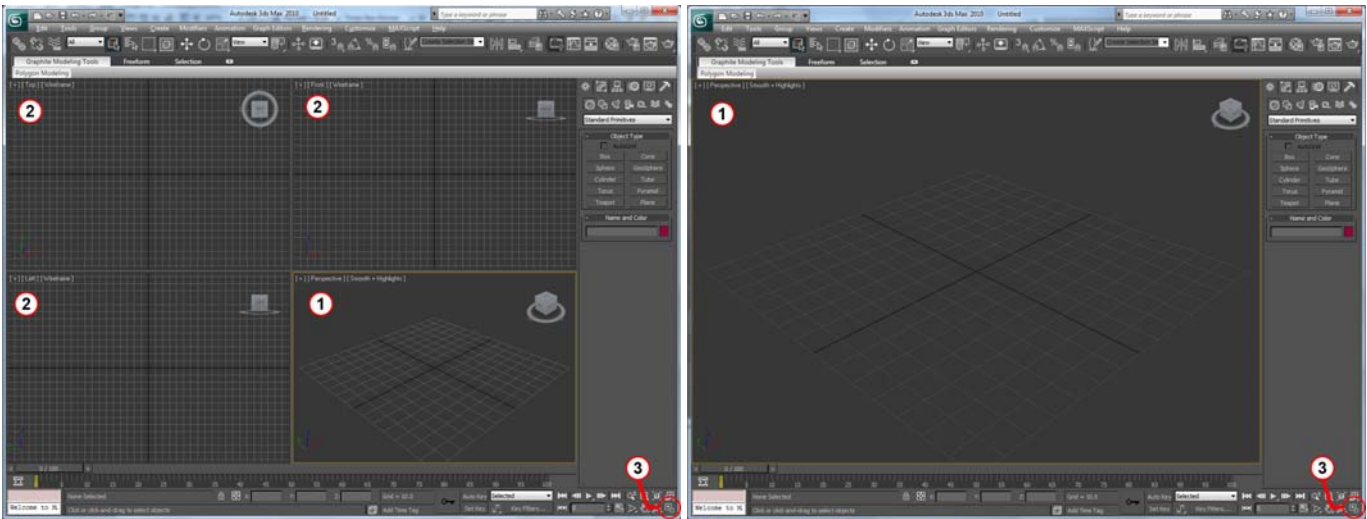





GA2211 – Hard Surfaces Modeling Section A & B – Class Notes – Week 1

Basic Interface: Viewports

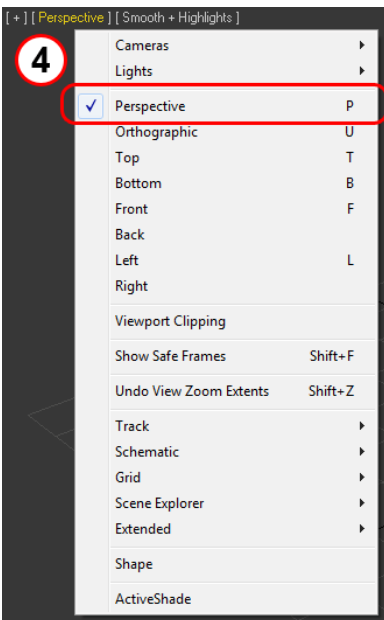


- 1) This is the **Active Viewport**. You can usually tumble, pan & zoom in one viewport at a time. You make any viewport the active viewport by clicking inside it.
- 2) The other viewports will update to your changes in the scene, allowing you to see the effect of your transformations in other views.

3) To maximize any Active View, use the button in the bottom-right . You can alternately use the hotkeys “ + ”. It is good to learn this hotkey, because you will use it often. To go back to the previous viewport layout, hit the button again, or use the hotkey “ALT + W” again.

Because any viewport can hold any type of view or camera output, it is very beneficial to work in a single maximized viewport. This configuration gives you maximum screen space to view your model with the least eye strain. You can always change the output of the Active Viewport to any other views, as explained below...

4) In the top-left of every viewport, the camera output currently displayed is noted in the second set of [brackets]...in this example “Perspective”.



You can change the camera in any Active Viewport by either:

- Left-Click on the name in [Brackets] and select another default camera from the menu.
- Hit the hotkey associated with that view...you will see these to the right of the view:


Camera	Hotkey	Description
Perspective	P	Standard 3D perspective-distorted view. Most like human vision.
Orthographic	U	3D view, but no perspective distortion.
Top	T	Orthographic 2D TOP view looking from above on your model. No distortion...parallel lines parallel to infinity.
Bottom	B	Orthographic 2D BOTTOM view looking from below on your model. No distortion...parallel lines parallel to infinity.
Front	F	Orthographic 2D FRONT view looking down Y+ axis toward your model. No distortion...parallel lines parallel to infinity.
Left	L	Orthographic 2D LEFT view looking down X+ axis toward your model. No distortion...parallel lines parallel to infinity.

Basic Interface: Tumbling, Panning & Zoom.

Tumbling, orbiting, panning and zooming can all be done from the mouse and combinations of ALT and CONTROL keys.

They can also be done by entering dedicated tool modes represented by the icons in the bottom right – but you will progress faster if you learn the ALT, CONTROL and Middle mouse combos.

TUMBLE/ORBIT:


- To tumble the camera around your object (in your viewport) , hold  + **Middle Mouse button** as you drag the mouse around.
- To center your tumbling on one object and orbit it: select it and “zoom-extents” on it (see below).
- Be careful when tumbling in an orthographic view(side, top, front, etc) because this will change the fixed 2D view to a 3D orthographic view.

PAN:

- “Panning” the view means to retaining the camera direction, but slide it laterally or vertically.
- Panning is useful in orthographic views to see more of the model.
- To pan, hold the **Middle Mouse Button** while dragging around.


ZOOM/DOLLY:

- To zoom the view in, or “Dolly” the camera , hold  +  + **Middle Mouse Button** while dragging.
- Alternately, you can use the **wheel of the mouse** to scroll in or out.



- To quickly zoom in , or “**Zoom Extents**” on a selected object...hit “**Z**” key  . This is also useful for centering your orbit on one object.

Basic Interface: Selection and Transformations:

Selection and Transformations are how you interact with your objects in 3D. These are the tools that let you select, move, rotate and scale objects and components in your scene.

The standard arrangement for selection and transformation hotkeys is  - and this will be where your hand is placed for most of your modeling session.

SELECTION:

To enter the selection tool, hit  . You can alternately use the tool button  in the main toolbar (center top).

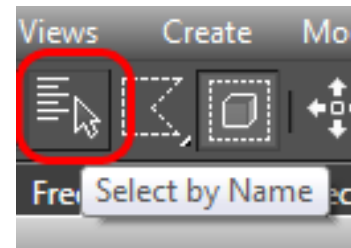
You have several methods to help select objects. The first is by **REGION** in your viewport. To select by region, select a method in the main toolbar:



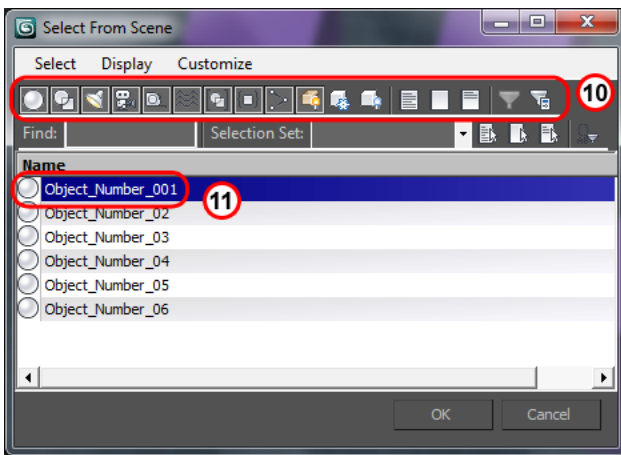
	Method	Details
5)	Rectangular	Drag out a rectangle, selects everything inside
6)	Circle	Drag out a circle, selects everything inside
7)	Fence	Click to define fence-posts. Keep clicking to define selection area. End fence by clicking on beginning post. Selects contents inside area.
8)	Lasso	Draw out an organic shape. Selects everything inside.
9)	Paint	Paint-select tool. Paint across your viewport, selects any items you intersect or paint on.

The next method to selection is by Name.

To select an object by name, click on the “**Select by Name**” tool button in the main toolbar.



A window will come up with a list of scene objects...



10) You can filter this list by object type - click off the items here to filter them out. There are other options, including name search, etc.

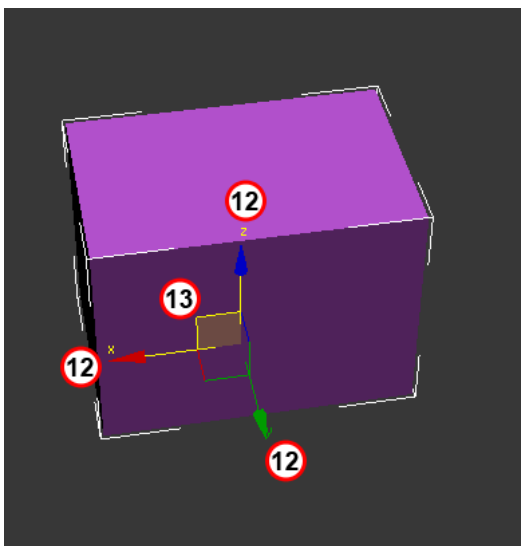
11) Select your item from the list. It is a good idea to name your items as you go...so this list shows meaningful names instead of “box0012-box9999”.

Selection works at the object level (Top Level) and sub-object level.

This means you can select whole objects when at the top level.

And when in sub-object mode, you can select components such as vertices , faces, polygons, elements, etc.

MOVE TOOL:



To enter the **MOVE** tool, hit  . You can alternately use the move tool



button in the main toolbar (Top center).

12) You can move your selection along one axis, either X, Y or Z by dragging the transform gizmo at that axis.

13) To move along two axis, hover over the right-angle made at the intersection of each axis. This will highlight that plane and allow you to drag/move your selection - but constrained to the plane created by those two axis.

Move works at the object level and sub-object level.

ROTATE TOOL:

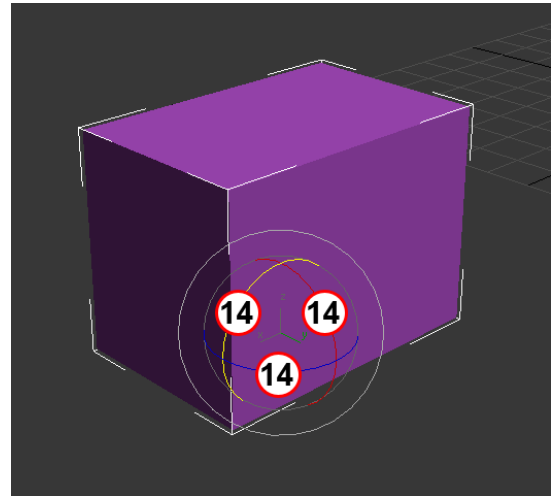


To enter the **ROTATE** tool, hit **E** . You can alternately use the rotate tool button  in the main toolbar (Top Center).

14) To rotate your selection, grab one of the arcs that represent the axis and drag it.


These axis are color coded. The standard convention in 3D is :

X = **RED**
Y = **GREEN**
Z = **BLUE**

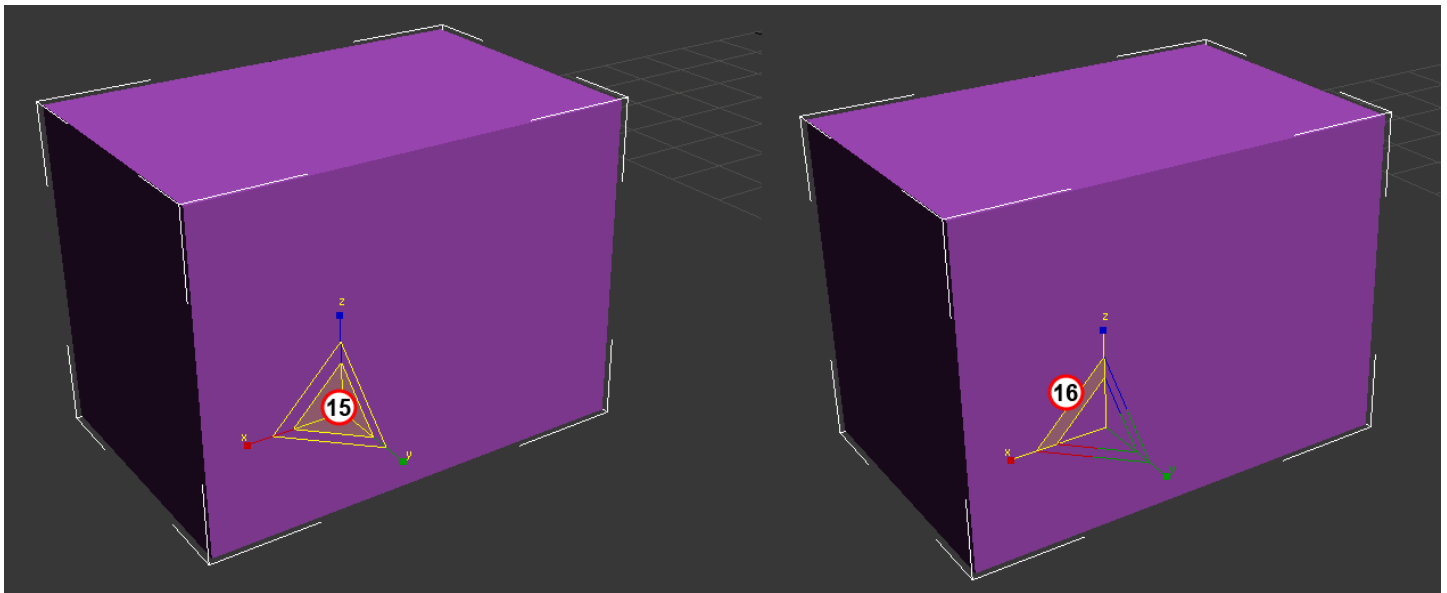


SCALE:



To enter the **SCALE** tool, hit **R** . You can alternately use the Scale tool button  on the main toolbar.

Much like the Move tool, the scale tool allows you to constrain scale along one or multiple axis.



15) To scale **UNIFORMLY** in all axis, begin dragging in the center of the transform gizmo.

To scale **NON-UNIFORMLY** along a single axis, begin dragging on one axis (X, Y or Z) to scale on that axis only.

16) To scale on 2 axis simultaneously, hover over the right-angle created by 2 axis until the gizmo changes to highlight that plane. Drag from this location to scale along those 2 axis.

DISCREET MOVE/SCALE:

There are times when you want precision in your transformations. To discreetly move/scale objects/components to a specific location or scale value, you can use the **Absolute Transform Type In**. This is located in the bottom center toolbar.



With either **MOVE** or **ROTATE** tools, type in the exact transformation along X, Y or Z. This is particularly useful for exact angles (example 90.0 degrees) and world positions (example 0 , 0, 0).

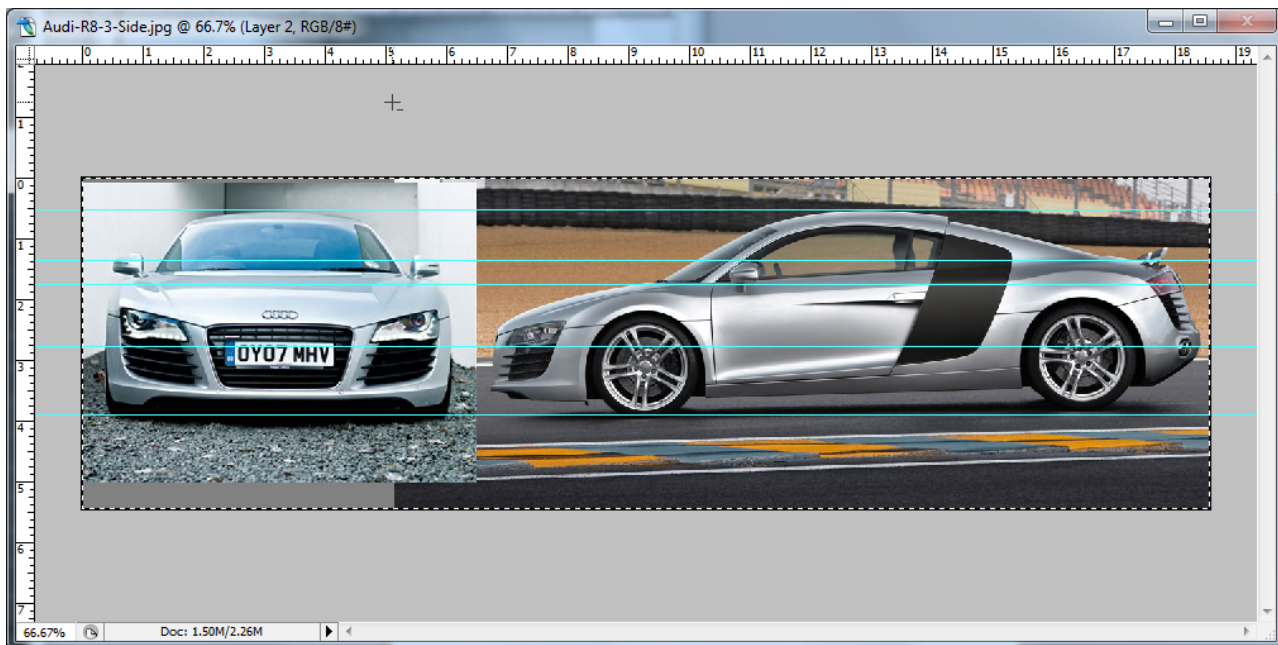
SETTING UP REFERENCE PLANES:

- Reference planes help us keep models in proportion and scale.
- They are usually images matching 2 or more of the Orthogonal camera views – **Front, Left, Right, Top**, etc....
- Reference planes, or Image Planes, must be created at the correct scale and source images also created in proportion.

Once you have proper reference, it is important to scale it properly. Your FRONT view must be the same scale as your SIDE view, or discrepancies between the two will cause frustration and inaccuracies in the model as you switch views.

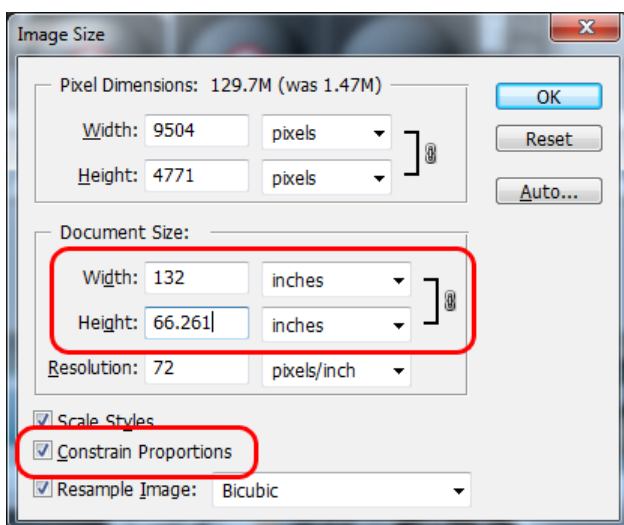
To scale the image planes properly:

- In Photoshop, open your two candidate images for orthogonal views – example Front and Right.
- Bring one of them into the other file as a layer.
- Choose One that will serve as the base – you will scale the other one to match it's scale.
- Create Guides at landmarks on the object – at the very least, you should have 2 for height landmarks – bottom and top.

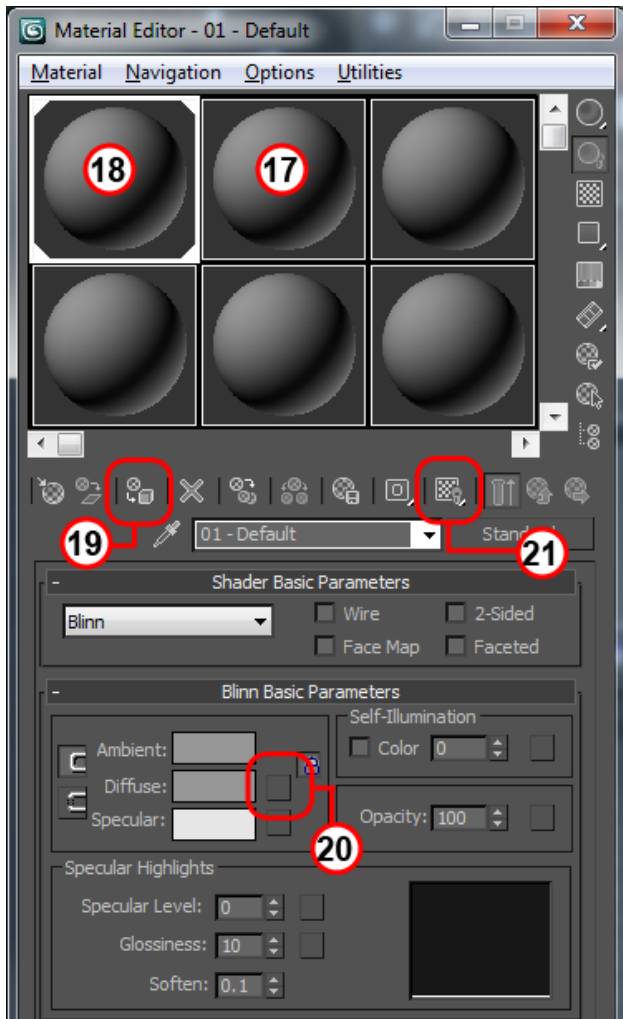


- Scale the second image to fit inside the guides and line up with landmarks. It is important to get reference images with the least amount of distortion. Try to get images at exact right angles to your object.
- Save this image as a JPEG, TIFF or BMP. You can save as a single image or cut them back into 2 scale images.

In 3DS Max again:



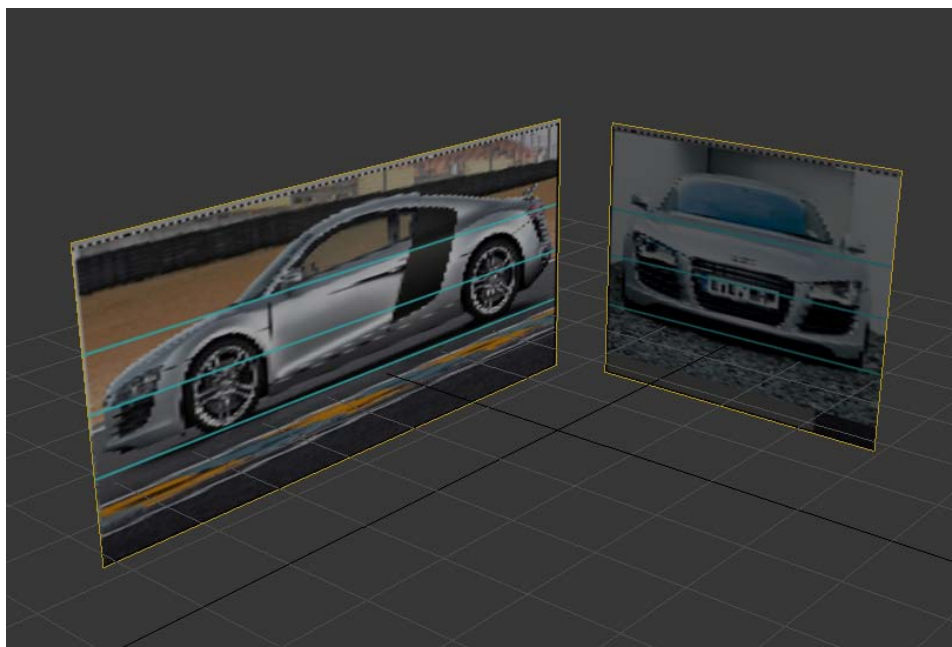
- In the view that matches your reference (Example: The “Left” view, if your reference is from the left)...
- Create a plane with only 1 segment in width and 1 segment in height.
- The height and width should match the height and width of the object you intend to build, plus any space around the object in your reference.
- It is essential to keep the aspect ratio of your image plane intact. That means do not non-uniformly scale or make the image too tall/wide – distorting the image aspect ratio.
- Given at least one known dimension, you can use Photoshop’s “Image Size“ feature as a quick calculator for finding the other dimensions.
- With “Constrain Proportions” on, type in one measurement...the other will auto-calculate in the next field. Make a note of this and hit CANCEL.



move along Y axis only.



COPY THE PLANE by hitting **CTRL** + **V** and rotate 90 degrees.



Move that view away from the origin as well – pushing it perpendicular to the view it represents.



You should have at least 2 Reference Planes at right angles, with room for a model in between.

The last step is to **FREEZE** these pieces. This makes them non-selectable. It will help us not select them as we model.

Right-Click on each and choose “Object Properties”.

Click “**FREEZE**” in the “Interactivity” section and turn off “**Show Frozen in Grey**”.


You are now ready to begin modeling.

Open the material editor. You can hit  to open it, or click the  icon in the main toolbar.

Choose an empty material slot – you can tell if a material slot is not assigned if it has no dog ears around the corners.

17) This material is unassigned


18) This material is assigned to some object in your scene.

19) Assign this material to the plane you just created by either dragging it from the material swatch to the viewport (onto the object)...or click the  button.

20) To assign an image to the diffuse channel of this material, click the grey square next to the “Diffuse” channel.

A window will come up with a list of options.

Choose “**Bitmap**” to assign an image file to this channel. Point to the image plane file we created in Photoshop.

21) To see the results of this diffuse mapping, click the  button.

Move the plane away from the origin (0,0,0) along an axis perpendicular to the view...in the case of LEFT, move along X axis only, for FRONT