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Lesson-5-Vertex

Editable Poly (Vertex)

Vertices are points in space: They define the structure of other sub-objects (edges and polygons) that make up the poly object. When you move or edit vertices, the connected geometry is affected as well. Vertices can also exist independently; such isolated vertices can be used to construct other geometry but are otherwise invisible when rendering.

- Select an editable poly or Edit Poly object. > Modify panel > Selection rollout > Vertex
- Select an editable poly or Edit Poly object. > Modify panel > Modifier List display > Expand Edit Poly. > Vertex
- Select an editable poly or Edit Poly object. > Quad menu > Tools 1 quadrant > Vertex

At the Vertex sub-object level, you can select single and multiple vertices and move them using standard methods. This topic covers the Edit Vertices and Vertex Properties rollouts and provides links to the rest.

Procedures

To weld polygon vertices:

You can use either of two methods to combine several vertices into one, also known as welding. If the vertices are very close together, use the Weld function. You can also use Weld to combine a number of vertices to the average position of all of them.

Alternatively, to combine two vertices that are far apart, resulting in a single vertex that's in the same position as one of them, use Target Weld.

1. **To use Weld:**

   If the vertices are very close together, simply click Weld. If they are farther apart, click  (Settings) to the right of the Weld button. This opens the Weld Vertices caddy, where you can increase the Weld Threshold. Once you change Weld Threshold, it remains at the new value until you change it again, or until the end of the 3ds Max session.

   Play Video

2. **To use Target Weld:**

   The two vertices must be contiguous; that is, they must be connected by a single edge.

   Play Video

To select vertices by color:

Note: This procedure applies to editable poly objects only, as the Vertex Properties rollout is unavailable in the Edit Poly modifier.

1. In the Vertex Properties rollout ➤ Select Vertices By group, click the color swatch, and specify the color of vertex you want in the Color Selector.
2. Specify ranges in the RGB Range spinners. This lets you select vertices that are close to the specified color, but don't match exactly.
3. Click the Select button.

   All vertices matching the color, or within the RGB range, are selected.

   You can add to the selection by holding Ctrl as you click the Select button, and subtract from the selection by holding the Alt key.

   Tip: You can select all vertices of the same color by first selecting the vertex you want matched, dragging a copy of the Edit Color swatch to the Existing Color swatch, and then clicking the Select button. (If you want an exact match, be sure to set the RGB Range spinners to 0 first.)

Interface

This topic provides detailed information on the vertex-specific rollouts: Edit Vertices and Vertex Properties. The remaining rollouts are described in their own topics.

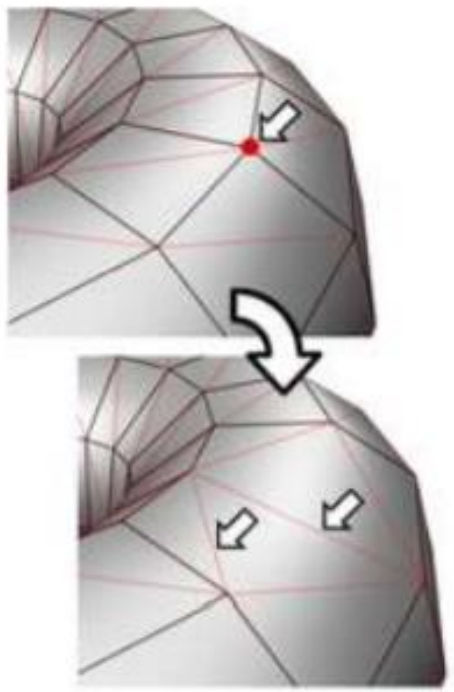
Edit Vertices rollout

This rollout includes commands specific to vertex editing.

Tip: To delete vertices, you can select them and press the Delete key, but this can create holes in the mesh. To delete vertices without creating holes, use Remove (see the following).

Remove

Deletes selected vertices and combines the polygons that use them. The keyboard shortcut is Backspace.



Removing one or more vertices deletes them and retriangulates the mesh to keep the surface intact. If you use Delete instead, the polygons depending on those vertices are deleted as well, creating a hole in the mesh.

Warning: Use of Remove can result in mesh shape changes and non-planar polygons.

Break

Creates a new vertex for each polygon attached to selected vertices, allowing the polygon corners to be moved away from each other where they were once joined at each original vertex. If a vertex is isolated or used by only one polygon, it is unaffected.

Extrude

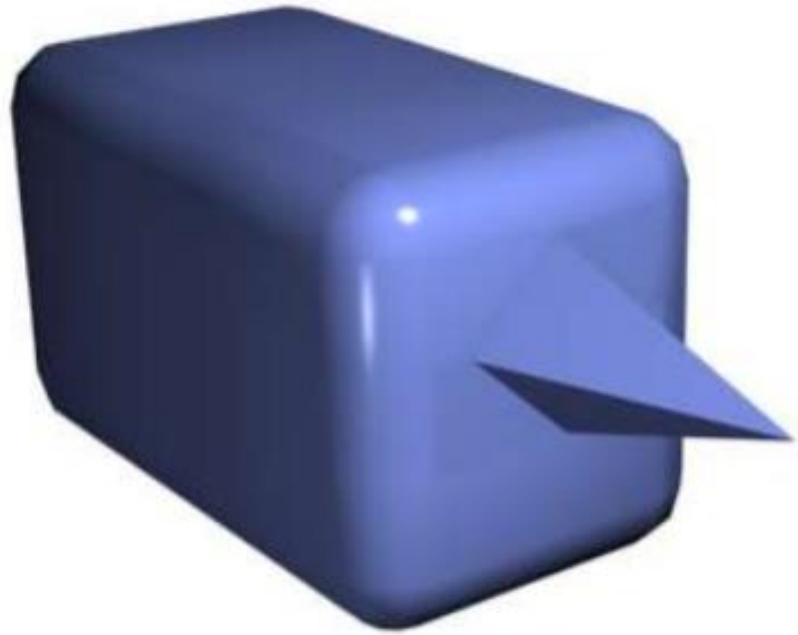
Lets you extrude vertices manually via direct manipulation in the viewport. Click this button, and then drag vertically on any vertex to extrude it.

Extruding a vertex moves it along a normal and creates new polygons that form the sides of the extrusion, connecting the vertex to the object. The extrusion has the same number of sides as the number of polygons that originally used the extruded vertex.

Following are important aspects of vertex extrusion:

- When over a selected vertex, the mouse cursor changes to an Extrude cursor.
- Drag vertically to specify the extent of the extrusion, and horizontally to set the size of the base.
- With multiple vertices selected, dragging on any one extrudes all selected vertices equally.

- You can drag other vertices in turn to extrude them while the Extrude button is active. Click Extrude again or right-click in the active viewport to end the operation.



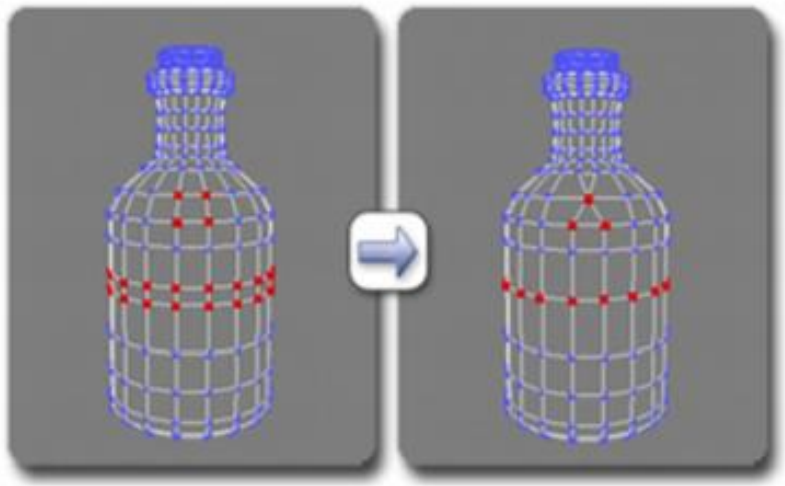
Chamfer box showing extruded vertex

- **Extrude Settings** Opens the Extrude Vertices caddy, which lets you perform extrusion via interactive manipulation.

  If you click this button after performing a manual extrusion, the same extrusion is performed on the current selection as a preview and the caddy opens with Extrusion Height set to the amount of the last manual extrusion.

Weld

Combines contiguous, selected vertices that fall within the tolerance specified in Weld Vertices caddy. All edges become connected to the resulting single vertex.



Using Weld at the Vertex level

Vertices farther apart than the Threshold distance are not welded.

Weld is best suited to automatically simplifying geometry that has areas with a number of vertices that are very close together. Before using Weld, set the Weld Threshold via the Weld caddy. To weld vertices that are relatively far apart, use Target Weld instead.

- **Weld Settings** Opens the Weld Vertices caddy, which lets you specify the weld threshold.

Chamfer

Click this button and then drag vertices in the active object. To chamfer vertices numerically, click the Chamfer Settings button and use the Chamfer Amount value.

If you chamfer multiple selected vertices, all of them are chamfered identically. If you drag an unselected vertex, any selected vertices are first deselected.

Each chamfered vertex is effectively replaced by a new face that connects new points on all edges leading to the original vertex. These new points are exactly <chamfer amount> distance from the original vertex along each of these edges. New chamfer faces are created with the material ID of one of the neighboring faces (picked at random) and a smoothing group which is an intersection of all neighboring smoothing groups.

For example, if you chamfer one corner of a box, the single corner vertex is replaced by a triangular face whose vertices move along the three edges that led to the corner. Outside faces are rearranged and split to use these three new vertices, and a new triangle is created at the corner.

Alternatively, you can create open space around the chamfered vertices; for details, see Chamfer.