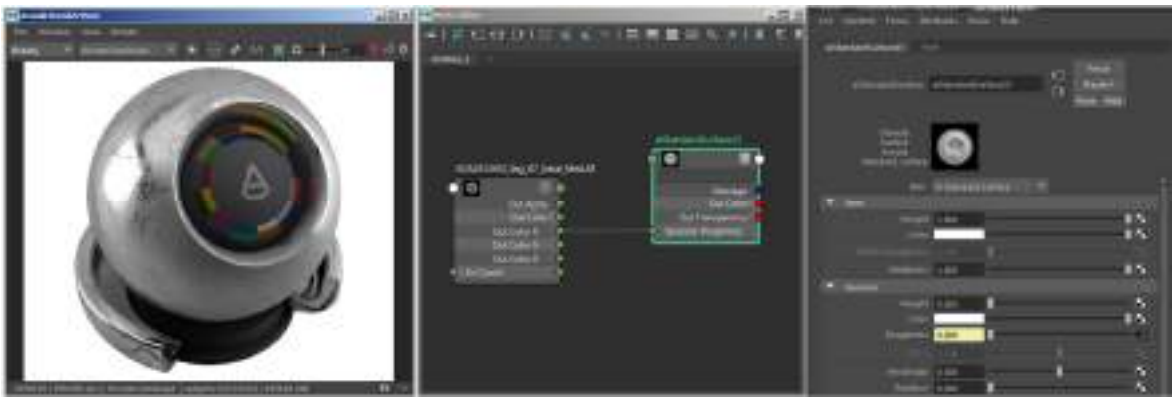
0 **0.5** **1**

Fingerprint texture -> *Specular Roughness*

The specular roughness affects both specular reflection and refraction. There is also a Transmission Extra Roughness parameter to add some additional roughness for refraction if required. You can, however, use Coat to create a rough reflection layer over a sharp refraction.



0 **0.5** **1**



***Out Color R* of file texture connected to Specular Roughness**

IOR

The IOR parameter (Index of Refraction) defines the material's Fresnel reflectivity and is by default the angular function used. Effectively the IOR will define the balance between reflections on surfaces facing the viewer and on surface edges. You can see the reflection intensity remains unchanged, but the reflection intensity on the front side changes a lot.

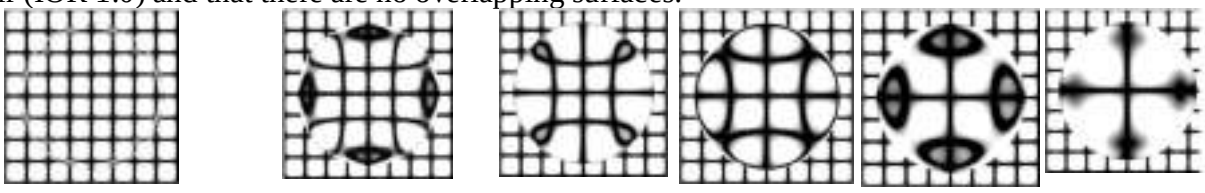
1 **1.1** **1.5 (default)**

Using a very high *IOR* value can look quite similar to *Metalness*. It looks the same if you set the *Base Color* to the *Specular Color* and the *Specular Color* to black. The difference is that you get an extra reflection at the edges, with the *Specular Color* controlling the edge tint. The metal fresnel works the same as in the new complex IOR shader, with the artistic parameters.

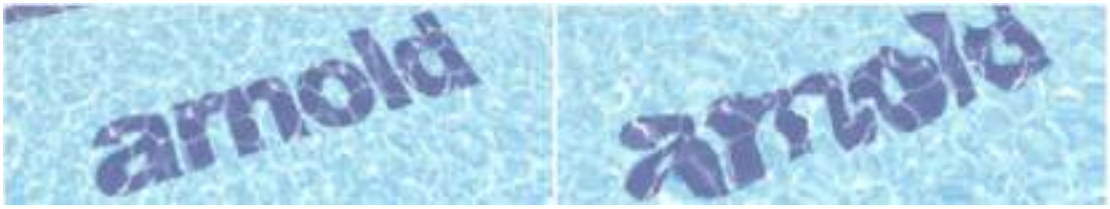
You should normally use *IOR* for materials like plastic, glass, or skin (dielectric fresnel) and *Metalness* for metals (conductive fresnel with *Complex IOR*). The other reason is that *Metalness* is easier to texture since it's in the 0..1 range, and using textures from applications like Substance painter works best when using *Metalness* rather than *IOR*.

Specular IOR with Transmission

The default value of 1.0 is the refractive index of a vacuum, i.e., an object with IOR of 1.0 in empty space will not refract any rays. In simple terms, 1.0 means 'no refraction'. The *Standard Surface* shader assumes that any geometry has outward facing normals, that objects are embedded in the air (IOR 1.0) and that there are no overlapping surfaces.



1 **1.1** **1.2** **1.3** **1.4** **1.5**

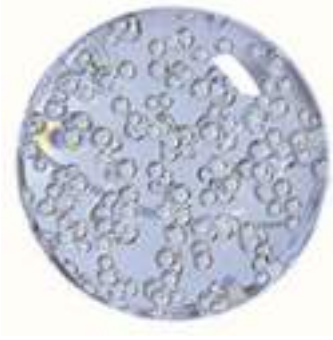


1 **1.5 (default)**

Normals

When rendering refractive surfaces, it is very important that the normals of the geometry face in the right direction. In the example below (left), you can see the difference between normals that are facing in the right direction (outward), versus those that are facing inwards (incorrect). This is especially important when rendering surfaces with double-sided thickness, such as glass. However, with air bubbles in glass (below center), the reverse is true. The bubble geometry normals should be reversed and the bubbles should be combined with the glass geometry. Normal direction is equally important when rendering single sided surfaces such as a car windscreen (right).

Normals pointing outward (correct). Rollover image to view normals pointing inward (incorrect).



Air bubbles in glass: Normals should point inward. Rollover image to view normals pointing outward (incorrect).

Windscreen model (single sided). Rollover image to view normals pointing inward (incorrect).

If you see any black where there should be refraction, you may not have a high enough *Transmission Ray Depth* value (found in the **Ray Depth** section in the render settings). The default value is eight, which is sufficient for most cases.

Anisotropy

Anisotropy reflects and transmits light with a directional bias and causes materials to appear rougher or glossier in certain directions. The default value for *Anisotropy* is 0, which means 'isotropic.' As you move the control towards 1.0, the surface is made more anisotropic in the U axis.

0 (default)

0.6

0.9

Anisotropy is suitable for materials that have a clear brush direction such as brushed metal which has tiny grooves in which form a 'stretched' anisotropic reflection.

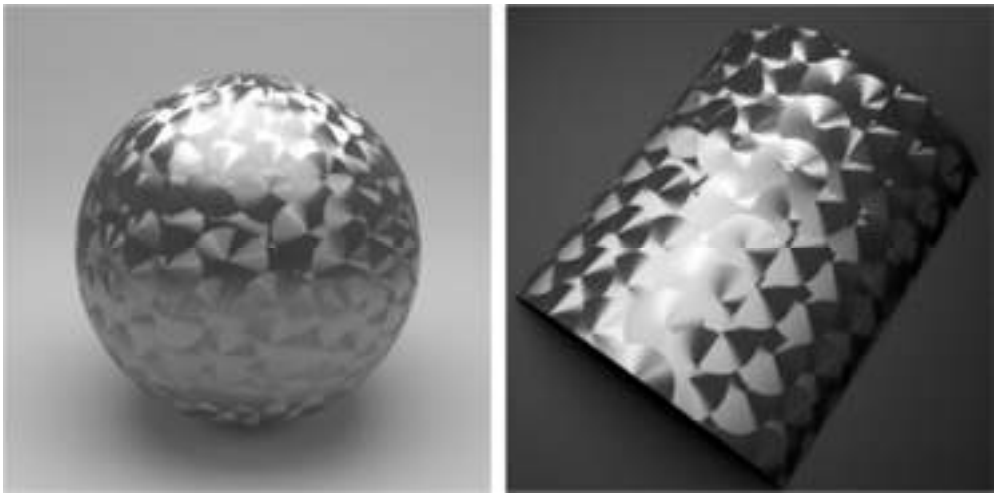
Many small discs form together to create an effect which is the anisotropic highlight

0.3

0.6

0.9

Anisotropic reflections are suitable for brushed metal effects such as in the example below:



Texture assigned to *Anisotropic Rotation*

You may notice faceting appear in highlights when using *Anisotropy*. It is possible to remove the faceted appearance by enabling smooth subdivision tangents (via Arnold subdiv_smooth_derivs parameter). Take into account this requires a subdivision iteration of at least one in the polymesh to work.

Faceting seen in the anisotropic highlight

Subdivision: enabled. Subdivision Iterations: 1. Smooth Tangents: enabled.

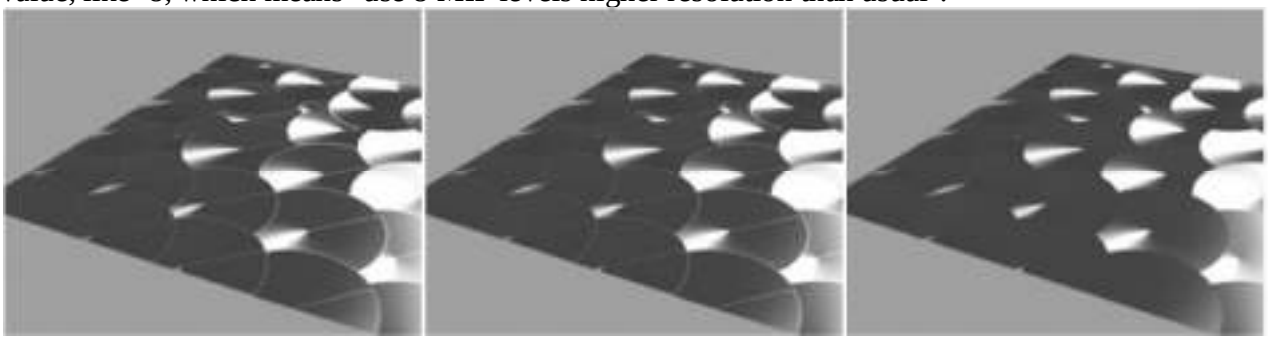
Increase *Subdivision Iterations* to remove anisotropic faceting.
More information about Specular 'Anisotropy' can be found here.

Rotation

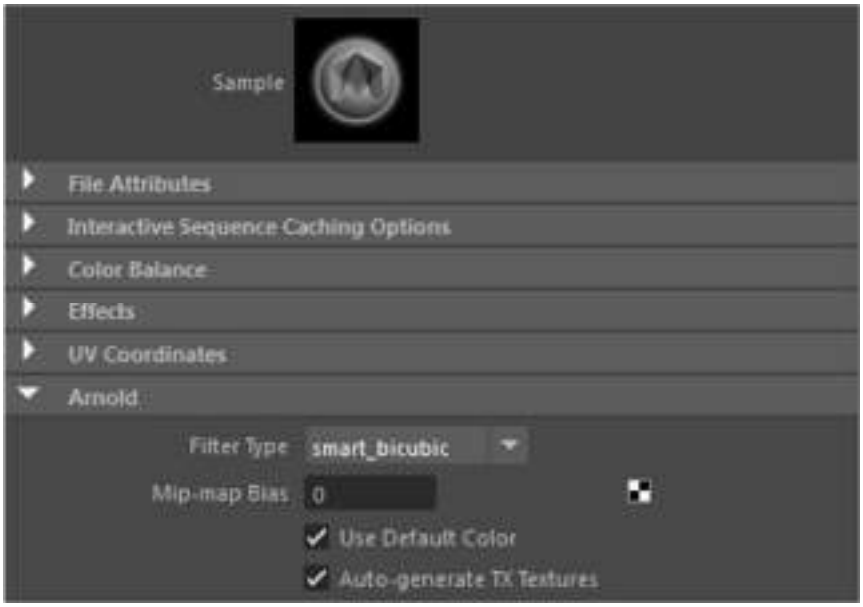
The rotation value changes the orientation of the anisotropic reflectance in UV space. At 0.0, there is no rotation, while at 1.0 the effect is rotated by 180 degrees. For a surface with brushed metal, this controls the angle at which the material was brushed. For metallic surfaces, the anisotropic highlight should stretch out in a direction perpendicular to the brushing direction.

0 (default) **0.25** **0.5** **0.75** **1**

It is possible to assign textures to the *rotation*. When doing so, it is advisable to avoid texture filtering. This means disabling MIP-mapping and disabling the magnification filter, which by default is set to "smart bicubic." One way is to set the mipmap_bias of the image node to a strong negative value, like -8, which means "use 8 MIP levels higher resolution than usual".



Mipmap bias set to 0. Filtering set to Bicubic. **Mipmap bias set to -8. Filtering set to Bicubic.** **No Mip-mapping. Magnification filter set to closest.**



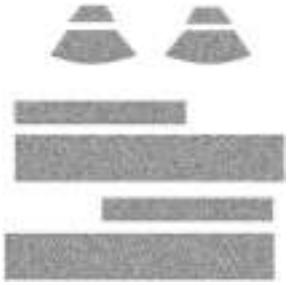
Arnold filter attributes found under Maya file node

Export the UV map to Adobe Phtoshop and paint the Texture on UV map

Sometimes itôs necessary to have a 2D Texture Template for a 3D model. It makes texturing a lot easier in 2D painting apps.

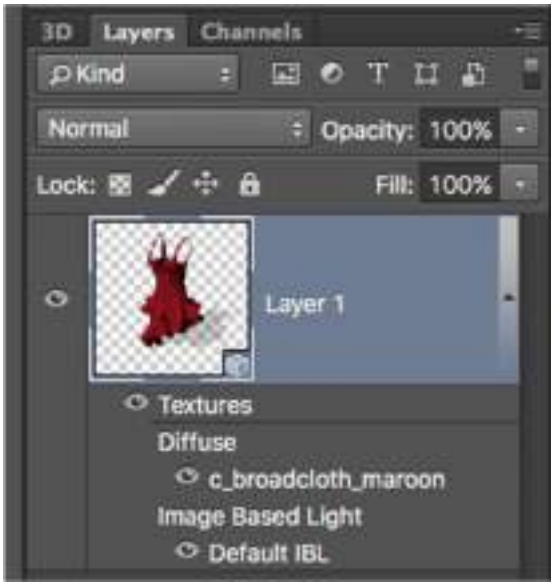
While some programmes like Marvelous Designer can create the UVs, and quite clearly show them to us, thereôs no easy way to export them as a flat file ï akin to the one you see on the right here.

Photoshop to the rescue! All versions of Photoshop 3D and Photoshop CC can import OBJ files, and they can not only display the UV Map as an overlay, they can turn it into a new Layer for us as well.

Hereôs how to do it. 

Displaying the UV Map as an overlay

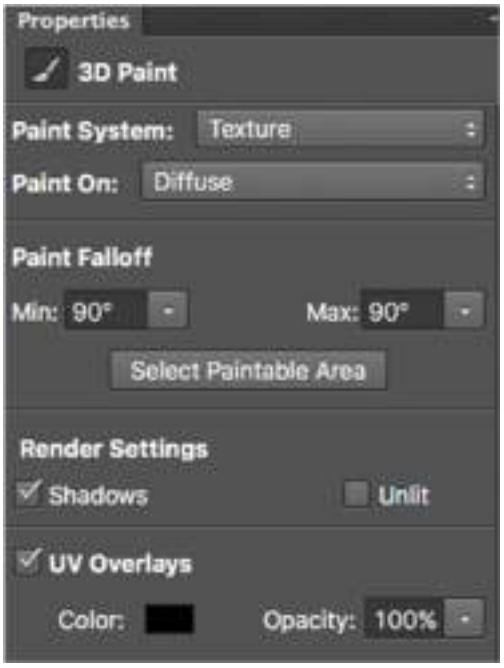
Import a UV mapped and perhaps even textured OBJ file into Photoshop. Youôre greeted with a 3D View of the object, and a small thumbnail of it in the Layers tab. Iôm using the Marvelous Designer default dress for this demo.



Notice the **Diffuse Texture Map** underneath the thumbnail. Mine is called c_broadcloth_maroon because thatôs the texture file my OBJ references. Depending on your OBJ, there may be other maps applied here as well.

Double-click the diffuse texture anywhere right to the little eye icon (eyeconé har har har) and a new document PSB document opens, showing you the flat texture. This allows for easy changes. Right now all we see here is a Background Layer, with no indication of how the object is unwrapped.

In the Properties Palette, under 3D Paint, find a checkbox that reads UV Overlays. When ticked, Photoshop will display the UV Map on top of the current image. How cool is that?

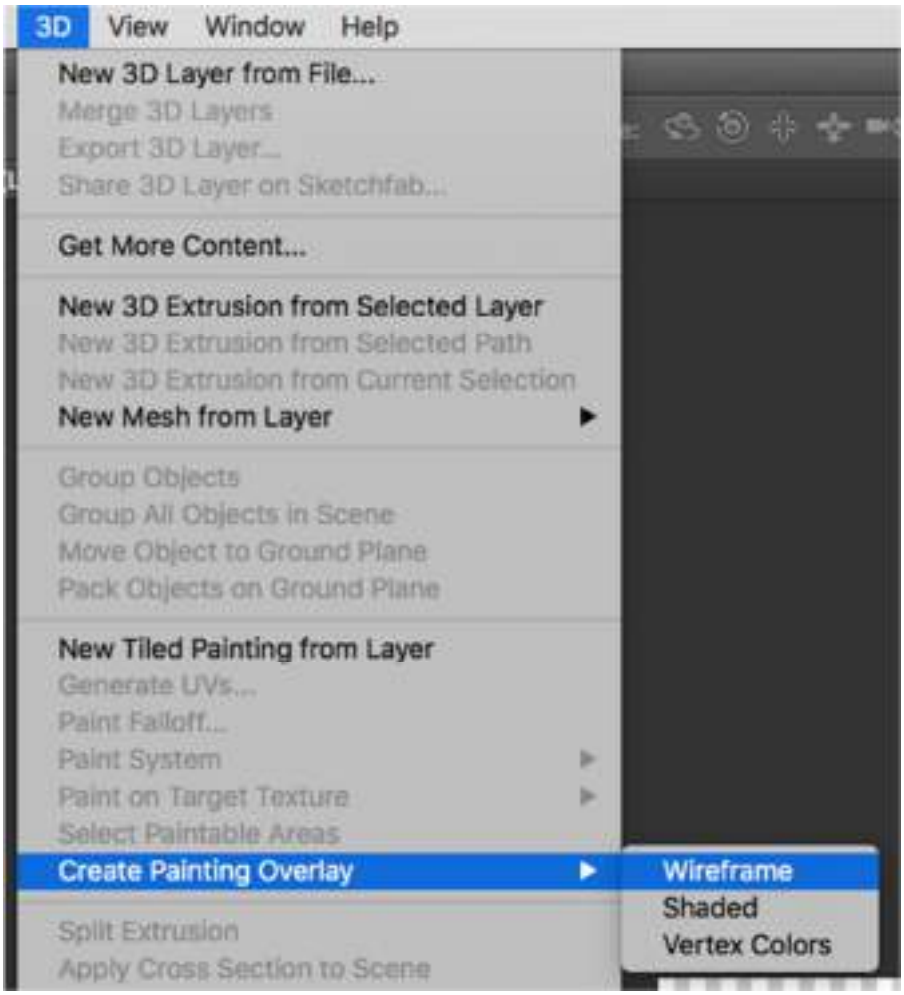


While this is a great help for painting textures, the overlay is presented much like a guideline or a ruler ï itôs not exportable as such. Weôll see how to do that next.

Turning the UV Overlay into a Layer

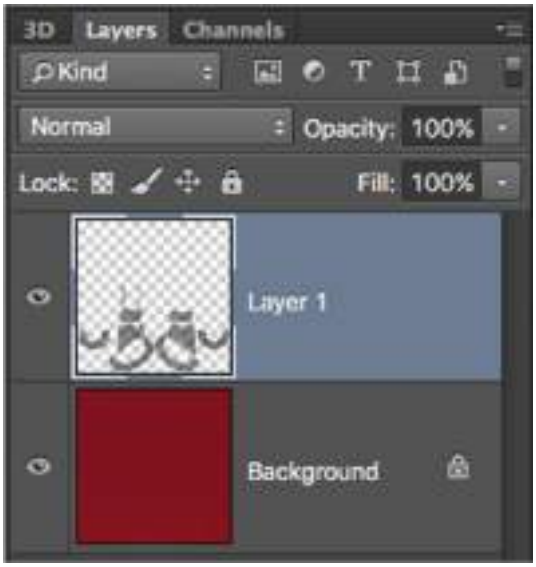
Untick the UV Overlays checkbox for now and see the UV Map disappear again. What we really want is that overlay baked into our image, preferably as a layer. And of course thatôs possible with Photoshop.

Head over to 3D ï Create Painting Overlay ï Wireframe will do just that.



Selecting this will create a new layer with the same UV Map as weôve just seen. This is your UV Texture Template.

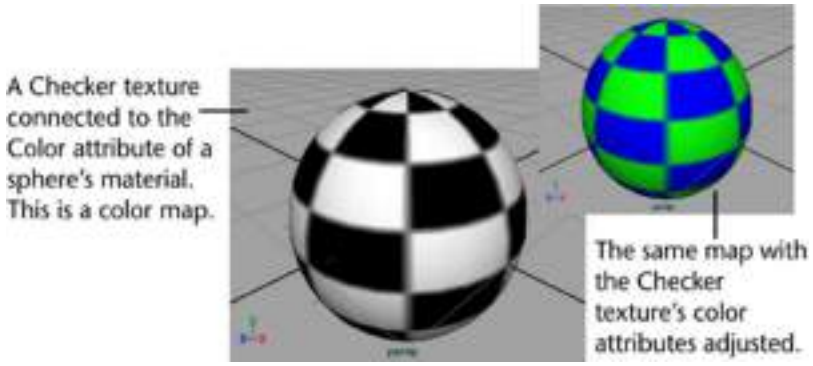
If you find that the current map isnôt big enough, simply resize the image to your liking and create the UV Overlay layer again to match your new texture size.


3D
Layers
Channels
Kind
Normal
Opacity: 100%
Lock:
Fill: 100%
Layer 1
Background

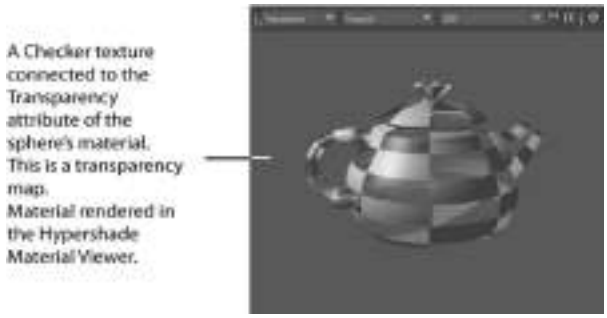
4. Demonstrate knowledge of creating seamless textures

To apply a texture to an object, you map the texture to an attribute on the object's material. The attribute to which the texture is connected determines how the texture is used and how it affects the final results.

For example, if you connect Mayaôs 2D black and white Checker texture to the color attribute of an objectôs material, you have applied a color map; the checkered pattern determines which parts of the object appear black and which appear white (or other colors if you adjust the textureôs color attributes).



If you connect the black and white Checker texture to the transparency attribute, you have applied a transparency map; the checkered pattern determines which parts of the object are opaque and which are transparent.



Commonly used texture maps

Color maps

By mapping a texture to the Color attribute of an objectôs material, you create a color map which describes the color of the object.

The following attributes are common to most surface materials.

For material-specific specular shading attributes, see the particular material. For example, for information on the specular shading attributes of the Anisotropic material, see Anisotropic.

Type

The materialôs basic type (such as Blinn or Phong).

When you change a materialôs type, only those attributes common to both types retain their previous values or settings. For example, if you change the material type from Blinn (which has a Color attribute and a Specular Color attribute) to Lambert (which has a Color attribute but no Specular Color attribute), the Color setting is preserved, but the Specular Color setting is lost.

Color

The default material color.

You can work with color in Maya in so many different ways. Here are some of the most common:

- Change the basic color of an object by adjusting the color attribute of a material applied to the object. See Set a color for the object for a visual demonstration.
- Apply a texture as a color map to the materialôs color attribute. See Map a texture to any of the material attributes for a visual demonstration, and Map a 2D or 3D texture to a material for more information.
- Use a Ramp Shader for extra control over the way color changes with light and view angle. You can simulate a variety of exotic materials and tweak traditional shading in subtle ways.
- Expand, enhance, or manipulate colors in applied textures using utilities such as Blend Colors, Clamp, Gamma Correct, and so forth. For example, you can blend colors, adjust contrast, and convert HSV to RGB. For a description of each of the utilities and what you can use them for, see Utility nodes.

Transparency

A materialôs color and level of transparency. For example, if the Transparency Value is 0 (black), the surface is totally opaque; if the Transparency value is 1 (white), the surface is totally transparent.

To make an object semi-transparent, set the Transparency color to a shade of grey or to the same color as the material Color. The default value is 0 (black). If you change Transparency from the default black (0), the background of the materialôs Hypershadeswatch becomes a checkered pattern. This is a visual aid and is not rendered.

You can work with the transparency of an object in the following ways:

- Change the transparency level of an object adjusting the transparency attribute of a material applied to the object.
- Apply a texture as a transparency map to the materialôs transparency attribute to designate which areas of an object are opaque, transparent or semi-transparent.

Note: If the material has specular highlights the transparency setting do not affect the highlights. So if you are trying to make an object disappear by animating the transparency attribute, you may also have to animate the specular highlight attributes.

Ambient Color

Set to black by default, which means it does not affect the materialôs Color. As the Ambient Color becomes lighter, it affects the materialôs 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

The color and brightness of light that a material appears to be emitting. (Incandescent objects do not illuminate other objects.) For example, to simulate lava, use a bright red Incandescence. The default color value is 0 (black).

Tip:

- Although incandescence makes a surface appear to glow, it does not actually act as a source of light in the scene.
- Use a little Incandescence for vegetation to make it look organic.

Bump Mapping

Makes the surface appear rough or bumpy by altering surface normals (during rendering) according to the intensity of the pixels in the bump map texture. A bump map does not actually alter the surface. A silhouette of the surface appears smooth.

For more information about bump mapping, see About surface relief.

Diffuse

Gives the material the ability to reflect light in all directions. The Diffuse value acts like a scaling factor applied to the Color settingð the higher the Diffuse value, the closer the actual surface color is to the Color setting. The valid range is 0 to infinity. The slider range is 0 (no light is reflected in all directions) to 1, but you can type in a higher value. The default color value is 0.8.

Translucence

Gives the material the ability to transmit and diffuse light. Light falling on a translucent surface is first absorbed beneath the surface, and then diffused in all directions. If set to 0, the default, no light shows through the object. If set to 1, all the light shows through. The default value is 0.

Tip:

Use Translucence to simulate clouds, fur, hair, marble, jade, wax, paper, leaves, flower petals, or frosted light bulbs.

Note:

- The Translucence value of a surface lit by a non-shadow-casting light is zero or infinite (all non-zero values).

- If the scene combines a translucent surface with a shadow casting spotlight, faint grid-like artifacts may become visible. If this happens, increase the spotlight Filter Size or lower the Resolution.
- For high values of Translucence, lower Diffuse accordingly to avoid washout.
- A surfaceôs actual translucence is based on the illumination it receives from lights, and is not related to its transparency. However, as an object becomes more transparent, its translucent (and diffuse) illumination gets dimmer.
- Ambient lights have no effect on translucent (or diffuse) illumination.

Translucence Depth

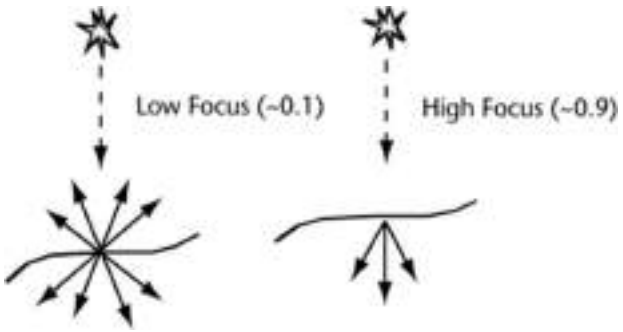
Simulates the way light diffusely penetrates through translucent objects. For example, when light shines on one side of the object, the other side is partially illuminated. This can be used for effects such as clouds, fur, hair, marble, jade, wax, paper, leaves, and so on. (To see this effect, turn on raytraced shadows for the light shining on the object.)

Translucence depth is based on worldspace. If it is set to 0 (the default), no light shows through the object. If set to 10, light penetrates through the surface, 10 units past the point where the object is in shadow.

Tip:
To see the effects of translucence depth, set the transparency to a non-zero value. If the surface is supposed to be opaque, set the transparency to a very small value, such as 0.0001.

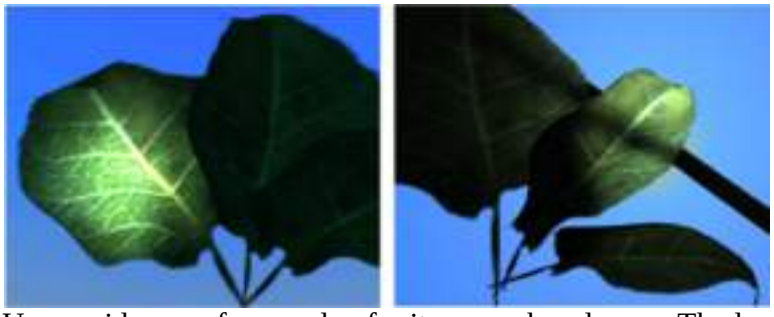
Translucence Focus

The Translucence Focus value controls how much translucent light is scattered depending on the direction of the light.

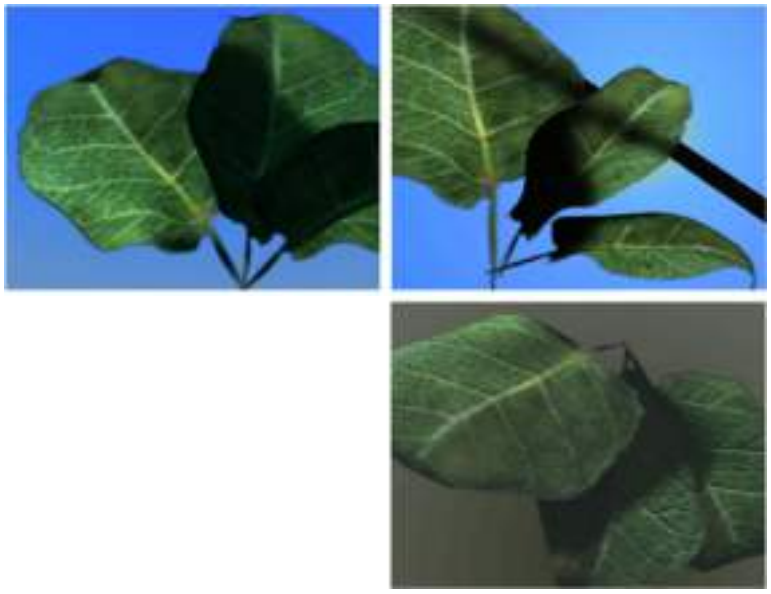


For example, use a high value for very thin materials, such as wax paper or steam, where most of the light is scattered over a small angle relative to the lightôs direction. The object looks brightest with the light source directly behind it.

Note:
When a spotlight is used to light an object with a translucent material, the light does not scatter past the light's cone of influence, even if Translucence Focus is lowered.



Use a mid-range focus value for items such as leaves. The leaves glow when backlit, but do not wash out when lit from the front.



Use a low focus value for thicker objects, such as wax. To compensate for the added light and avoid a washed out result, lower the diffuse value, or lower the overall color (which also affects ambient lighting).

Tip:
Lower the color value for very shiny objects that have a bright specular component.

Transparency maps

By mapping a texture to the Transparency attribute of an objectôs material, you create a transparency map which lets you make parts of an object opaque, semi-transparent, or entirely transparent.

Specular maps

By mapping a texture to the Specular attribute of an objectôs material, you create a specular map which lets you describe how shine appears on objects (by controlling highlight).

Reflection maps

By mapping a texture to the Reflected Color attribute of an objectôs material, you create a reflection map which lets you describe how an object reflects its surroundings.

Create true reflections

Note:
To create true (photorealistic) reflections, you must raytrace the scene, a process which can take a significant amount of time. For more information about raytracing, see Depth map and raytraced shadows.

You must have at least two surfaces to create true reflections (or a surface that somehow curves around so one part of its surface can reflect onto another part of its surface).

You can control which surfaces appear in reflections and which donôt by turning Visible in Reflections on or off in each surfaceôs Attribute Editor. (Visible in Reflections is on by default when you create new surfaces.)

To create true reflections (example)

1. Create a sphere and a plane, and position the sphere over the plane. Create a light to illuminate both surfaces.
2. Create a specular material (a Phong or PhongE) and assign it to the sphere. The sphere is reflected in the plane.
3. Create a second material and assign it to the plane. The plane reflects the sphere.
4. Make each surface a different color so you can see the reflection of one in the other.
5. In the Raytracing Quality section of the Render Settings window, turn on Raytracing.

   This tells Maya to raytrace any surface whose Visible in Reflections/Refractions is toggled on. These attributes are on by default for all surfaces, but raytracing only works when you turn on Raytracing in the Render Settings window.

   To learn more about the Render Settings, see Render Settings window.

6. Perform a test render to visualize the results. If you want the sphere to reflect the plane, open the planeôs Attribute Editor and turn on Render Stats > Visible in Reflections.

To test iterations of a scene, see Visualize interactively with IPR.

Bump maps

By mapping a texture to the Bump attribute of an objectôs material, you create a bump map which lets you add the illusion of surface bump detail to a surface.

Displacement maps

Displacement maps let you add true dimension to a surface at render time, a process which may reduce or eliminate the need for you to create complex models.

Image by
Christine Beaumont

Displacement maps are grayscale textures you map to objects to create true surface relief (elevations and depressions) on an otherwise flat object.

With Displacement maps, depressions and elevations become part of the geometry of the object, changing the topology, unlike Bump maps that only create the illusion of surface relief.

Note:

- Because displacement changes the geometry of an object, displacement mapped objects usually require further tessellation (more triangles, which the renderer uses to approximate the smoothness of the surface). By default, Maya uses Feature-based displacement mapping to automatically add more triangles where required.
- File textures that are used for displacement mapping are usually connected via their outAlpha attribute. If the corresponding texture image file does not provide an alpha channel, then the displacement effect may be missing when using certain image formats. To avoid this, turn on the Alpha is Luminance attribute in the Color Balancesection of the File Texture node. For more information, see File.

Displacement maps move an objectôs vertices. By default, the height of the displacement is determined by the Alpha Gain value in the displacement mapôs Attribute Editor. If you turn on Alpha is Luminance, the height result is based on the intensity of the pixels instead.

Use displacement maps to create shallow or deep surface relief. For example, you can create embossing, mountain peaks and valleys, spikes, and so on.

Because Displacement maps create true surface relief, they:

- can cast or receive shadows
- can be seen if you silhouette the object
- take more time to render than bump maps, which create the illusion of surface relief

Note:
You can connect a texture as a displacement map by connecting it to the Displacement mat attribute in the materialôs shading group. See Connect a texture as a displacement map for more information.

Displacement Bounding Box

Because displacement mapping changes the volume of an object, itôs bounding box may become too small or too large.

Bounding boxes, which represent the bounding volume of an object, can be used to speed up Maya operations and can make a significant difference for complex models.

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