

## INTRO TO EDITING MESHES IN BLENDER – EDGES

By Mr. D at Delta 3D

Open up Blender and if there is not one already create or switch a Window to '3D View'. Then if the Window is not Maximized press '**Ctrl UpArrow**', and set your **Mode List** to 'Edit Mode'.

(If continuing from Intro-Vertices)

On to 'Edges' so let's first clear things up a bit, either go to your **User Preferences Bar** and do a 'File >New' and answer Ok? > Erase All (if your preferences are at default you will go back to a multi window view and most likely you are in 'Object Mode' for your '3D View Window'. Not to worry, simply highlight your '3DView Window' and press '**Ctrl UpArrow**' to maximize. Now move to the **Mode List** and switch from Object to Edit, or use the '**Tab**' key shortcut).

Also you can try going back to 'Object Mode' from the **Mode List**, then select your Cube and hit the 'Delete' button and Ok? >Erase Selected Object(s). Now you'll need a new Cube to work with, and to do that go to **User Preferences Bar** then Add >Mesh >Cube. But remember that the Cube is created at the location of your **Marking Cursor**. (Also after creation try pressing '**n**' to get the 'Transform Properties PopUp', and use it to set your XYZ location to 0,0,0. Most likely you'll have to zero out the Cube's rotation numbers as well).

Now toggle between 'Object' and 'Edit' modes using the '**Tab**' key just to get use to it, but end up in 'Edit' Mode.

### MAKE FACE/EDGE

From the 'Mesh' hotspot bring up your list of actions, and highlight 'Edges' on it the top action is '**Make Face/Edge**' or '**f**'. This will take a moment to explain. An edge connects two vertices; a face is three edges and three vertices. So to make a new Edge or Face you need to find a) 2 Vertices that do not share and Edge to make a new edge. b) for a face three Vertices that have no more than 2 edges. Having a third edge would make this a face already.

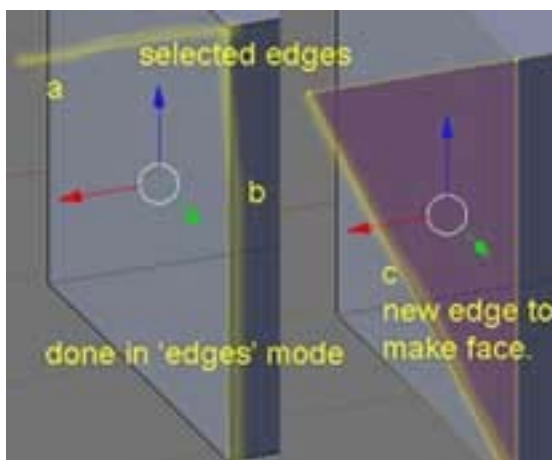
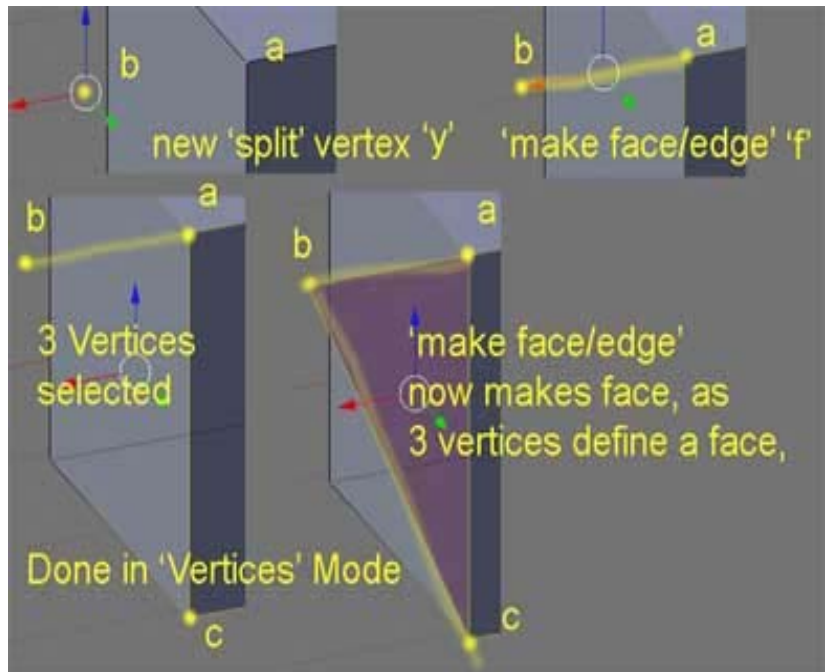
Confusing but follow along to help understand better.

First we need to go back to 'Vertices' Mode and make an extra Vertex. So in 'Edit Mode' click the Vertices Icon and hit '**a**' if need be to unselect all, plus be in 'Translate' the Red Triangle Icon. Now click select a Vertex and using Menu (Mesh >Vertices >Split), or Marker (hold down mouse button in open area) Edit >Vertices >Split; or simply use the '**y**' shortcut to split the vertex.

Remember not to move your mouse until the Ok? >Split pop up appears under its cursor for you to click, then click. Nothing appears to happen, but a new vertex was created at the same place as the selected one, and it is now the selected vertex. Move your mouse to the 'Translate' axis a click and holding drag the new vertex away from your cube.

Now to make an edge, so release the mouse button (your new vertex is still yellow indicating it is selected), and holding down the 'Shift' key click select the original vertex.

Here's a tricky place, as Blender does not offer 'Make Face/Edge' from the 'Vertices' mode. You can't switch back into 'Edges' Mode because your vertices will no longer be selected. So you have to remember the shortcut is the 'f' key



Could you do that from edges, at first we needed to create the extra vertex simply because our Cube's a nice solid piece of geometry. But once we had the extra edge from 'Vertices' Mode you could have picked two edges to make the face from within 'Edges' Mode.

### How does this help in modeling?

The above portion may seem a bit confusing, mainly because we started out with a simple object like a cube. When building a mesh model normally it will tell a greater degree of complexity. There will be far more faces-edges-vertices to have to deal with. You'll be building and cutting up various meshes, or joining one or more that do not always match up. So adding faces and edges becomes more important then.

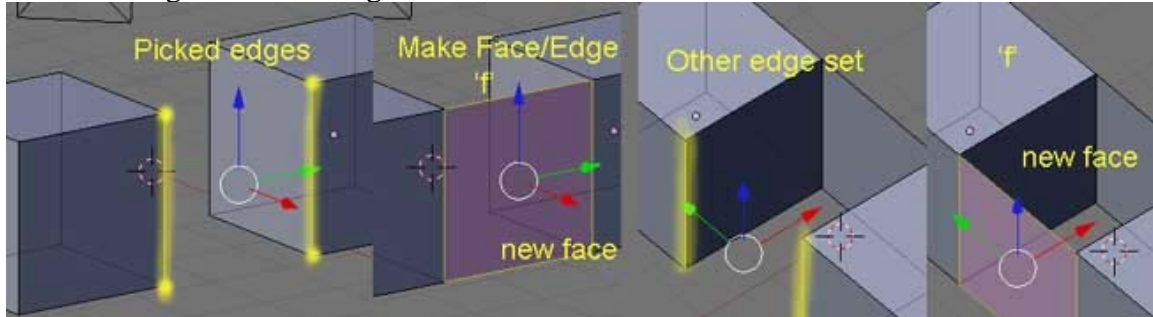
Below a little example of how it might also be used.

Start off by doing a File >New, and get yourself a new cube. Now add a second cube by doing Add >Mesh >Cube, then checking to make sure your '3D View' is on 'Object' Mode move the new Cube a bit away from the first.

Now we'll turn these two objects into one by **Joining** them together. Still in 'Object' Mode select one Cube then 'Shift' click select the other. Now join them through Menu of Object >Join Objects or '**Ctrl j**' shortcut, or use the **Tool Box** menu.

We'll say I'm making a castle for an adventure game and these cubes are my two towers. However I want walls running between them. Now I could duplicate faces then do some vertex welding. Or I could extrude edges, but there is a simpler way.

Go into 'Edge' Mode and pick the two opposite inner edges of the Cubes and hit the '**f**' Key to make a wall (since you are in Edge Mode you could use the Menu here). Now the other two edges and hit '**f**' again to make the other wall.



Nice, quick and simple, plus no need to worry about attaching up a bunch of vertices

So how did Blender know to make a face/quad here as the two edges did not touch? Actually in this case Blender is considering that each edge has two vertices for a total of four, which is what you need to make a quad. Could I have gone in to 'Vertices' Mode, then picked each of the four vertices? Yes, but its quicker to pick 2 edges than 4 Vertices.

And remember you have to be in an area where a face or edge does not already exist. Try this out by picking to edges on opposite sides of a quad and read the message that shows up.

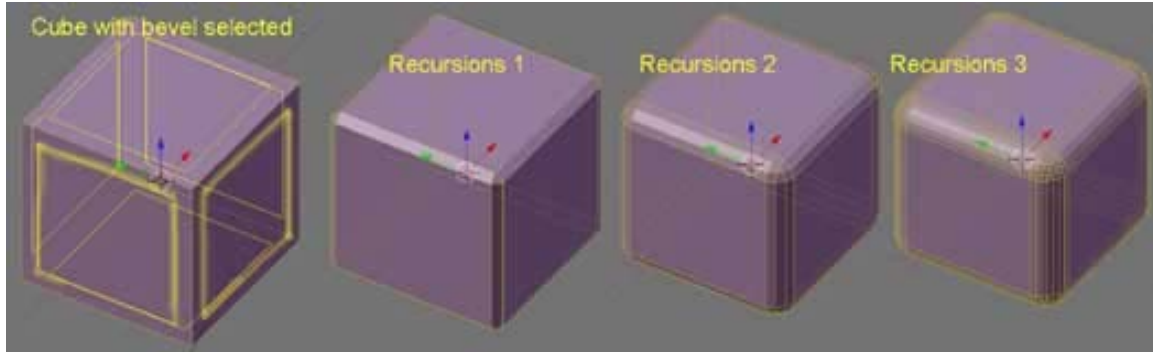
## BEVEL '**W Alt2**'

In using '**Bevel**' Blender tries to round over and objects edges to give a more smooth appearance. Understand the regular bevel command works on the whole object, not just selected edges. The command is listed under the 'Edges' sub-object category because the action is being carried out on 'Edges'. There is suppose to be a Python script that can do this, but using Blender v2.42 and Python v2.4.4 I kept getting 'Script Error' message every time I tried to run the Bevel Center script I found. Most likely indicating there are version problems with the script, unknown if on Blender side or Python.

Go to Meshes >Edges >Bevel, a pop up appears under your cursor called '**Recursion:** (#) and **OK**. The (#) you use to change the '**Recursion**' value by click-hold on the number and slide your mouse back and forth, or click on the word '**Recursion**' to open up for numeric input by keyboard.

Recursion deals with the number of step your bevel command does between two edges to round them over. The higher the recursions number the higher the number of steps,

and the smoother the round over. But remember the more recursions the more faces added.



**Note:**

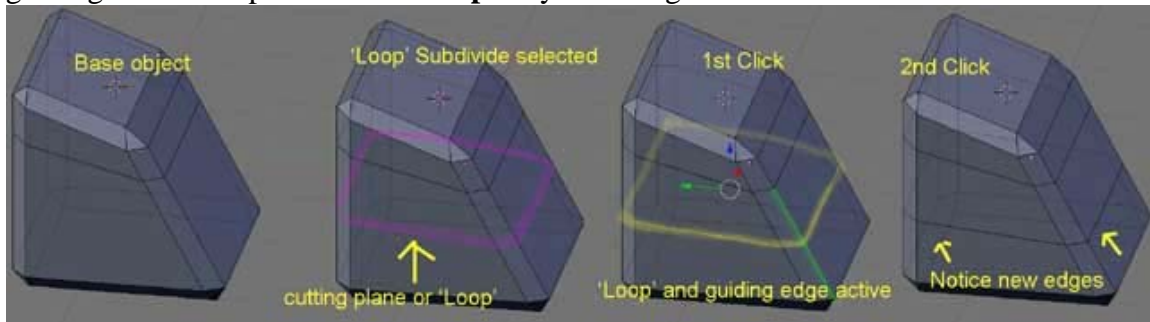
When you first click 'Bevel' you'll notice your mesh becomes filled with yellow lines. These are tool/gizmo representation of your mesh's faces, and what you are looking for here is the opening of space between faces as you move your mouse. This space is where the Beveling will occur, and the smaller sized faces what the new size of the original faces will be. The first Cube in the image created Recursions: 3.

Also about the keyboard shortcut '**W Alt2**', so first you hit '**W**' and a list called **Specials** pops up. Then you press '**Alt2**' to get **Bevel**. Find in practice it is easier to hit '**W**' then simply pick **Bevel** from the list using your mouse.

**LOOP SUBDIVIDE 'Ctrl r'**

This tool is similar to a slicing plane in 3dsMax and Maya. But here you can not slice selected edges or faces; instead the plane slices the entire object.

Simply be in 'Edge' Mode and go Mesh >Vertices >Loop Subdivide or '**Ctrl r**'. A purplish loop appears denoting the cutting plane within your object. Move your mouse over the faces of your mesh to re-orient the '**Loop**' angle to the faces. When you get the angle you like click once and the '**Loop**' turns yellow and the edge to which the '**Loop**' is aligning itself turns green. Moving your mouse slides the '**Loop**' along this edge as a guiding rail. Next position the '**Loop**' to your liking in the mesh.



Beveled Cube use to better show how all edges are cut.

Click again and the green edge disappears, however you still see a yellow '**Loop**' line, but actually these are the newly created edges you have just made selected. Hit '**a**' to deselect all to view your mesh and you'll see the new edges there.

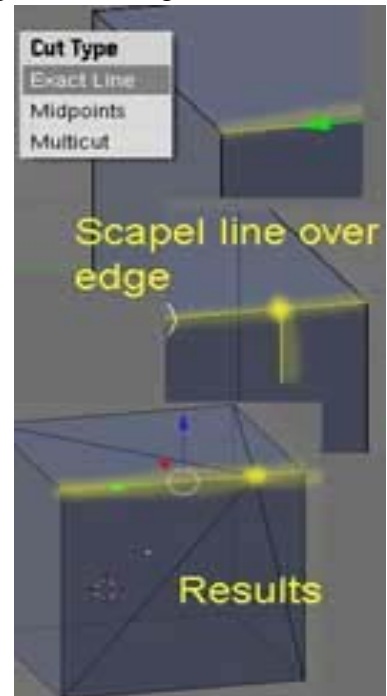
## KNIFE SUBDIVIDE 'Shift k'

Used to subdivide edges, also Blender does not have a command similar to 'Cut Face(s)' found in other 3D packages. In Blender if you're cutting a face, you are actually cutting two edges.

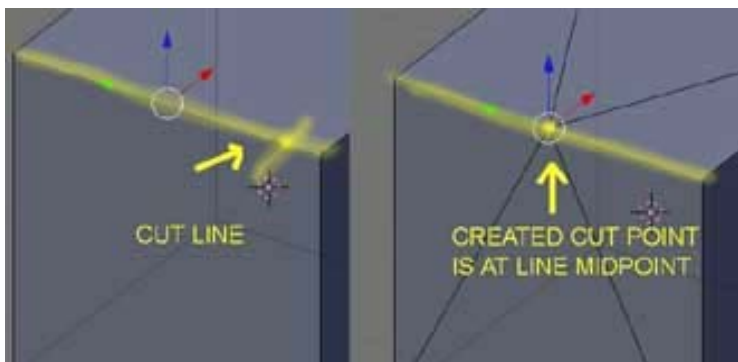
In 'Edges' sub-mode select an edge you wish to cut. Do a *Mesh >Edges >Knife* Subdivide, and a popup called '**Cut Type**' appears under your cursor. If you are using the keyboard shortcut '**Shift k**' make sure your mouse is away from other edges before pressing them. Find sometimes your edge selection suddenly goes to an edge that the mouse is over.

**EXACT LINE:** This means cut the 'Edge' exactly where I create my cut line. Clicking '**Exact Line**' changes your cursor to the cutting/scalpel icon, now move it to where you would like the cut, you do not have to be on the line, click and drag a cutting line over the point on the edge where you wish to subdivide it. Once you go over the line release the mouse button, but **DO NOT CLICK AGAIN**, instead press the '**Enter**' key to cut the edge.

You could continue drawing out the line to cross other vertices, but only the one is selected. You could also go back and forth over the selected line, but the '**Exact Line**' only makes a cut over the first place the cutting line crossed the selected Edge.

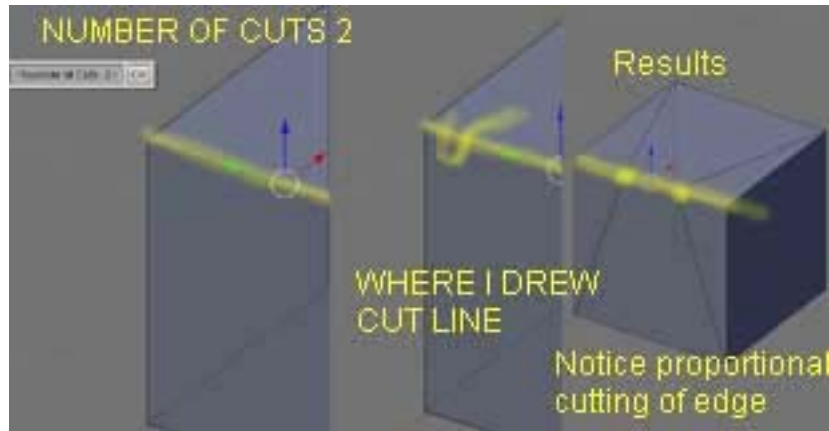


**MIDPOINTS:** You cut the same way, but no matter where you make your cut Blender splits the 'Edge' at its midpoint.



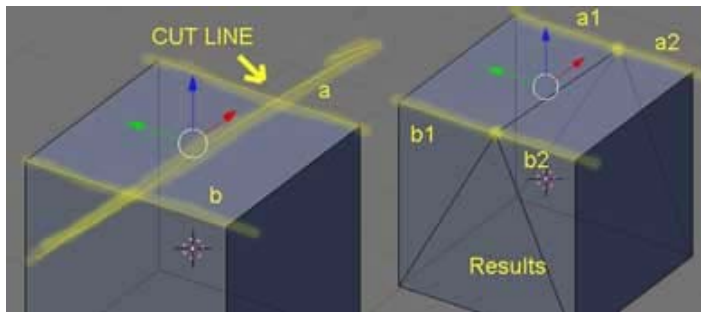
**MULTICUTS:** When you choose **'Multicuts'**, a pop up appears under your cursor asking **'Number of cuts (#) OK'**. Same as before hold and slide to change the number of cuts, or click on words to keyboard enter. Hit OK and draw your line like before, you actually need only cross the edge once by click dragging out your **'Cutting Line'** and hitting **'Enter'**. As with **'Midpoints'** Blender carries out a proportional dividing of the edge. So a number of two cuts produces 3 even sized edge segments, 3cuts makes 4. In the image I drew a looping 'Cut Line' back over the 'Edge'.

This is just to show how my line is at the far end of the 'Edge'. You really only need to draw across the line once, that is because Blender calculates out the cut points on the edge.



### KNIFE SUBDIVIDE AS FACE CUTTING TOOL

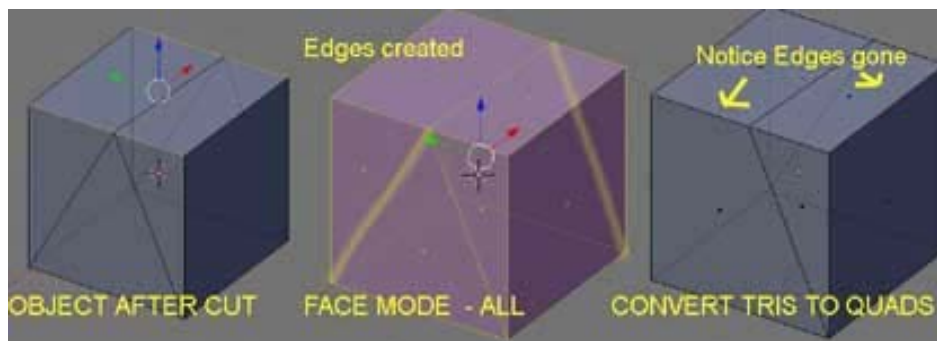
In the above example I used **'Knife Subdivide'** to cut just a single edge. But the tool can also be used to cut multiple edges at once or two edges on the same face dividing the face as you might use a **Face Cut** in 3dsMax or Maya.



Pick two edges on your Cube opposite one another, and then do a **'Knife Subdivide'** choosing the type you want. You just cut a face, but remember Blender thinks you subdivided 2 edges. Try picking and cutting more Edges.

**TIP:** When Blender cut the Edges it has to create new edges running from the cut point. Blender then displays these new edges, but things after a few cuts get kind of busy.

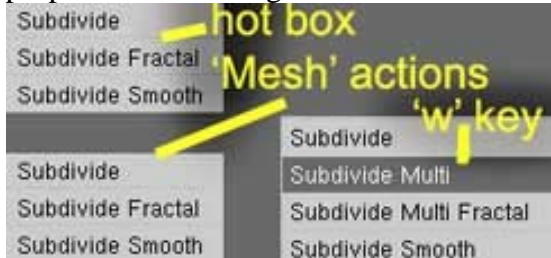
To help clean things up a bit switch into **'Faces'** Mode and use **'a'** to select all faces. Now Mesh >Faces >Convert Triangles to Quads or **'Alt j'** should help clean up some.



Remember Blender currently does not handle N-gons, so even though that front face is nice and co-planar it still has to do a quad and tri combination.

## SUBDIVIDE 'w 1'

Sub-dividing is another way to go about cutting up edges, but here it is always proportional meaning a mathematical division (1/2, 1/3, 1/4...)



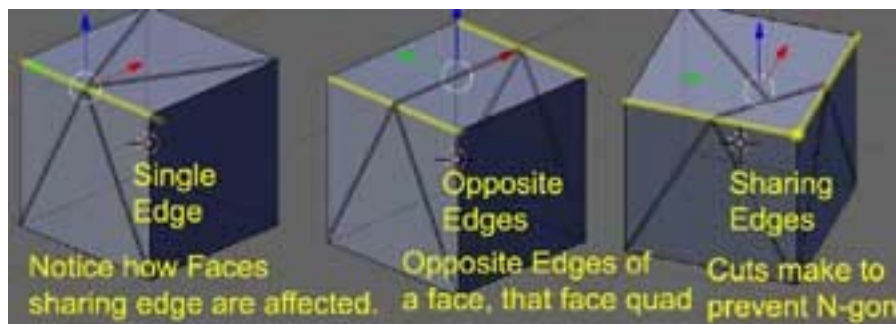
**Take Note:** To the left are Sub-divide action lists, notice how though the '**Hot Box**' or **Edit Header Menu – Mesh** you get 3 choices. But when used the keyboard shortcut '**w**', you get the added choice of Subdivide Multi, and Subdivide Fractal becomes Subdivide Multi Fractal.

In Blender sometimes fewer actions may show in the **Hot Box** or **Menu Bar**, for example with '**w**' Specials List or '**m**' Merge List.

Box and Menu show most common actions used, but more types of actions maybe available. Especially if you see a Keyboard shortcut listed like '**w 1**', meaning **w** brings up a list and **1** is the option's position on that list. Seeing the number on the shortcut tends to mean a long list, and when you see this it is best to hit the first letter keyboard shortcut to see the whole list.

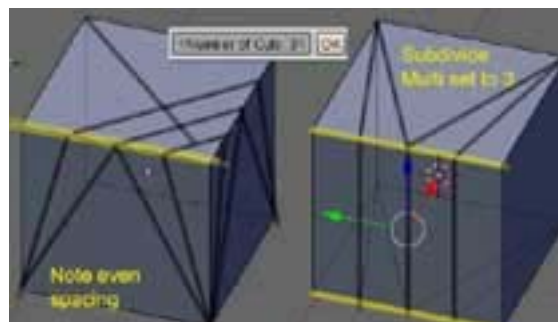
**Subdivide: 'w 1'** simply cuts an **Edge** in half, if a single **Edge** the **Face(s)** associated with that **Edge** will be divided up into Triangular face. If **Opposite Edges** sharing a **Face** are subdivided 2Quads are produced, but only on that face.

If two **Edges** share a **Face**, and also share Vertices in common, Blender cuts the **Edges** but also makes additional cuts/Triangles as needed to prevent N-gons from being created.



**Subdivide Multi: 'w 2'** specify evenly spaced series of cut on selected edge(s) through pop up. Again notice where needed Blender cuts extra geometry to prevent N-gons.

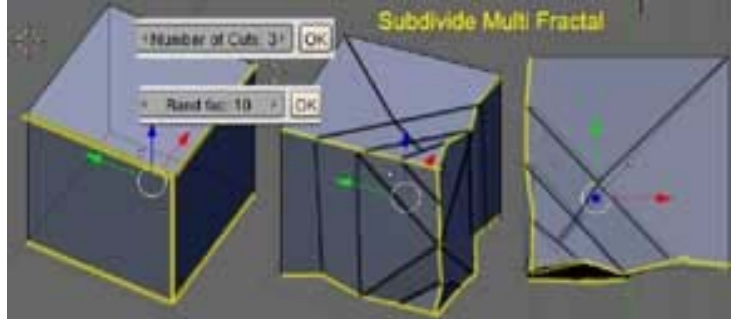
(3 sides = Tri, 4 sides = Quad, 5 sides plus = N-gon)



### Subdivide Multi Fractal: 'w 3'

First part is the same as Subdivide *Multi*, where a popup asks for number of *Cuts* to be made. But it then wants a *Rand(om)* factor which randomly modifies the vertex position of the results.

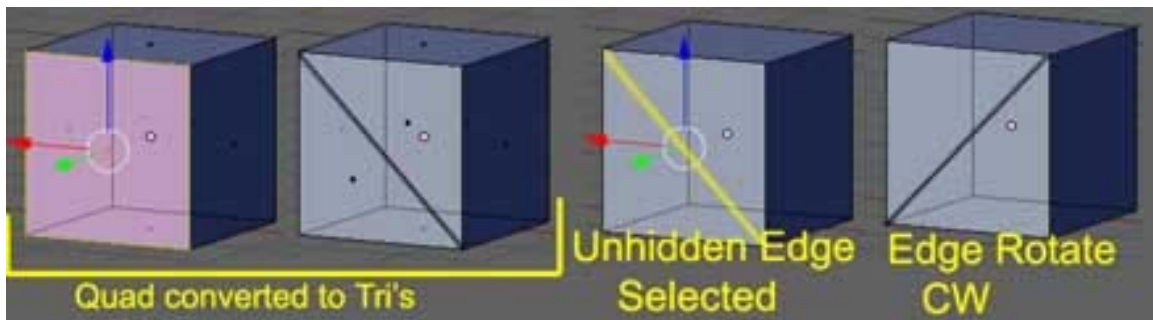
Usefulness: You have a model of a car that you quickly want to look like it has body damage. Picking a number of edges and doing a Subdivide Multi Fractal can quickly make the car's body to appear damaged.



### ROTATE EDGE (CW CCW) 'Ctrl e'

Basically referred to by most other 3D programs as *Flip Edges*, but here in Blender it is called *Rotate Edge* with the option of ClockWise and CounterClockWise rotation.

The *Edge* to be rotated is the usually the unseen one that splits a Quad, so first make a new Cube for yourself. It has 6 quads that are actually 12 faces/tri's with the Edge bisecting the quad hidden. So to begin with you will need to unhide this edge by converting the Quad to Tri's. Put yourself in *Edit Mode – Faces*, keep in mind '**Ctrl Tab**' allows changing sub-object select in **3D View Edit Mode**. Next pick a face and using the **Hot Box** or *Mesh > Faces > Convert to Triangles* or '**Ctrl t**' change the Quad into two Tri's. You should now see an Edge running diagonal across the former Quad, so back to **Edge Mode**. Make sure nothing is selected using the '**a**' key, and then select the *diagonal Edge*. Now *Mesh > Edges > Rotate Edge CW* (notice both CW and CCW plus a number of other actions show **Ctrl E** as their shortcut. When **Ctrl E** is pressed in Edit Mode a list of Edge Specials actions comes, up so just one key combo can not carry out this action) or **CCW** will flip that *Edge*.



Subdivide and Fractal are available in your *Buttons WindowType-Editing Panel- Mesh Tools*.