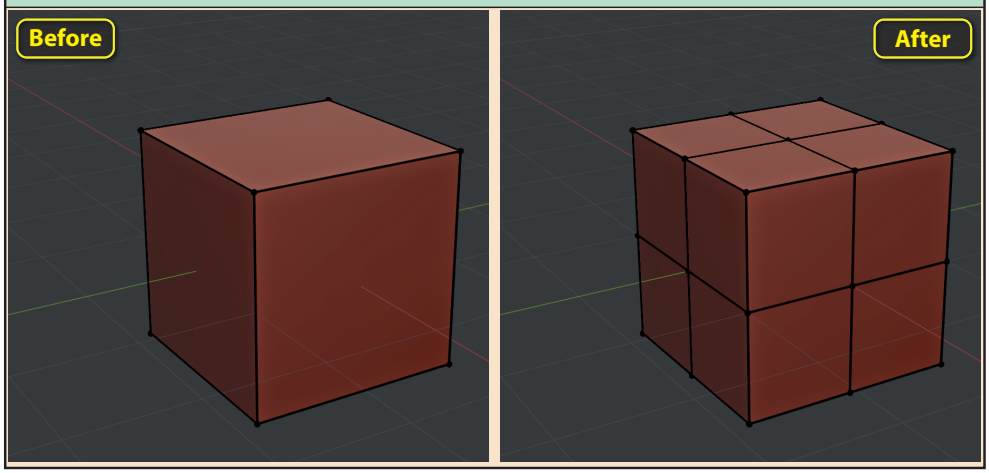
Subdivision

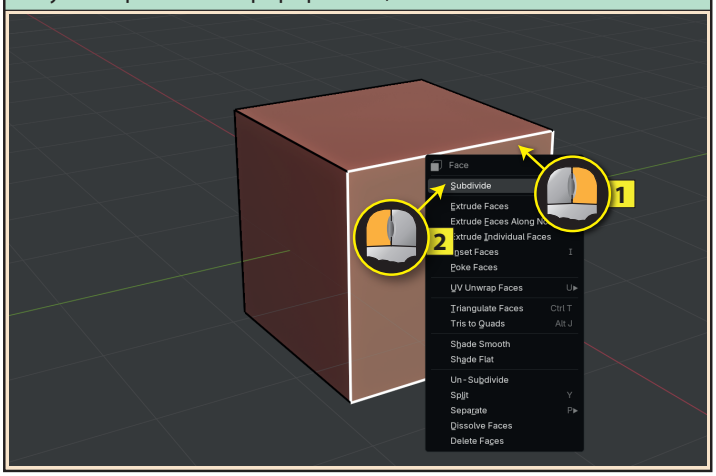
Although we should always strive to minimise the number of Faces we use in a model, often the Faces in the mesh we start with will have to be increased.

A simple way to do this is to use subdivision which splits selected Faces into multiple new Faces.

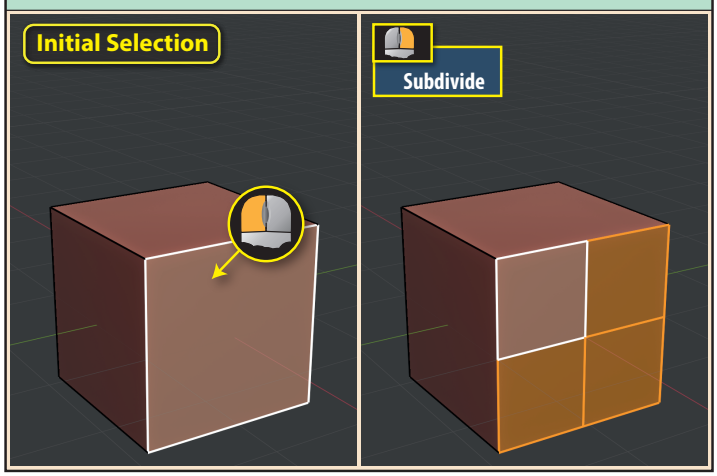
For example, below we can see the Faces in the default Cube before and after subdivision using the default parameter values given in the ***Last Op*** panel.



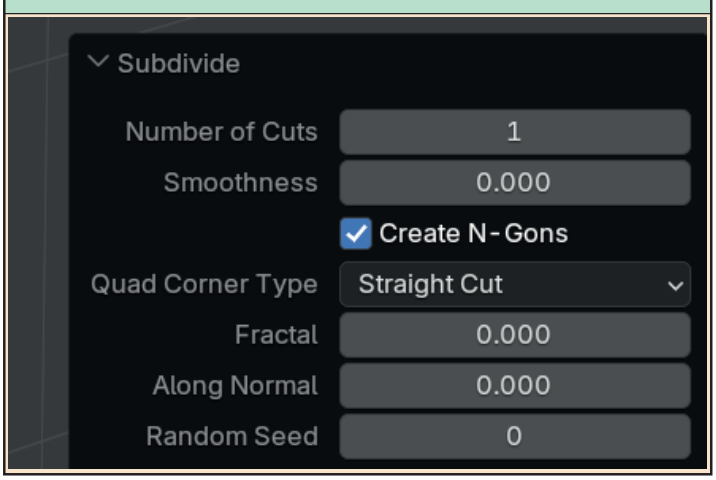
To use subdivision, we start by selecting those elements we which to subdivide. Normally, these will be Faces, but Edges can aslo be subdivided. Now we click the right mouse button and select the very first option in the popup menu, **Subdivide**.



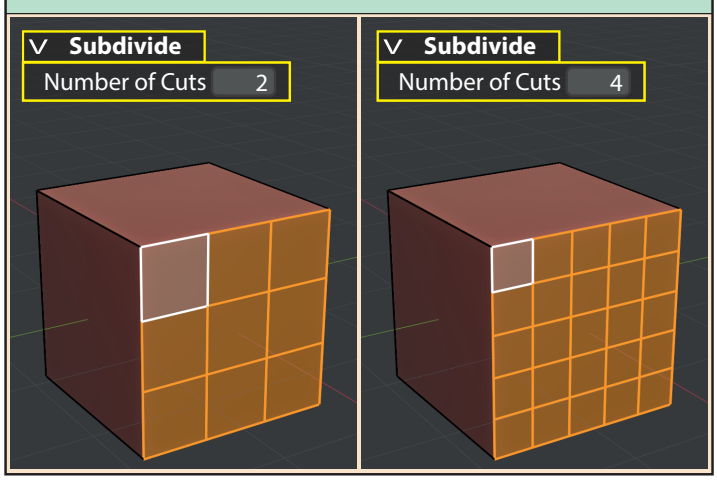
This will subdivide the selected elements by dividing the Edges within the selection into two equal parts, creating new Faces accordingly.



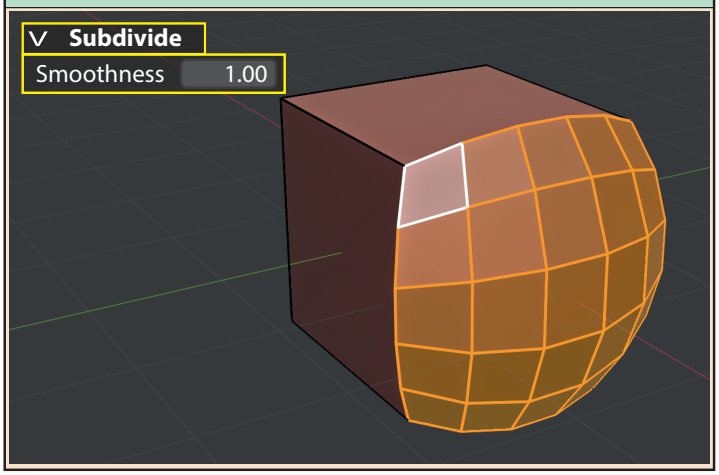
The ***Last Op*** panel has many parameter settings.



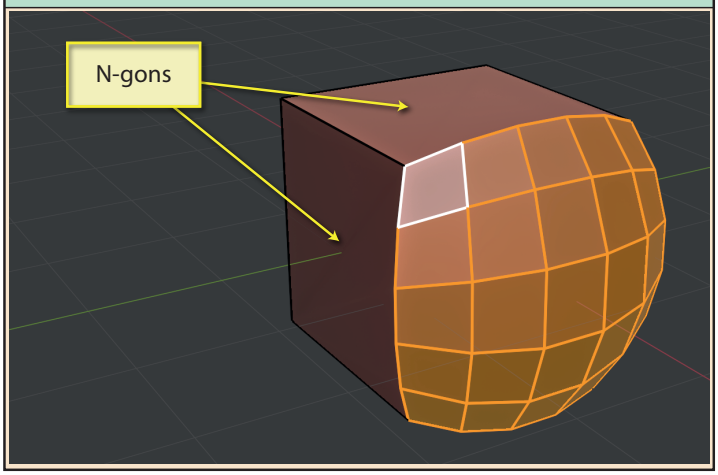
Number of Cuts sets the number of cuts to each selected Edge.



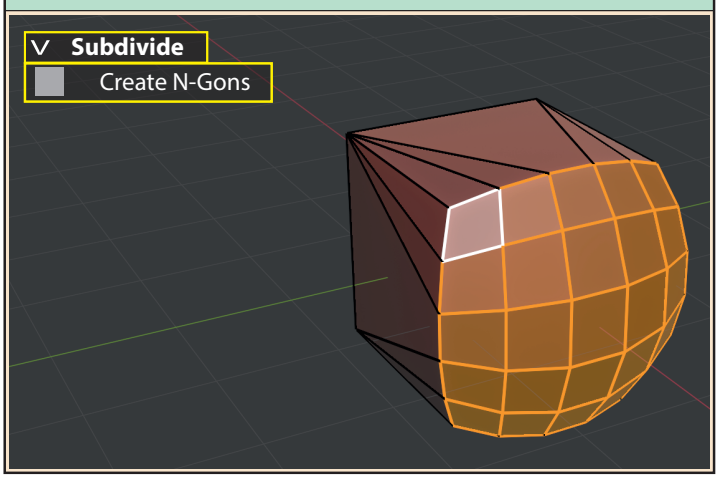
Smoothness, when set to values other than zero, has an increasingly "rounding" effect on the newly created faces. Below we can see the effect on the Cube's selected Face when we set **Smoothness** to 1.00.



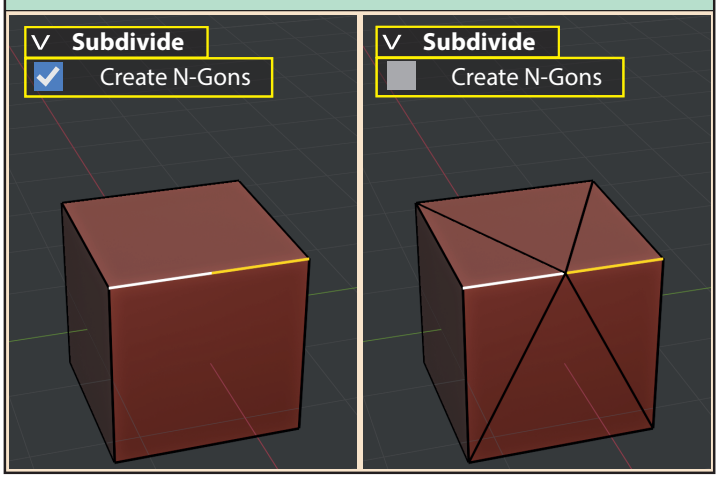
Because of the additional vertices that have been added, the Faces adjacent to the subdivision have changed from quads to n-gons.



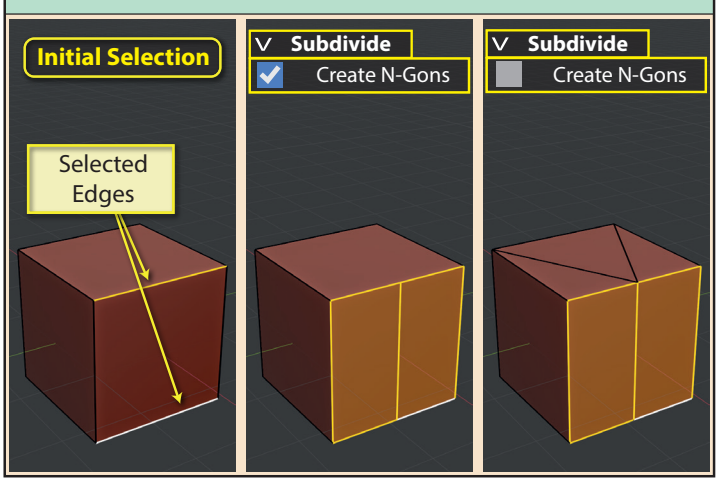
If we deselect the **Create N-Gons** checkbox in the ***Last Op*** panel, we force Blender to create only Tris and Quads in the surrounding Faces.



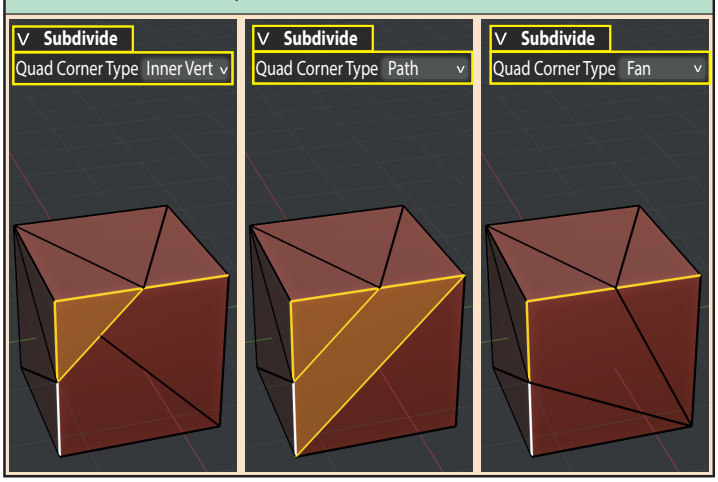
The minimum we can select in order to perform subdivision is a single edge. Visually there won't be much difference unless we disable the creation of N-gons.



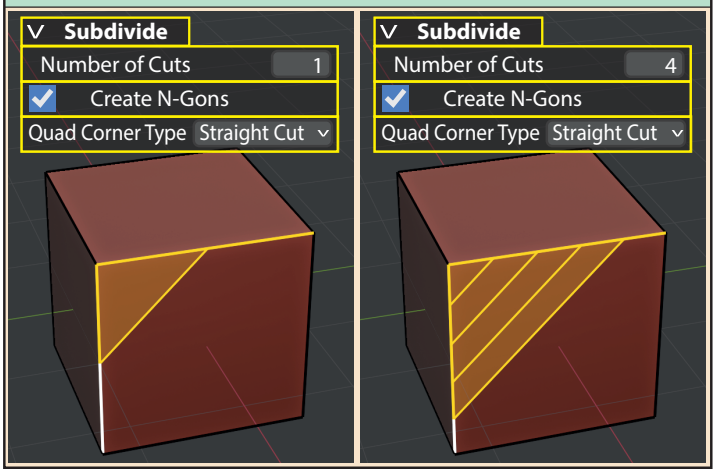
Subdividing two opposite Edges creates the effect shown below.



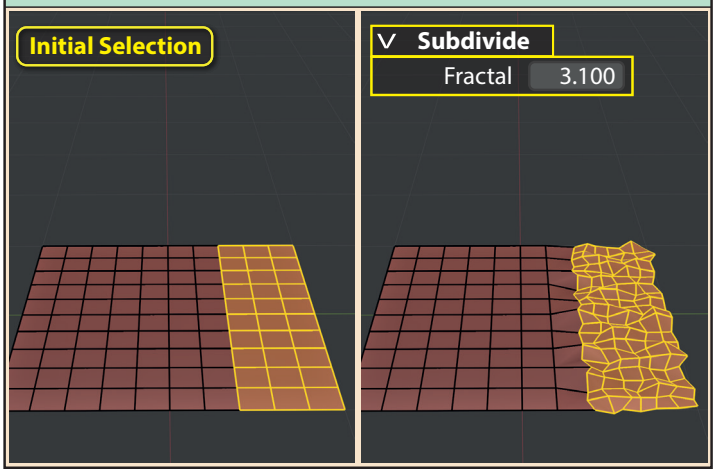
When selecting two adjacent Edges (top and left below), the cuts created are affected by the ***Last Op*** panel's **Quad Corner Type** setting. The results of three options are shown below (***Create N-Gons*** is unchecked).



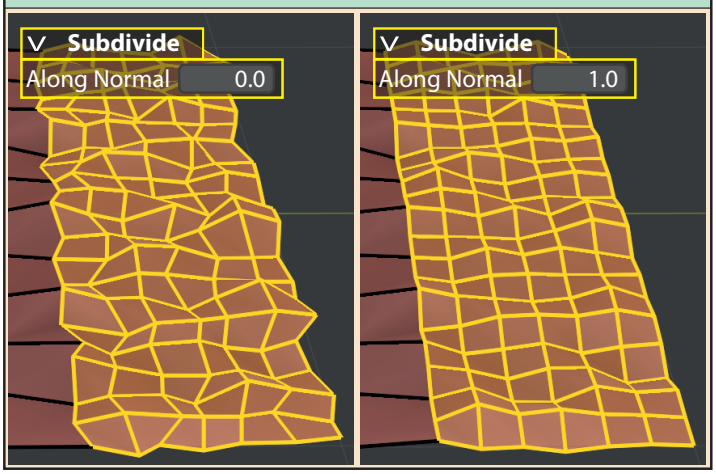
Quad Corner Type: Straight Cut is only available when **Create Quads** is selected. This creates a triangle and a quad when only one cut is being made, with more quads when there are multiple cuts.



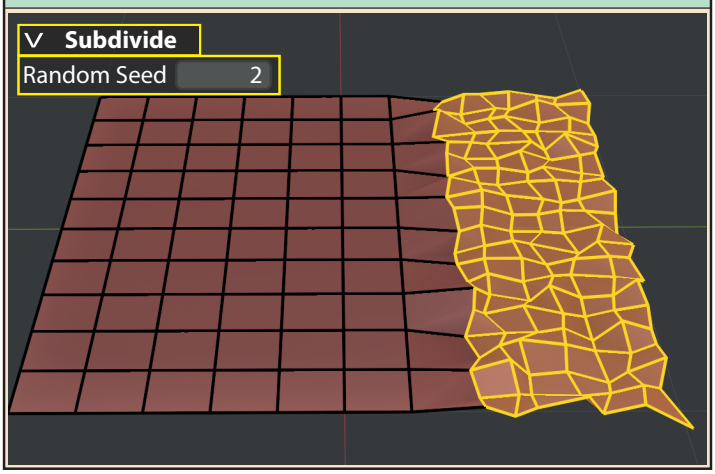
The *Last Op* panel's **Fractal** field is used to randomly reposition the vertices within the current selection.



Along Normal adjusts the direction of the vertex movement created by ***Fractal*** from a random direction to along the vertex's normal. The degree to which the direction changes from random to normal depends on **Along Normal's** value.

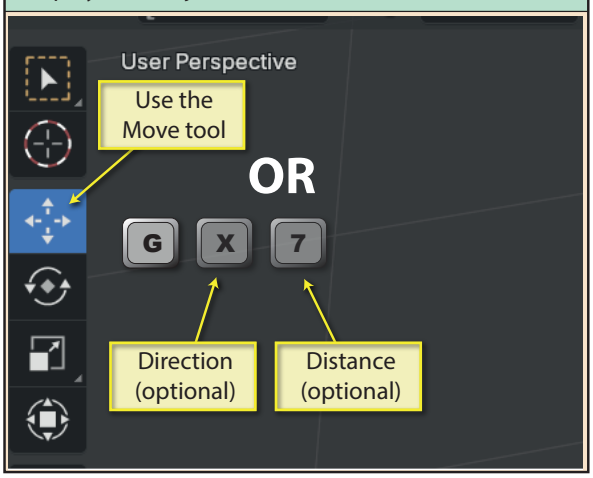


Random Seed adjusts the starting value for the random number generator used by the ***Fractal*** option. Each seed value produces a different result. Below the seed has been changed from the default 0 to 2 with ***Along Normal*** set to 0.0.

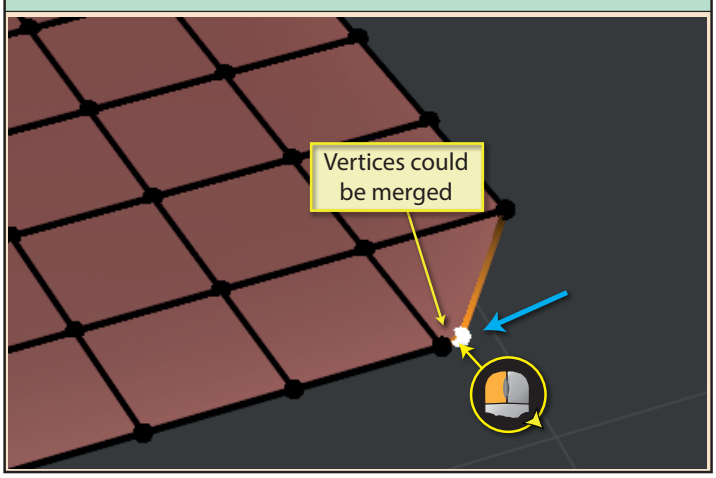


Merging

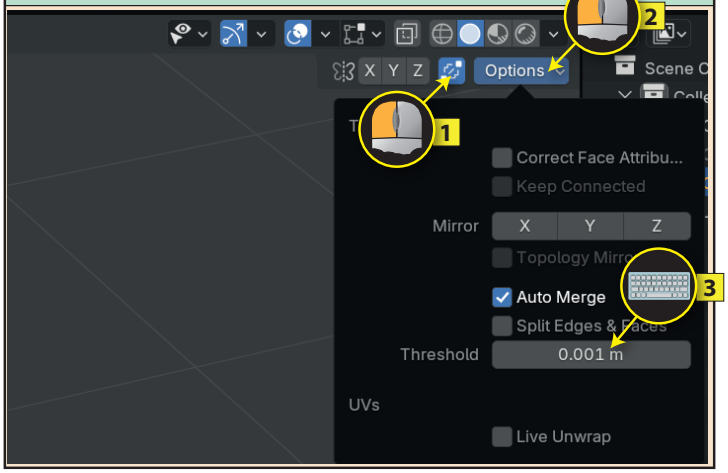
When we are adjusting the shape of a mesh, the most fundamental operation is moving a single vertex. We can use the same tools and shortcuts that we employed in Object mode.



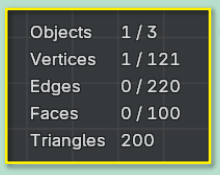
When we move a vertex close to another vertex, we have the option to merge them, creating one vertex instead of two and hence reducing the complexity of the mesh.

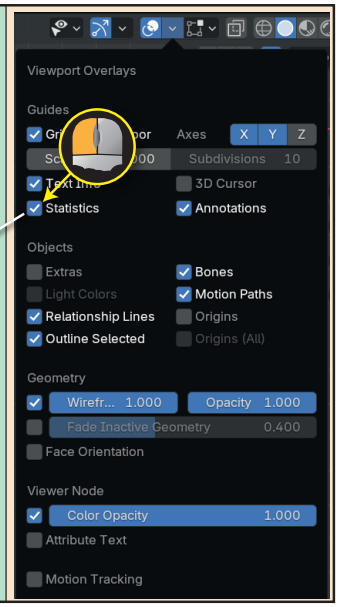


To automate the merging of two vertices, we need to activate the **Merge** icon in the top-right of the Viewport. By cicking on the **Options** dropdown, we can set a **Threshold** value stating how close the vertices should be before merging occurs.

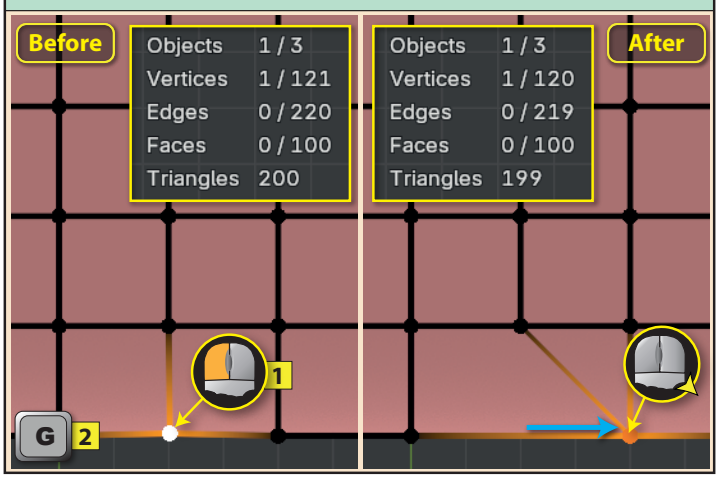


To be absolutely sure that merging has taken place, we can go to the ***Viewport Overlay*** options and activate **Statistics**. This will display in the top-left of the Viewport all the details of the mesh we are currently editing.

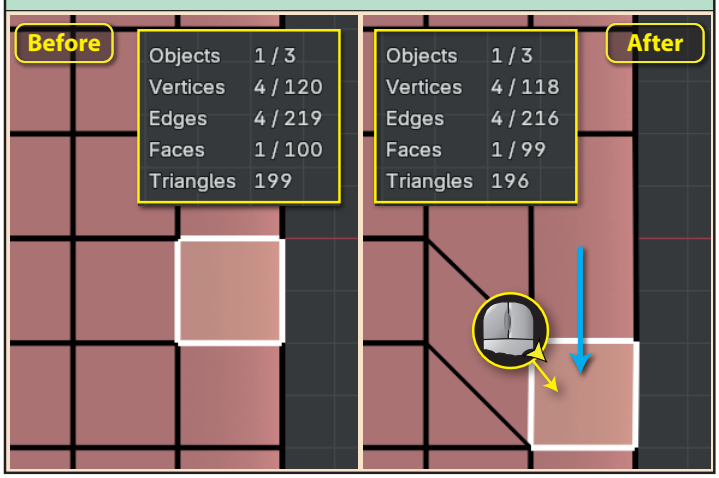




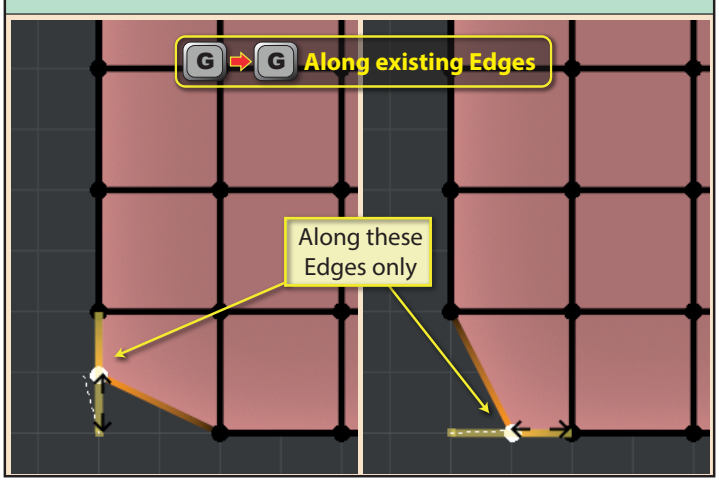
Below the selected vertex is moved and this causes it to merge with a second vertex. This, in turn, reduces the Vertex and Edge counts.



Vertex merging also works when moving an Edge or a Face. Below we see the effect of merging by moving a Face.



There is one key combination that works differently in Edit mode than in Object mode. In Edit mode pressing **GG** causes movement to be restricted to along the Edges to which it is attached.



To extend the path lines, hold down the **Alt** key after starting the move.