INTRO TO BLENDER MESH MODELING-PART1

Basics of the Blender Interface and 3D View

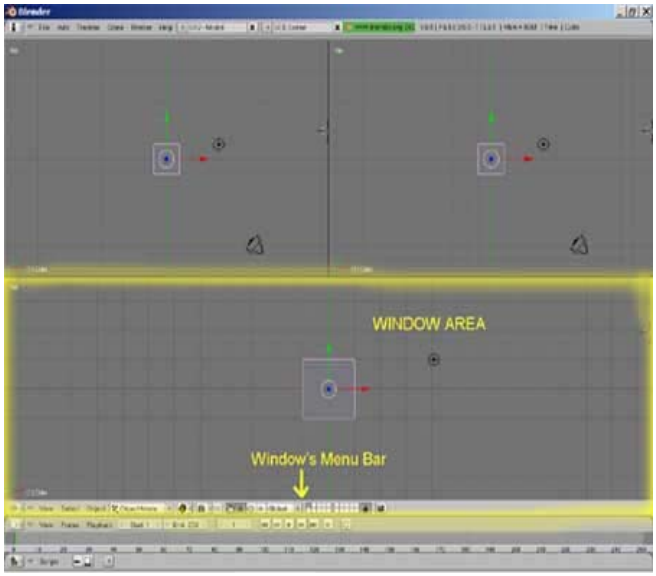
By Mr. D at Delta 3D

One of the first things to remember about Blender is that it is setup almost as two programs. One is for real time use with the Blender Game engine, the other to produce images and animations used canned; or pictures and movies that are not designed to run real time in the Blender game engine.

Certain actions apply to both real time and canned objects, and some are designed more for one type of work or the other. So in developing your workflow in Blender it may differ depending on what the destination of your final output will be.

Also if you are using Blender to produce artwork for a game engine other than Blender's may effect what you can and can not do. So if you do not know what your engine can handle art wise it is good advice to do so before you begin building art assets for your project.

When opening Blender you see a work area composed of multiple **Window Work Areas**, with each area having a **Window Header/Menu Bar** that lists actions that maybe carried out in that window type. At the far left of the **Header Menu Bar** is an icon to control the type of window it is.



Note: Blender easily allows for resizing of 'Work Areas', and whether the menu bar appears at the top of a Window, bottom, or not at all. Later you find out how to do this.

Here are two '**Header/Information Menu Bars'** for the **3D View** and **Timeline** Window Types. A few first things, far left the **Window Type Icon,** sets what type of window you are in. Notice this icon has small up/down arrows at the side of the icon, this indicates other types of modes are available. Those modes refer to the icon type, so on that icon other choices would be for the various modes of 'Window Type'.

Notice further down where it says ‘Object Mode’ this icon’s arrow are for ‘Editing’ choices, so selecting it’s icon lists the ‘Editing Modes’ available.

Icon boxes with left/right arrows indicate a numeric icon, meaning you can change the number in the ‘Icon Box’. Do this using the arrow icon to increase or decrease the value, or clicking on the number or word in the icon (such as ‘Start:’ #) will allow for numeric input from your keyboard.

Immediately to the left of the ‘**Window Type**’ Icon is an arrow that controls whether the ‘**Actions**’ hot area selections are seen or not. Click it to hide or show these ‘**Actions**’. The ‘**Actions**’ themselves may change with ‘**Window Type**’, in the example above you’ll notice View stays but the other two actions change, and there can be more or less actions. Just remember certain actions can be carried out only in certain windows.

On the ‘**Menu Bar**’ the listed ‘Action Types’ where the words are ‘hot’ areas that when clicked on bring up a list associated with that Action. Within the Action List can be further sub-lists branching off them main item. Also shown are the keyboard shortcuts for the action.

Menu Icons plus Mode/Type options

Action hot area plus Actions list
And sub-lists

Timeline Start value changed using Right/Left Arrows,
and opening a numeric input in the icon

WINDOW TYPES USED IN MESH MODELING

These 'Window Types' tend to be the most common ones you might choose to have available when mesh modeling.

USER PREFERENCES: Start new projects, load and save projects. Render images and animations, but remember these are camera based renderings, or 'Full Renders' not working window quick renders, no camera no U.P. >Render

New object types are added here including mesh primitives, curves, cameras, and lights.

Also the armature for building an animation skeleton and creating object groups. 'Timeline' has animation controls, and 'Game' for preparing objects for use and testing as **Blender Engine** game assets.

Within the '**User Preferences**' work area are options to help control Display, Menus, and Tool Box pause time among others.

CAUTION: In a normal default install the '**User Preferences**' work area is hidden away at the top of the screen. The Work Window has been pushed upwards till only the **Header Bar** shows. To see the whole window move your mouse up to the 'User' Header Bar and it should change to an Up/Down Arrow. Click and drag down to resize the window and reveal the Work Area.

Useful Tips: If you are more use to another program sure as 3dsMax or Maya, within sub category '**Views & Controls'** you might try these. 1) Display: turn on View Name, to turn on your **3D View Window's** name. 2) Select With: you my like using the left mouse button to select with than the right. 3) Mouse Wheel: try it inverted.

'**Auto Save'** sub category sets how often to save and how many versions to keep.

'**File Paths'** set to place where you plan to save your project's files if you don't care to use Blender defaults.

BUTTONS WINDOW: This is where you choose menu icons to do things like make a material, and assign it to an object (**Shading icon**). Create '**special Objects'** like particle systems, or forces (gravity, wind…), and deflector systems (**Object icon**).

You can create vertex groups, assign smoothing, add a modifier to and object (lattice, boolean, mirror…) (**Edit icon**); or set rendering options for your scene (**Scene icon**).

3D VIEW: Your main modeling work area, more on this further down.

UV/IMAGE EDITOR: Here you assign and manipulate uv co-ordinates for a mesh.

NOTE: These Menus have more functions, and you should explore around on your own to test more actions. Many of the functions and actions are not designed for modeling so will not be covered in this paper, or in some cases to the depth needed to fully understand their uses.

So since Blender allows for multiple windows to be open you might want to set up some for different 'Types' to help your modeling workflow.

MODIFYING YOUR WORK SPACE **based on default install**

Blender is designed to let you create a workflow suited to you, to that end you can increase the number of 'Windows' you have and position and resize them to your liking.

First off '**User Preferences**': Since you'll want this to access and save files it's good to have, but since you usually don't change a lot of options once you set them best to do like default and hide the work area when not needed.

A note before going further, in a default install, the two top '3D View' work areas have NO 'Header Bar**'s. Many people at first believe the '**User Preferences Menu Bar**' is the menu for those windows.
But as you learned above that menu's Work Area is hidden, and the two 3D View windows are in reality not set to display their **Header Menu Bars**.

UNHIDING/HIDING AND LOCATING A HEADER BAR

Move to the left hand edge of the window whose menu you want to unhide or 'Add', and right click (RMB). A small menu pops up under the cursor, Split Area – Join Areas – Add Header, slide over to 'Add Header' and click. Your Header/Menu now appears. Use this to hide or show your Header/Menu to your liking. If a Header Menu is showing then 'No Header' will be the last choice.

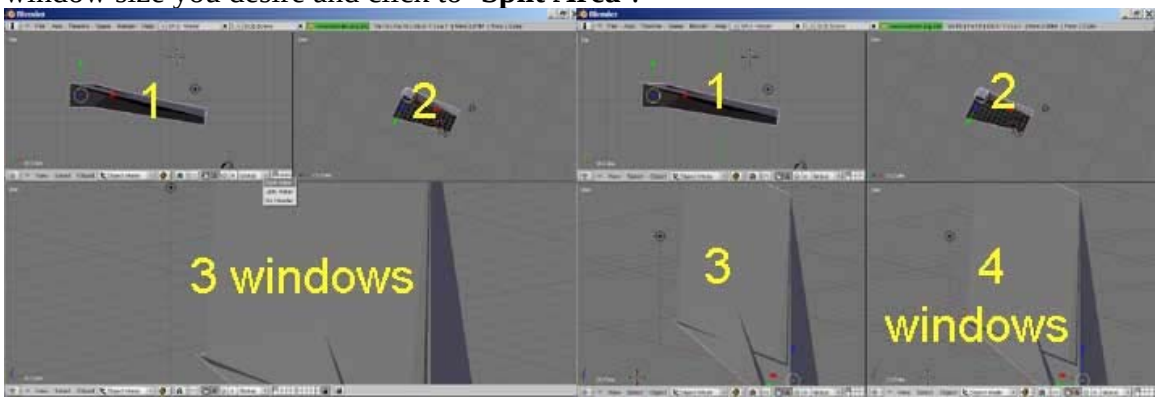
Locating the Header Bar – Move to the far left side of the Header Menu Bar you wish to change location for. Just the other side of the Window Type Icon is fine then right click (RMB), a pop up asks for Header Top-Header Bottom-No Header. Your choice.

SPLITTING-JOINING WINDOWS

This can be done to any 'Window' by we'll use one of the small upper '**3D View**' windows. Now some of you may like to have as large a modeling window as possible, while others prefer the standard 4 views found in other 3D programs. So first let's take the Default three '**3D View**'s and create four Windows.

SPLITTING WINDOWS

To create a fourth window we will 'Split' the lower long 3D View window, by first clicking in that window to make sure it's the one selected. Since we want a **vertical split** you must go to the **top edge** of the window, going to the **side** will cause a **horizontal split**. Now right click (RMB) and choose '**Split Area**' from the pop up menu. Under your cursor is now the window splitting tool, so slide it along the edge till you have the window size you desire and click to '**Split Area**'.



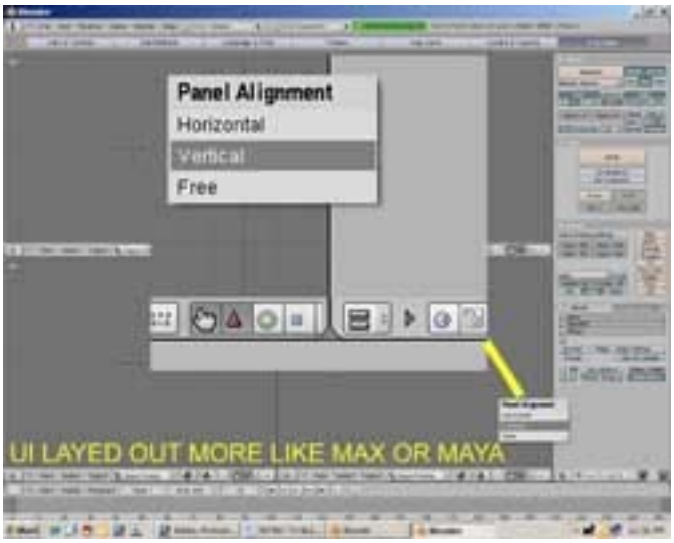
JOINING WINDOWS

Use this to join to Blender Windows together by first going to a shared edge between two windows, place your mouse cursor on the edge so it turns into an up/down arrow and right click (**RMB**). The Split/Join menu shows so select Join and one window will darken and display a large arrow shape in it. Move your mouse slightly and the 'Window' it can join to darkens. Click in either Window, but on a Up/Down join your Header Bar location comes from the non-darkened Window.

NOTE: When **Joining** the two Windows they must be of the **same Type**. Also remember they must share an edge between those two Windows. If using the image above were we had set up a Blender UI with five 3D View Windows; A-A can join, B-B or A-B combos were one was above the other would Join. However the lower/left B can not Join with the upper/right A, no shared edge between them.

Also the shared edge must be inclusive between the two Windows being Joined, the middle A does share an edge with the New Window, but middle B shares the same edge with the New Window so you can't join them.

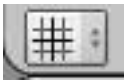
BUTTONS WINDOW ALIGNMENT



Ok, this is for people who might like your UI to resemble other 3D programs like Max and Maya. A number of modeling actions you carry out are located in the **Buttons Window Type**. You may like to form a long window out of this one and locate it off to the right hand side, giving your Blender a look you might be more accustom to working in.

Here I simply took a long window and moved it over to the right hand side. I then made it a Buttons Type Window, and right clicking (RMB) in an open area brought up the **Panel Alignment** pop up. From its list I chose Vertical to align the Buttons Type Window sub-menu Panels into a vertical alignment.

Does have some problems in that further options and actions chosen from the sub menus need windows that don't fit this size. In Max or Maya many of these would appear in pop up windows, but this is not the case in Blender.

THE 3D VIEW WINDOW TYPE 

This is your 3d modeling working area, where you will build and manipulate 3D objects like meshes and curves.

The 'Tool Box' or 'Hot Box /Marker Menu' in 3D View

Like with Maya having a 'Marker Menu' that allows you to easily bring up a pop up menu, through which you can carry out many common modeling actions without going to the menu bar. Blender has such a system available in the **3D View Window Type**, referred to as the '**Tool Box**'. Most '**Actions**' you can do through the **Header Menu Bar** while working in a 3D View can also be done in Blender using the '**Tool Box**'. This is a pop up that appears under your mouse cursor when it is held down while you are not on or too near scene objects. The keyboard shortcut is the **'Space'Bar**.

The **'Tool Box'** is available in the **Modes of 'Object' and 'Edit'**, and notice the Menu Items can have sub-lists, and how 'Actions' found in the Header Bar 'Object' and 'Mesh' hot panel areas are about the same as those found here.

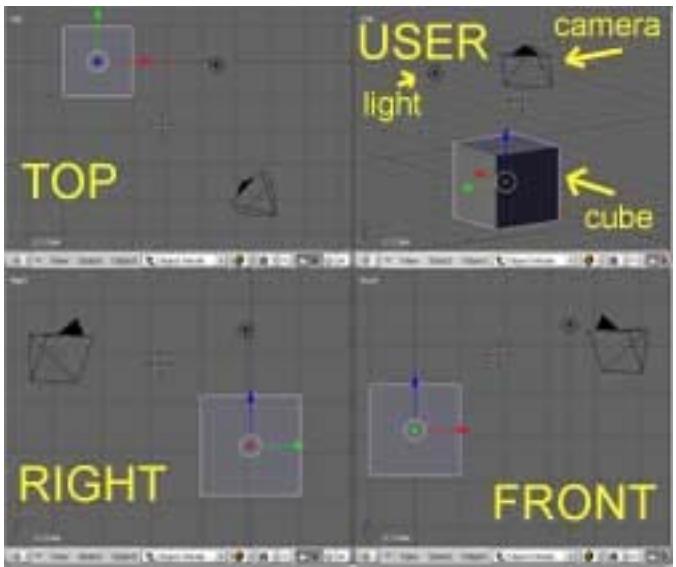
Many advanced artists like to maximize their working area, and will hide their Header Menu Bar and use keyboard shortcuts and the Tool Box instead. If you want, when you see a command like ***Mesh >Transform >Warp*** while in 'Edit' Mode, which means click 'Mesh' Hot Area >select 'Transform' action from list; and chose 'Warp' from the sub-list. You can try using the **'Tool Box'** to get to these commands as well.

GETTING AROUND THE 3D VIEW WINDOW (3 button wheel mouse)

MMB (Middle Mouse Button): Rotate View

Shift MMB: Move/Pan view

Ctrl MMB: Zoom/Dolly view - This is a Dolly Move and not just a zoom. In a zoom the view location stays the same but optically you are zooming in your view area by changing focal length. A Dolly is as if your view point was a camera on a track or movie term Dolly, and this camera is actually moving in and out of the area changing its distance from the object.



3D View –Window View

In Blender you can chose the view for the Window. To do this use the 'View' hot area panel on the Header Menu Bar for that window.

Click on 'View' to set the View Type, but you need a Camera in the scene to View from one. Also the '**Side**' view is from the Right Side, and there is no Left view.

Anytime you rotate a Window View you go immediately into User View.
In the **User Preferences Useful Tips** above in this paper it tells you how to turn on View names.

INFORMATION/HEADER MENU BAR

Here is the **HEADER MENU BAR** for the 3D View Window in 'Object' Mode.

ICONS

TYPE: Sets MODE TYPE for window, you click here to change type to **Buttons** for example.
PANEL HOT AREA: Clicking on one of these 'Hot Areas' (a hot area simply means a defined area under the word is associated through code to perform and action if clicked upon.) brings up a list of '**actions**' associated with that '**Panel**'. The small arrow to the left hides/shows 'Actions'. Click on each to see a list of 'Actions" for each, and move over the '**Actions**' to see they may branch down into further sub-actions.
Also take note that where available a keyboard shortcut is listed by the '**Action**'.

You may also wish to try using the **'Tool Box'** (go to an open area and click and hold a mouse button till the '**Tool Box**' appears, or press the 'Space' bar) to see if you can figure out how to get to the same action.

MODE: Lists '**Mode**' available for **Window Type**.
Object – do 'Actions' to an object(s) such as grouping, joining, or Booleans.
Edit – where you carry out 'Actions' or modifying of object sub-components and values. For mesh modeling this means 'Actions' carried out on Vertices-Edges-Faces.
UV Face Select – select and carry out UV operations on selected Faces.
Vertex Paint – add color to vertices, similar to vertex lighting in other 3D Programs. But when working with 3D Engines remember lighting is vertex brightness level on a grey scale, and vertex color is the saturation level of color in the vertex.
Texture Paint – not fully implemented yet.
Weight Paint – paint vertex weights onto skinned meshes used in animation.

SHADING MODE: Lists types of shading available for 3D View.
Bounding Box- a box replaces the object which represents it volume. Or another way to think about it is a box equal in length-height-width of the greatest x-y-z distance of the mesh displayed.
Wire Frame – mesh displayed by just its Edges.

Solid – object is flat shaded based on its diffuse color and world light only.
Shaded – color still based on diffuse color, but lighting effects are based on all scene lights.
Texture – color based on bitmap texture, however procedural textures do not show.

Extra Draw Modes:

In your ***Buttons Window*** **>** ***Panel-Object*** **>** ***Draw*** you will see in addiction to Layers and Draw Type that you have some **Draw Extra** buttons. So mode your mouse over each Icon to see what each does.

Two that might be helpful in your modeling are:
TRANSP – allows transparent texture to show in the 3D View, but can slow down draw time.
Wire – Like Show Edges in 3dsMax, overlays a wireframe image of the mesh over the solid displayed object.

PIVOT: Locates where your pivot is located for carrying out 'Transformations' of **Rotation and Scaling**.

Bounding Box Center – calculates as if there is a bounding box around selected objects and places a Pivot at that Bounding Boxes center.

Median Point – unable to find basis for placement, similar to bounding box, but seems like the actual geometry is being used and not a surrounding box.

3D Cursor – locates pivot at location in 3D space at the **3D/Marking Cursor**.

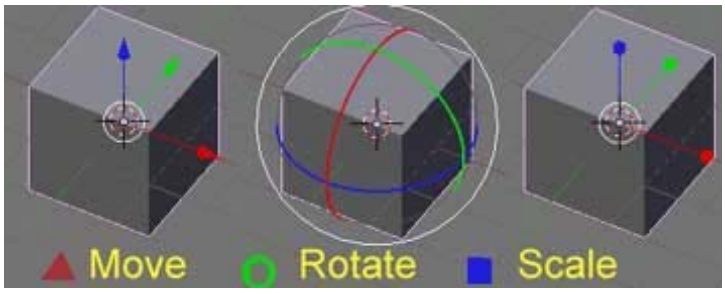
Individual Centers – calculates a pivot as if for an object made from the selected sub-objects.

Active Object – sets pivot at pivot point of the selected object or sub-object, or if multiples selected the last object or sub-object selected.

MOVE OBJECT CENTERS ONLY: can not find affect of this Icon.

3D TRANSFORM MANIPULATORS 'Ctrl Space'
The **Hand Icon** hides/unhides the three manipulators following it on the **Header Menu Bar**.

Red Triangle – Translate or Move
Green Circle – Rotate
Blue Square - Scale



The image to the right shows the look of the manipulation gizmo when each 'Transform' is selected. The gizmo's color references the color of the 'Orientation Axis' (red X, green Y, blue Z) as set in the 'Transform Orientation' mentioned below. The 'White' circle allows for manipulation of the object along more than one axis at a time. Try manipulating your object/Cube.

TRANSFORM ORIENTATION MODE

Here you set the orientation of the axis you are applying transforms to.

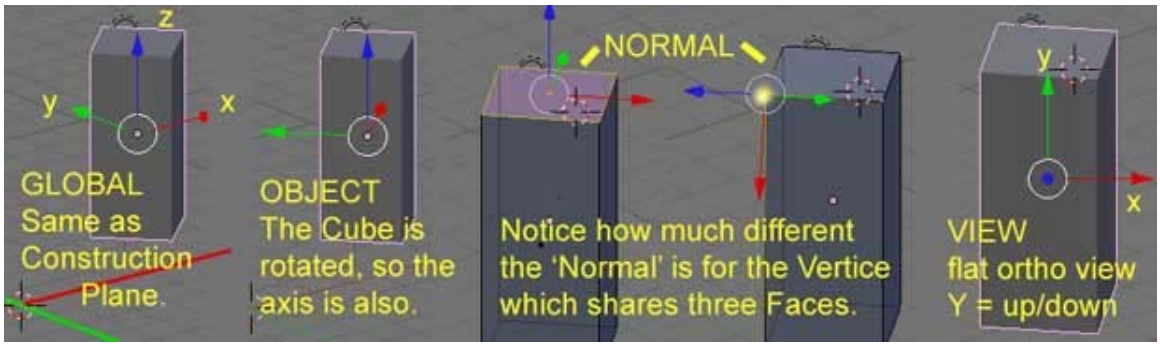
Global - Axis aligned to the building grid/plane, sometimes called World view with Z= Up/Down, X= Left/Right, Y = In/Out.

Local – The axis belonging to the object being transformed is used, however this reflects any rotational manipulations the object has under gone.

Normal – In "Edit' Mode the axis is based on the selected sub-objects normal direction. If more than one sub-component is picked Blender calculates an angle averaged from those of the sub-objects selected.

Note: If in 'Object' Mode this shows same as the Local axis. Also in sub-object mode Normals are based off faces. So sub-objects like Edges and Vertices that share more that one face will have an axis calculated off of the Faces it's a component of.

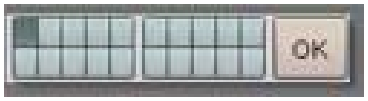
View – All 3D View Windows get treated as if they are flat orthographic planes with Y= Up/Down, X= Left/Right, Z= In/Out. Notice how Y and Z are the opposite here than in Global Orientation.



LAYERS: Layer Visibility (Object Mode) - Think of '**Layers**' as being like pages in a book stacked on top of one another, familiar to users of Lightwave or Maya. And like a book's pages where each can hold different information, so can '**Layers**' in Blender contain different objects. Example: In a scene you might want all lights in one 'Layer', all Level objects in a different one and each character in their own.

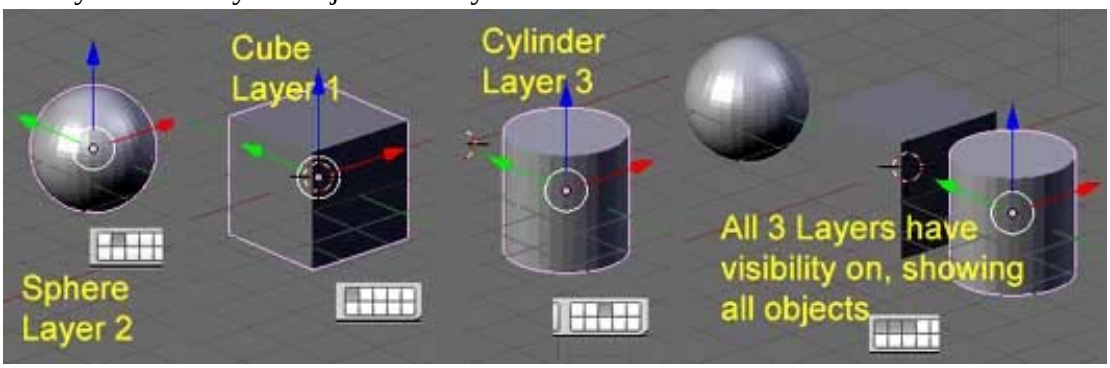
Towards the far right of the Header Bar Menu you see the '**Layer Visibility**' icons. There are twenty shown, and a dark icon means it is visible, and more than one can be made visible.

In Blender there are two main ways to **Move** and object into a '**Layer**', first pick a 'Layer' (simply click on one of the small squares, there are twenty) and create the object there.



Secondly you can create in one 'Layer' then move the object to another, and to do this be in 'Object' Mode with the Object(s) you which to move to a different 'Layer' selected. Then from the Header Bar do ***Object >Move to Layer,*** or **'m'** on the keyboard. A pop up appears which looks like the 'Layers' visibility Icon from the Header Bar but with '**OK**' at the end of it. You simply click the blueish icon for the Layer you want the items **Moved** to and hit '**OK**'.

Now go to the 'Header Menu Bar – Layer Visibility' and click on and off your old and new Layer to see if your object actually moved.



PROPORTIONAL EDIT FALLOFF: 'Shift o' (Edit Mode)

Proportional editing would be called 'Soft Selection' in Max or Maya, or you pick one or more vertices and based on the level of falloff vertices close those selected are affected as well by transforms.

The icon has **Off –On -Connected** as choices, difference between On and Connected being, with **On** all Vertices within the distance of influence of those selected are manipulated. For Connected only Vertices that could be connected by edge to those selected are influenced.

NOTE: Unfortunately currently Blender does not show in Window how the falloff influences the Vertices. So with the version used here 2.4, this is very much a guess as to how to decide how other non-selected vertices are influenced by the Falloff.

Remember that this works in Edge and Face Modes as well, because Blender is using the Vertices that belong to those Edges and Faces selected.

When **Proportional Falloff** is **On** another icon appears which relates to the type/amount of Falloff. Rather then explain it here simply click the Icon for Falloff type, the shape/rate of the Falloff is shown by a small Icon depicting the type of influence it will have.

To increase/decrease the influence Falloff you use the '**PageUp**' and '**PageDown**' keys, but keep in mind you have no way of seeing this influence represented in the 3D View Window.

SUB-OBJECT/COMPONENT: (Edit Mode) These three Icons represent from left to right **Vertices** Mode – **Edge** Mode – **Face** Mode. Clicking one puts you in the Editing Mode for that Sub-Object.

LIMIT SELECTION TO VISIBLE: (Edit Mode)

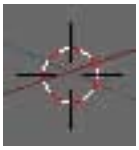
As the name implies when on it limits the sub-objects you can select (especially if you're using a Marque or Lasso) to only those visible in the 3D View Window, base on depth buffering.

RENDER THIS WINDOW:

Renders the view as seen from the **3D View Window** of the Header Bar from which the Icon is activated. And should not to be confused with the '**Render**' shown on the **User Preferences Menu Bar**, or 3D View Header Bar action of ***View >Render Preview***. Both of which use a scene Camera for their render's point of view used in the render.

HELPFUL THINGS TO KNOW:

1) '**Ctrl UpArrow**' maximizes and minimizes a Window.



2) This is the **Marking/3D Cursor**, New objects are created where it is located, and during a 'Action' such as 'Spin' the line used to spin the shape uses its location to base its lathe axis on. You need to understand this Cursor occupies 3D space.

More in part 2.