5.2.6.8 Modeling - Meshes - Editing - Deforming

Deforming

- Mirror
- Shrink/Fatten Along Normals
- Smooth
- Noise
- Push/Pull
- Shear
- To Sphere
- Warp
- Bend

Mirror

Reference

Mode: *Edit* mode

Menu: Mesh ‣ Mirror ‣ Desired Axis

Hotkey: `Ctrl-M`

The mirror tool mirrors a selection across a selected axis.

The mirror tool in *Edit* mode is similar to *Mirroring in Object mode*. It is exactly equivalent to scaling by -1 vertices, edges or faces around one chosen pivot point and in the direction of one chosen axis, only it is faster/handier.

After this tool becomes active, select an axis to mirror the selection on entering x,y, or z.

You can also interactively mirror the geometry by holding the MMB and dragging in the direction of the desired mirror direction.

Axis of symmetry

For each transformation orientation, you can choose one of its axes along which the mirroring will occur.

As you can see, the possibilities are infinite and the freedom complete: you can position the pivot point at any location around which we want the mirroring to occur, choose one transformation orientation and then one axis on it.
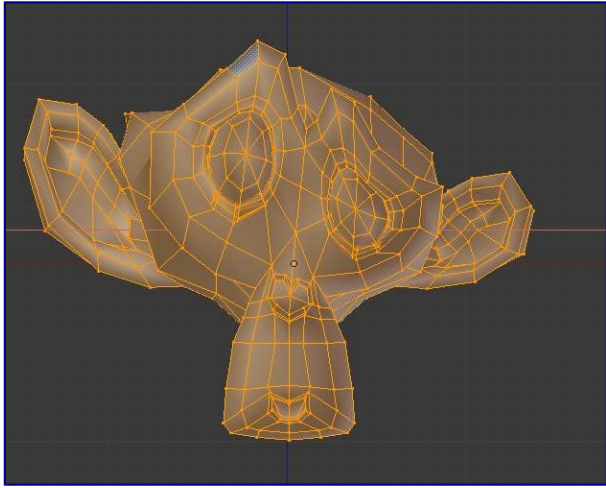
Pivot point

Pivot points must be set first. Pivot points will become the center of symmetry. If the widget is turned on it will always show where the pivot point is.

On (*Mirror around the Individual Centers ...*) the pivot point default to **median point of the selection of vertices** in *Edit* mode. This is a special case of the *Edit* mode as explained on the *pivot point page*.
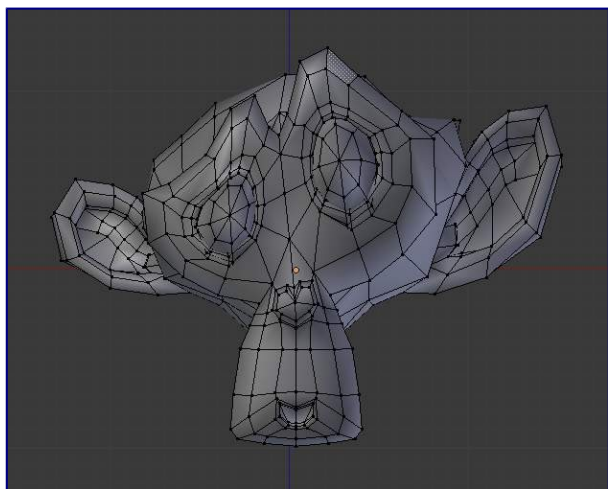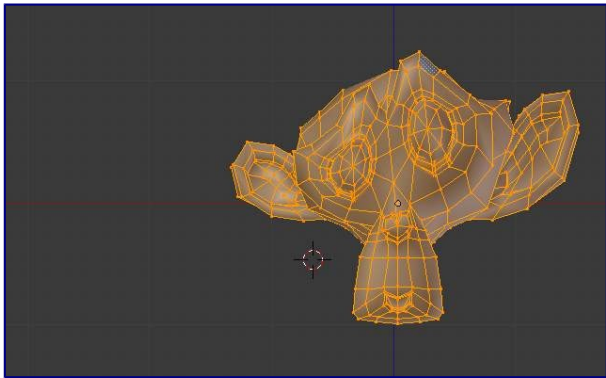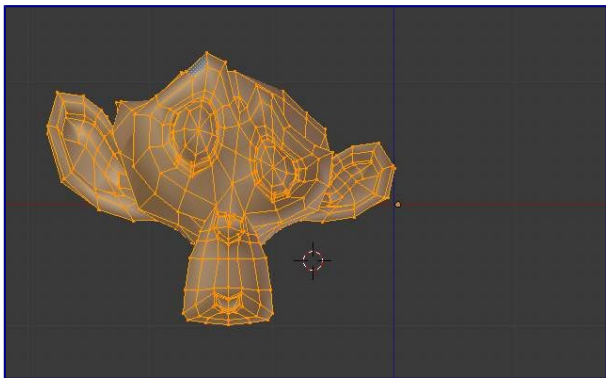

Mesh before mirror.

Mesh after mirrored along X axis

On (*Mirror around the 3D Cursor* ...) the pivot point is the *3D Cursor,* the transformation orientation is *Local,* a.k.a. the Object space, and the axis of transformation is X.

Mesh before mirror.

Mesh after mirrored along X axis using the 3d cursor as a pivot point

Transformation orientation

Transformation Orientations are found on the 3D area header, next to the *Widget* buttons. They decide which coordinate system will rule the mirroring.

Shrink/Fatten Along Normals

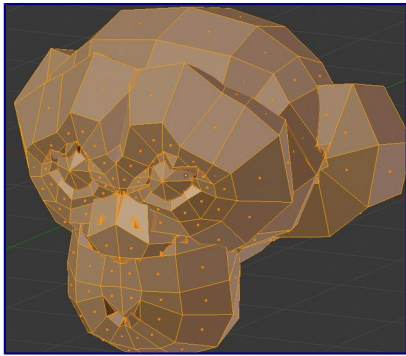| **Reference** |
|---|
| Mode: *Edit* mode |
| Panel: *Mesh Tools* (*Editing* context) |
| Menu: Mesh ‣ Transform ‣ Shrink/Fatten Along Normals |
| Hotkey: `Alt-S` |

This tool translates selected vertices/edges/faces along their own normal (perpendicular to the face), which, on "standard normal meshes", will shrink/fatten them.
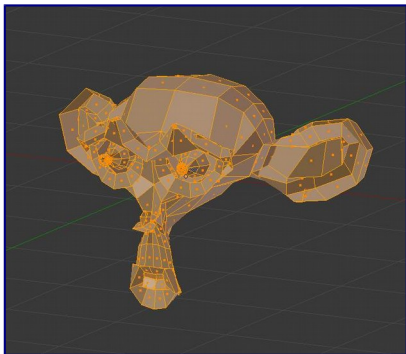
This transform tool does not take into account the pivot point or transform orientation.
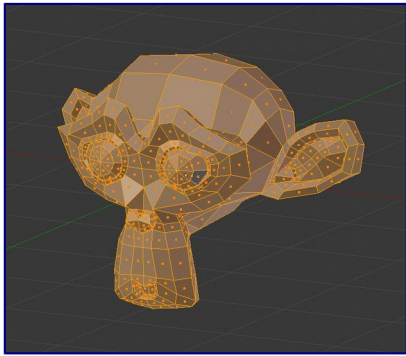
mesh before shrink/flatten

Inflated using a positive value

Shrunk using a negative value

Smooth

Reference

Mode: *Edit* mode
Panel: *Mesh Tools* (*Editing* context)
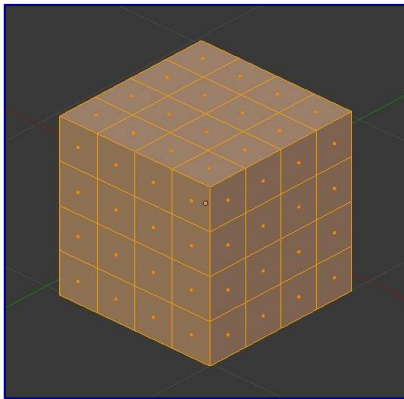Menu: Mesh ‣ Vertices ‣ Smooth vertex
Hotkey: [ctrl][V] ‣ Smooth vertex

This tool smooths the selected components by averaging the angles between faces. After using the tool, options appear in the *Tool Shelf*:
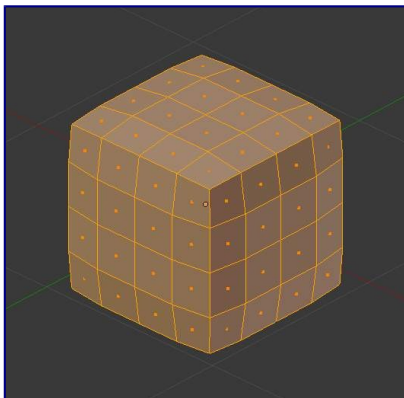
Number of times to smooth
    The number of smoothing iterations
Axes
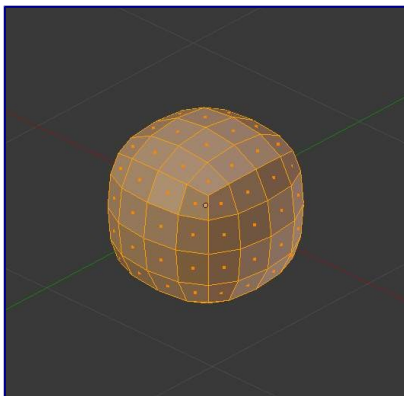   Limit the effect to certain axes.

mesh before smoothing

mesh after 1 smoothing iteration

mesh after 10 smoothing iterations

Laplacian Smooth

Reference
Mode: *Edit* mode Hotkey: [W] ‣ Laplacian Smooth

See the *Laplacian Smooth Modifier* for details.

Laplacian smooth is uses an alternative smoothing algorithm that better preserves the overall mesh shape. Laplacian smooth exists as a mesh operation and as a non-destructive modifier.

Note
The *Smooth modifier,* which can be limited to a *Vertex Group,* is a non-destructive alternative to the smooth tool.

Note
Real Smoothing versus Shading Smoothing Do not mistake this tool with the shading smoothing options described at *this page,* they do not work the same! This tool modifies the mesh itself, to reduce its sharpness, whereas *Set Smooth* / *AutoSmooth* and co. only control the way the mesh is shaded, creating an *illusion* of softness - but without modifying the mesh at all...

Noise

Reference
Mode: *Edit* mode Panel: Mesh Tools (*Editing* context)

| Note |
| --- |
| *Noise* is an old feature. The *Displace Modifier* is a non-destructive alternative to the Noise tool and is a more flexible way to realize these sort of effects. The key advantages of the modifier are that it can be canceled at any moment, you can precisely control how much and in which direction the displacement is applied, and much more.... See also the ANT Landscape *add-on*. |

The *Noise* function allows you to displace vertices in a mesh based on the grey values of the first texture slot of the material applied to the mesh.

The mesh must have a material and a texture assigned to it for this tool to work. To avoid having the texture affect the material's properties, it can be disabled in the texture menu.

The *Noise* function displaces vertices along the object's ±Z-Axis only.

Noise permanently modifies your mesh according to the material texture. Each click adds onto the current mesh. For a temporary effect, map the texture to Displacement for a render-time effect. In *Object* / *Edit* mode, your object will appear normal, but will render deformed.

The deformation can be controlled by modifying the *Mapping* panel and/or the texture's own panel (e.g. *Clouds*, *Marble*, etc.).
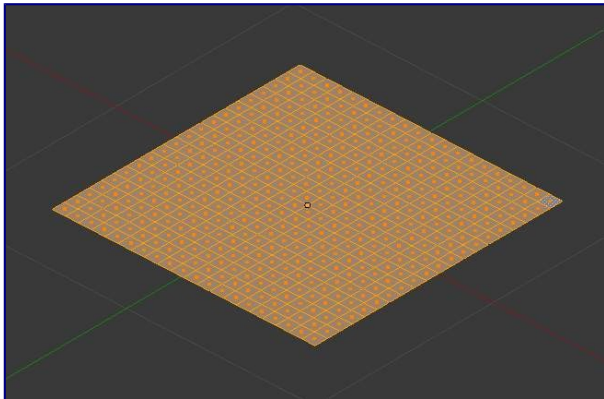
mesh before noise is added
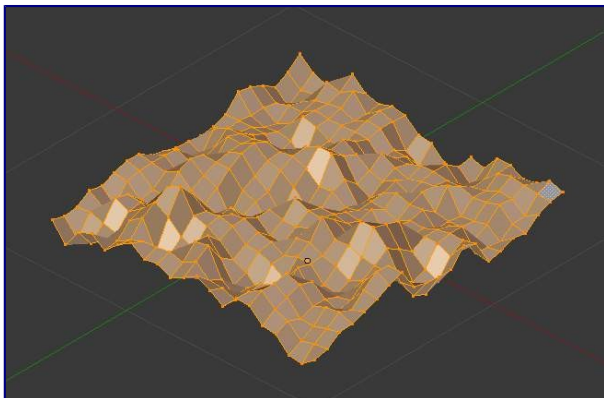
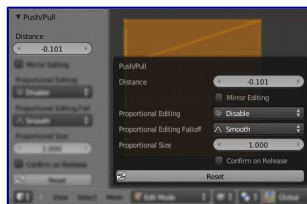
mesh after noise is added, using basic cloud texture

Push/Pull

Reference

Mode: *Object* and *Edit* modes
Menu: Object/Mesh ‣ Transform ‣ Push Pull

Description

Push/Pull distance.

Push/Pull will move the selected elements (Objects, vertices, edges or faces) closer together (Push) or further apart (Pull). Specifically, each element is moved towards or away from the center by the same distance. This distance is controlled by moving the mouse up (Push) or down (Pull), numeric input or through slider control.

Usage

Select the elements you want to operate on and activate the Push/Pull transform function. The Push/Pull option can be invoked from the Object/Mesh ‣ Transform ‣ Push/Pull menu option or by pressing Spacebar and using the search menu to search for *Push* or *Pull*. The amount of movement given to the selection can be determined interactively by moving the mouse or by typing a number. Pressing Return will confirm the transformation. The confirmed transformation can be further edited by pressing F6 or by going into the Toolshelf (T) and altering the Distance slider provided that no other actions take place between the *Push/Pull* transform confirmation and accessing the slider.

Note that the result of the *Push/Pull* transform is also dependant on the number and type of selected elements (Objects, vertices, faces etc). See below for the result of using *Push/Pull* on a number of different elements.
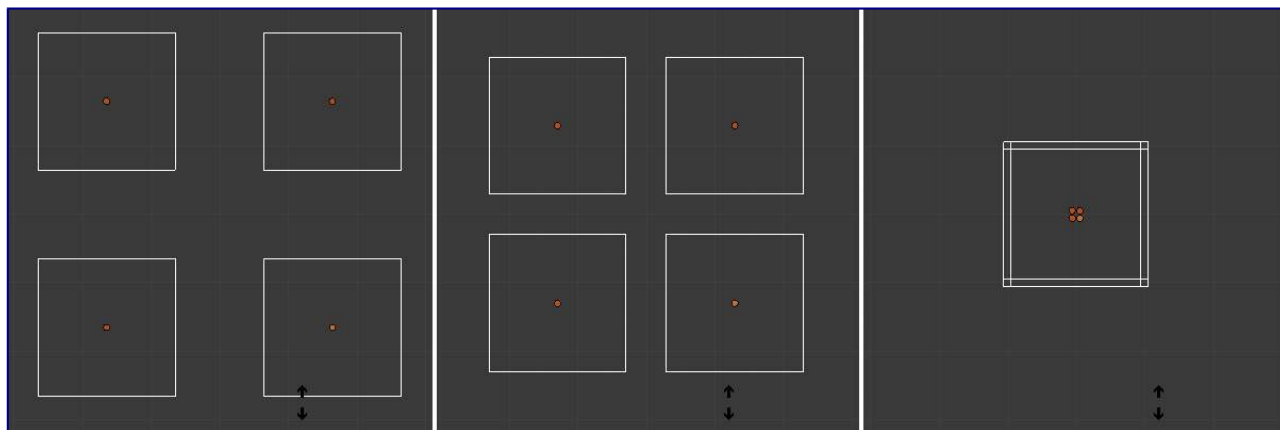
Equidistant Objects being pushed together.
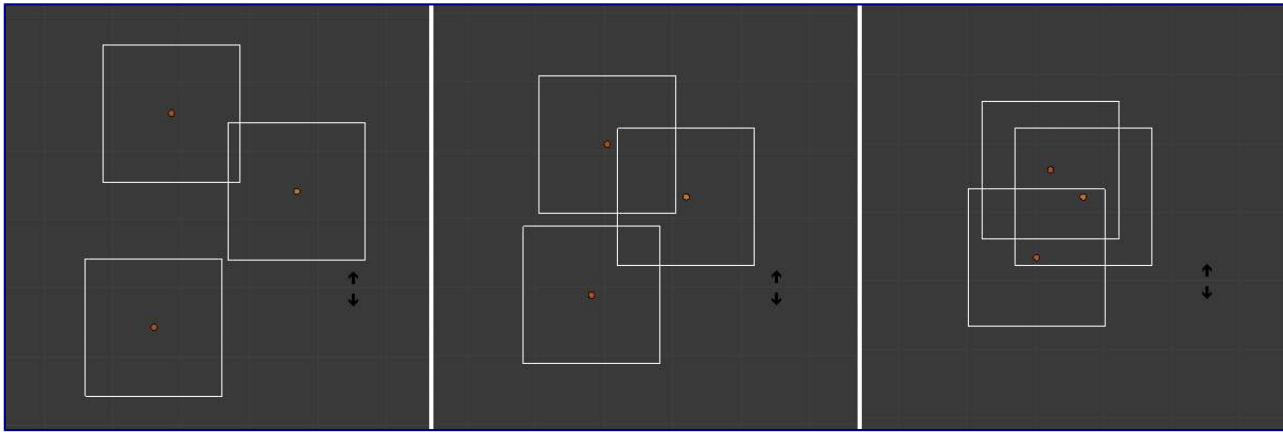
Random Objects being pushed together.
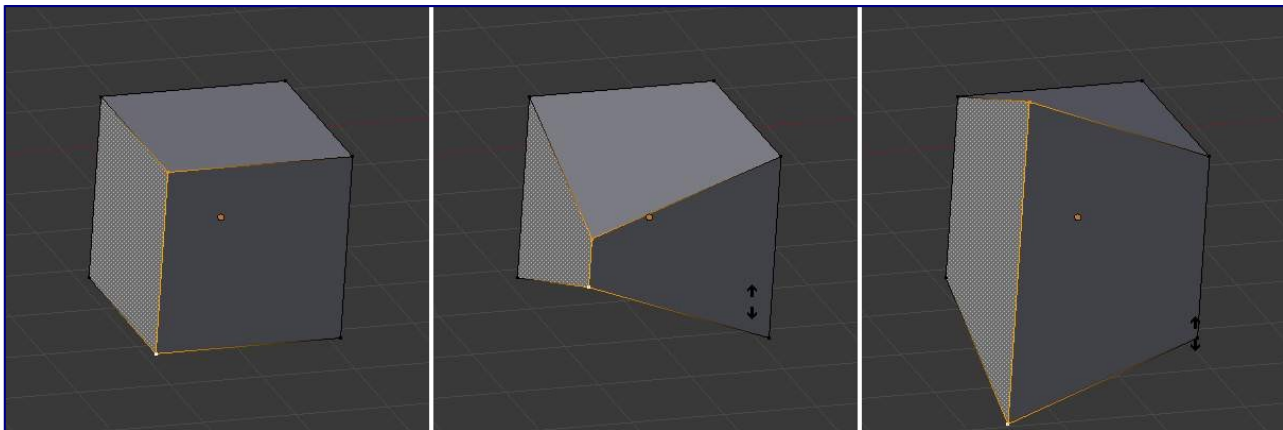
Vertices being pushed together, then pulled apart.
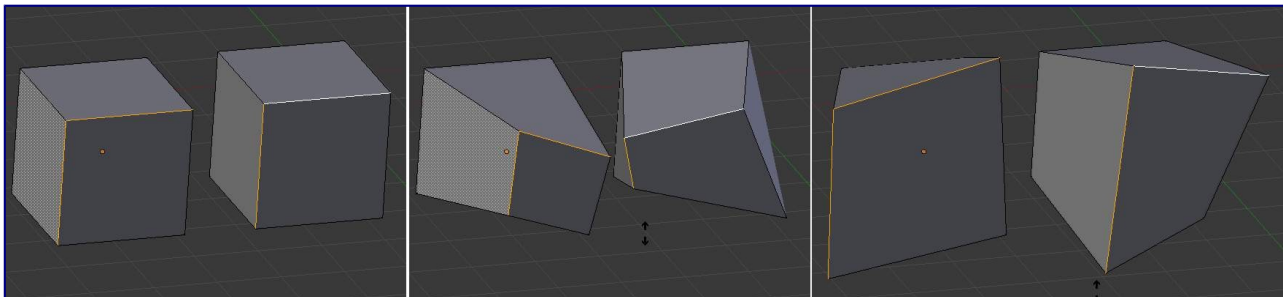
Edges on separate meshes being pushed together, then pulled apart.

Shear

Reference

Mode: *Object* and *Edit* modes

Menu: Object/Mesh/Curve/Surface ‣ Transform ‣ Shear

Hotkey: `Shift-Ctrl-Alt-S`

Description
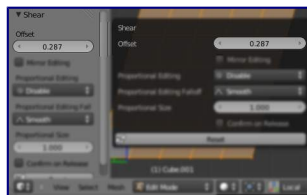
Shear Offset Factor.

Shearing is a form of movement where parallel surfaces move past one another. During this transform, movement of the selected elements will occur along the horizontal axis of the current view. The axis location will be defined by the *Pivot Point*. Everything that is "above" this axis will move (Shear) in the same direction as your mouse pointer (but always parallel to the horizontal axis). Everything that is "below" the horizontal axis will move in the opposite direction.

Read more about Pivot Points

Usage

Select the elements you want to operate on and activate the *Shear* transform function. The *Shear* option can be invoked from the Object/Mesh/Curve/Surface ‣ Transform ‣ Shear menu option or by pressing `Shift-Ctrl-Alt-S`. The amount of movement given to the selection can be determined interactively by moving the mouse or by typing a number. Pressing `Return` will confirm the transformation. The confirmed transformation can be further edited by pressing F6 or by going into the Toolshelf (`T`) and altering the Offset slider provided that no other actions take place between the *Shear* transform confirmation and accessing the slider.
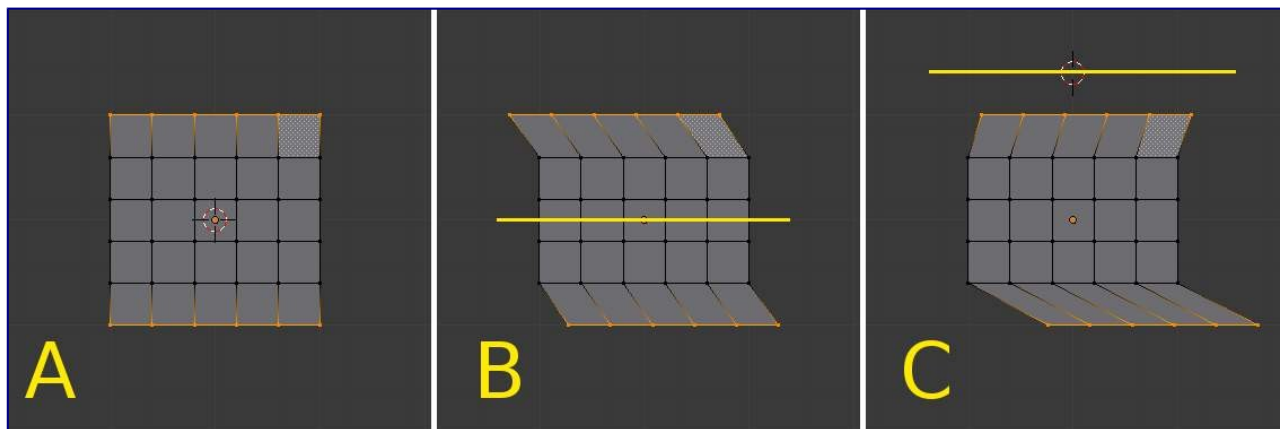

Note that the result of the *Shear* transform is also dependant on the number and type of selected elements (Objects, vertices, faces etc). See below for the result of using *Shear* on a number of different elements.

The effects of a Shear transform with different Pivot Points. See the text below for additional information.

The three frames of the image above show the effects of shearing on the selected vertices when the pivot point is altered. In frame B, the *Pivot Point* is set to *Median Point* (indicated by the yellow line) and the mouse was moved to the left during the transform. In frame C, the *Pivot Point* is set to the 3D cursor which is located above the mesh (indicated again by the yellow line). When the mouse is moved to the left during a *Shear* transform the selected vertices are moved to the right as they are below the horizontal axis.

> **Tip**
>
> Shear transform magnitude
>
> The magnitude of the *Shear* transform applied to the selected elements is directly proportional to the distance from the horizontal axis. i.e. the further from the axis, the greater the movement.
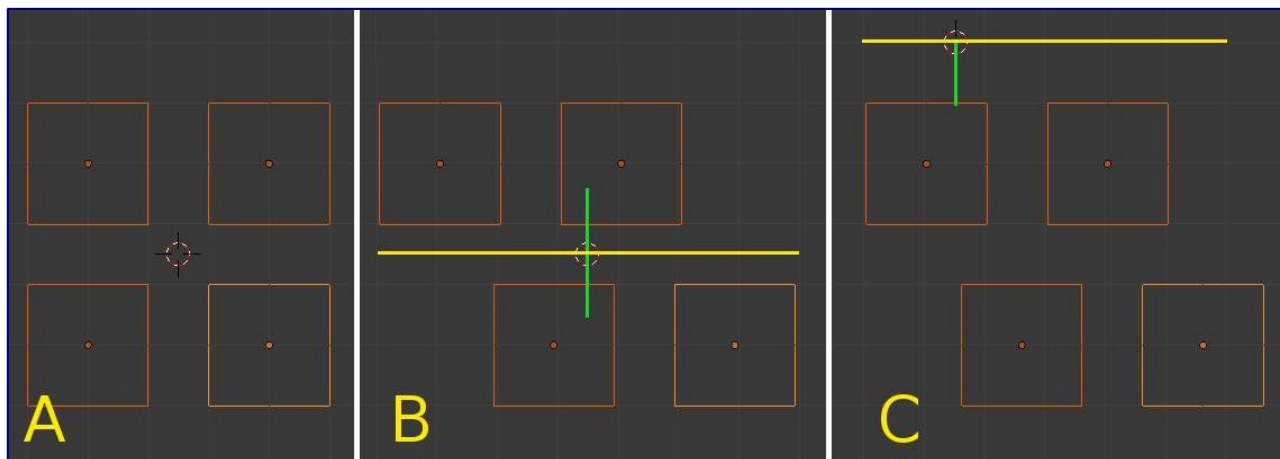

The effects of a Shear transform on Objects with different Pivot Points. See the text below for additional information.

The three frames of the image above show the effects of shearing on the selected Objects when the *Pivot Point* is altered. In frame B, the *Pivot Point* is set to *Median Point* (indicated by the yellow line) and the mouse was moved to the left during the transform. In frame C, the *Pivot Point* is set to the 3D cursor which is located above the Objects (indicated again by the yellow line). When the mouse is moved to the left during a *Shear* transform all of the selected Objects are moved to the right as they are below the horizontal axis. Again, note that the magnitude of the transform is proportional to the distance from the horizontal axis. In this case, the lower Objects move further than the upper ones.

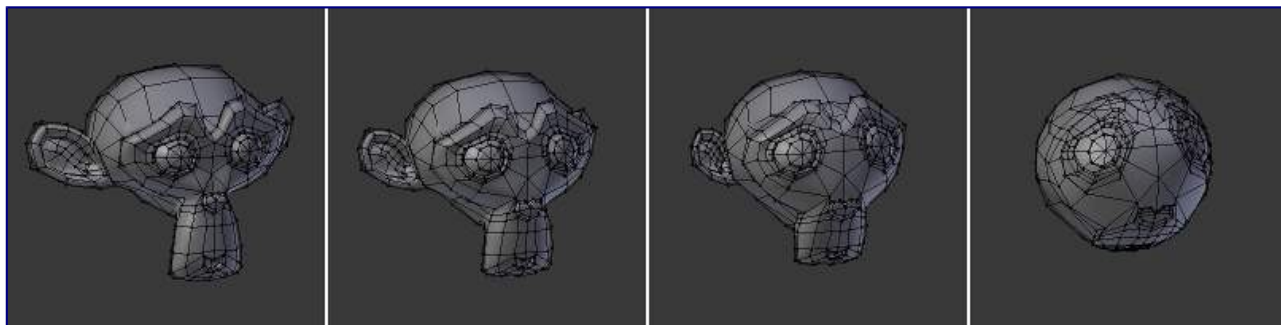# To Sphere

> **Reference**
>
> Mode: *Edit* mode
> Menu: Mesh ‣ Transform ‣ To Sphere
> Hotkey: `Shift-Alt-S`

Description

The *To Sphere* transformation will give the selection spherical qualities. The *Suzanne with increasing sphericity* image below shows the results of applying the *To Sphere* transformation to the Suzanne mesh.

Suzanne with increasing sphericity.

The sequence above shows a Suzanne mesh with a 0, 0.25 (25%), 0.5 (50%) and 1 (100%) To Sphere transform applied.

Usage
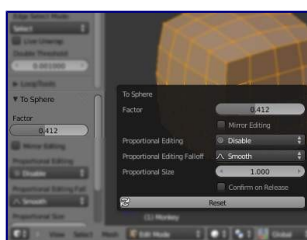
To Sphere Factor.

Select the elements you want to operate on and activate the *To Sphere* transform function. The *To Sphere* option can be invoked from the Mesh ‣ Transform ‣ To Sphere menu option or by pressing `Shift-Alt-S`. The amount of sphericity given to the selection can be determined interactively by moving the mouse or by typing a number between 0 and 1. Pressing `Return` will confirm the transformation. The confirmed transformation can be further edited by pressing `F6` or by going into the *Toolshelf* (`T`) and altering the *Factor* slider provided that no other actions take place between the *To Sphere* transform confirmation and accessing the slider.


Note that the result of the *To Sphere* transform is also dependant on the number of selected mesh elements (vertices, faces etc). As can be seen in the below image, the result will be smoother and more spherical when there are more mesh elements available to work with.
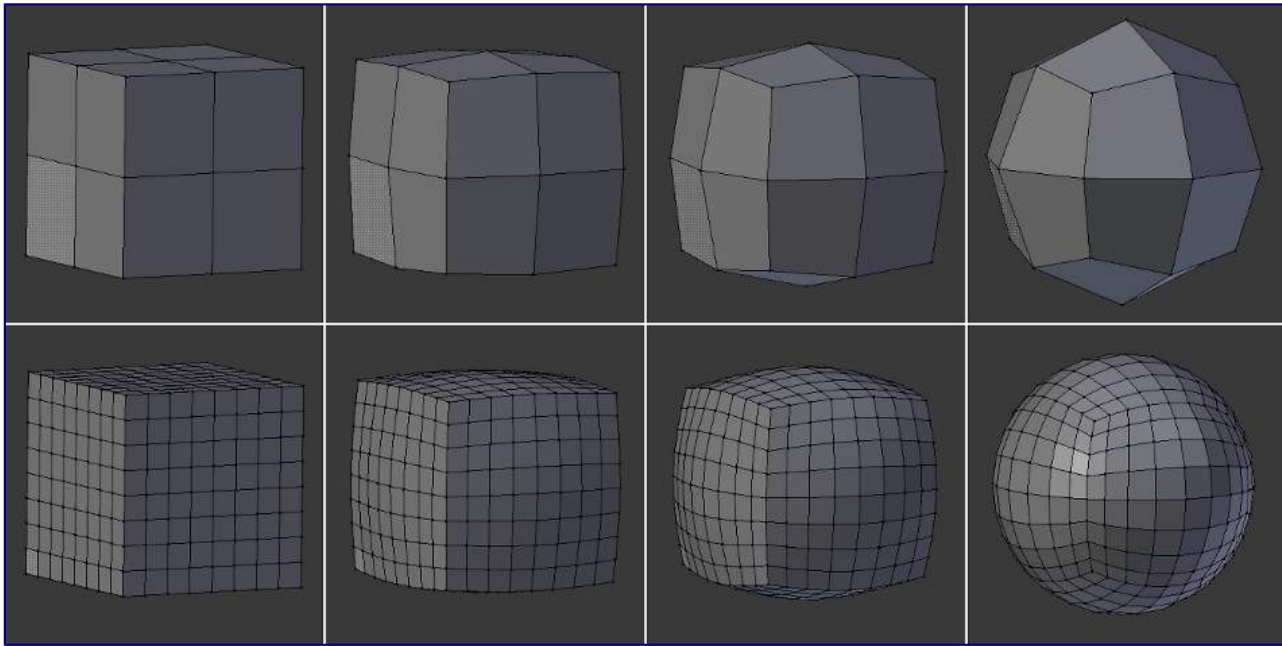
To Sphere applied to cubes with different subdivision levels. In this image sequence, To Sphere was applied to the entire cube at levels of 0, 0.25 (25%), 0.5 (50%) and 1 (100%) respectively.

The *To Sphere* transform will generate different results depending on the number and arrangement of elements that were selected (as shown by the below image).
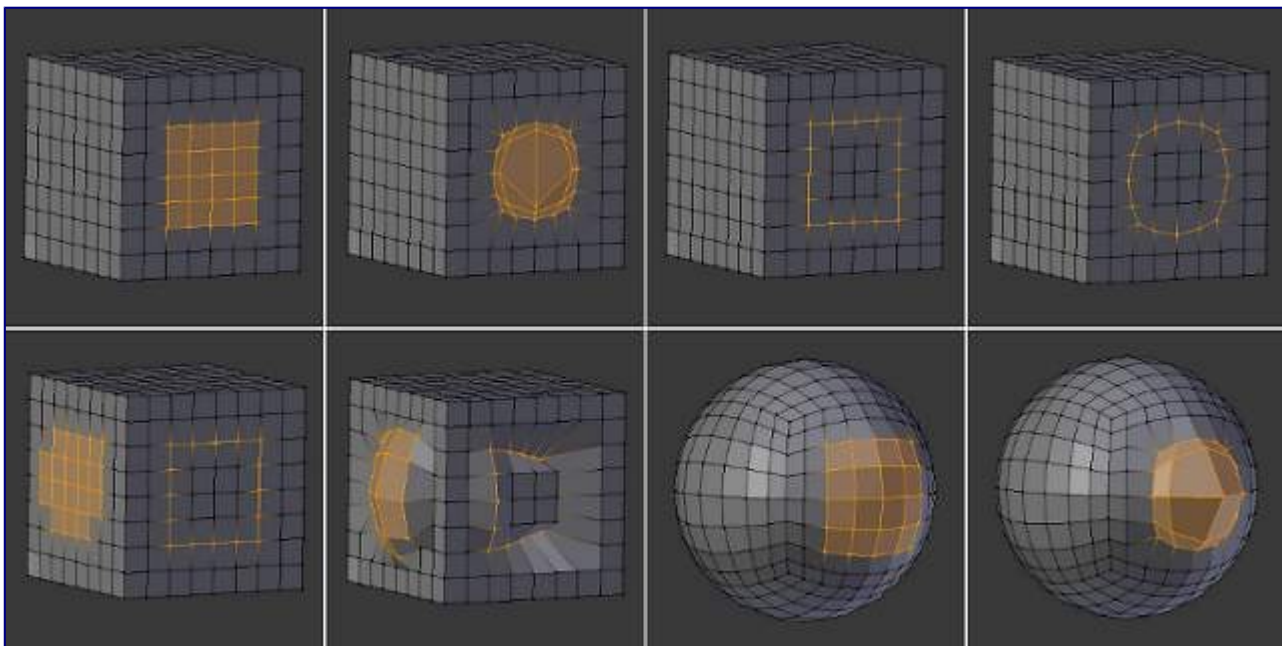
To Sphere applied to different selections.

Warp

Reference

Mode: *Object* and *Edit* modes

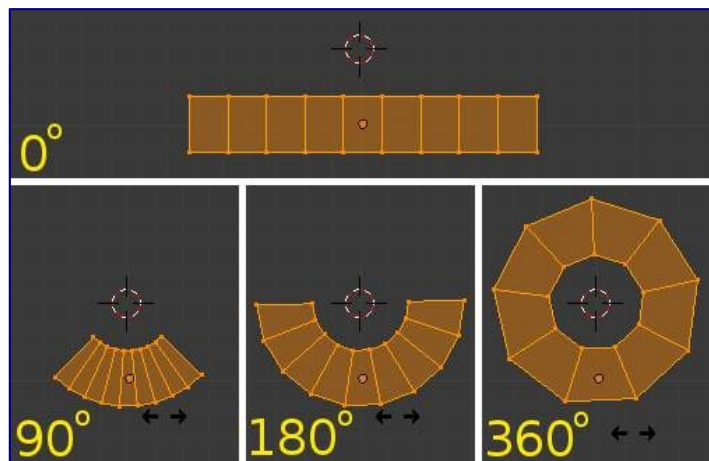Menu: Object/Mesh/Curve/Surface ‣ Transform ‣ Warp

warp tool options

In *Edit mode*, the *Warp* transformation takes selected elements and warps them around the 3D cursor by a certain angle. Note that this transformation is always dependent on the location of the 3D cursor. The Pivot Point is not taken into account. The results of the *Warp* transformation are also view dependent.

In *Object mode*, the *Warp* transformation takes the selected Objects and causes them to move in an orbit-like fashion around the 3D cursor. Similar to *Edit mode*, the Pivot Point is not taken into account and the results are view dependent.

Usage

In this example, a plane is warped around the 3D cursor by the indicated number of degrees.

Select the elements you want to operate on and activate the *Warp* transform function. The *Warp* option can be invoked from the Object/Mesh/Curve/Surface ‣ Transform ‣ Warp menu option. The amount of warping given to the selection can be determined interactively by moving the mouse or by typing a number. Pressing Return will confirm the transformation. The confirmed transformation can be further edited by pressing F6 or by going into the Toolshelf (T) and altering the Angle slider provided that no other actions take place between the *Warp* transform confirmation and accessing the slider.

14

Cursor position and view

The location of the 3D cursor can be used to alter the results of the *Warp* transformation. As can be seen from the example in this section, the *Warp* radius is dependent on the distance of the cursor from the selected elements. The greater the distance, the greater the radius.

The result of the *Warp* transform is also influenced by your current view. The example in this section shows the results of a 180 degree *Warp* transform applied to the same Suzanne mesh when in different views. A 3D render is also provided for comparison.
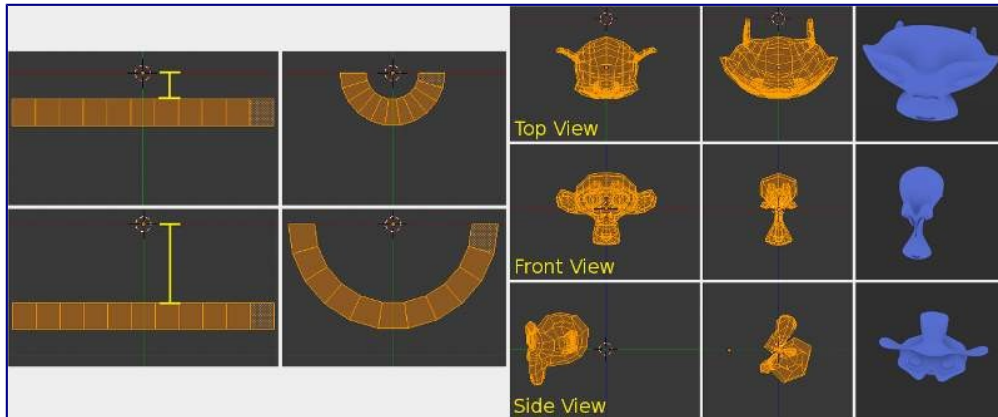
The left side of this image shows how the Warp transform is influenced by the location of the cursor. The right hand side shows the influence of the current view.

Note
Warping text
If you want to warp text, you will need to convert it from a Text Object to Mesh by pressing `Alt-C` and selecting the *Mesh from Curve/Meta/Surf/Text* option.

Example

Text wrapped around logo. This was made by creating the Blender logo and text as separate Objects. The text was converted to a mesh and then warped around the Blender logo.
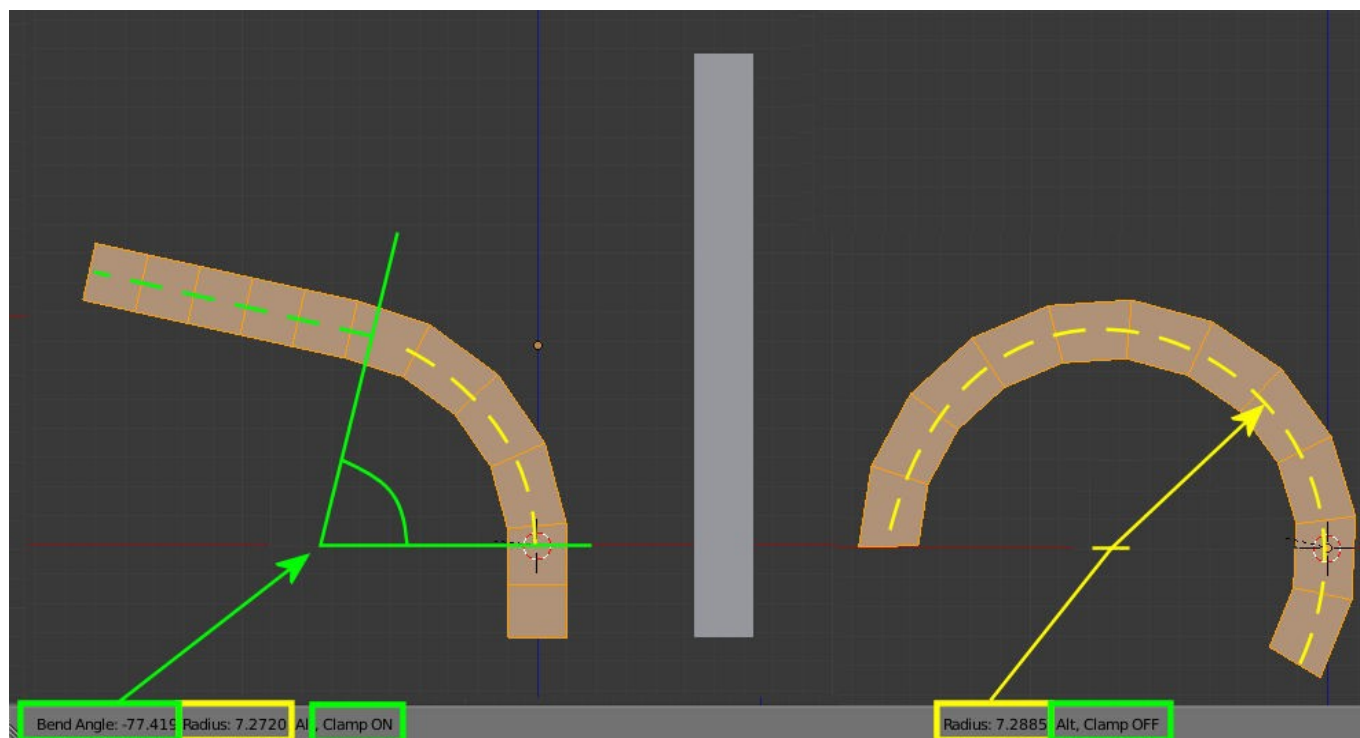
Bend

Reference

Reference
Mode: *Object* and *Edit* modes
Menu: Object/Mesh/Curve/Surface ‣ Transform ‣ Bend
Hotkey: Shift-W

Bend Transform with Clamp ON and OFF

This tool rotates a line of selected elements forming an arc between the mouse-cursor and the 3D-cursor.

Usage

The bend tool can be used in any case where you might want to bend a shape in two with a gradual transition between both sides.

This may take a little getting used to, the basics are listed below controls are noted here.

- The initial position of the cursors define the axis to bend on.
- The distance of the mouse-cursor to the 3d-cursor controls how sharp the bend will be.
- The relative angle of the mouse-cursor to the initial axis defines the bend angle.

If this seems overly complicated, its probably best to try the tool where it becomes quickly apparent how the tool reacts to your input.

Bend Angle
> The amount of rotation.

Radius
> The sharpness of the bend.

Clamp

> Normally the arc turns through a clamped rotation angle with the selected elements extended along a tangent line beyond that (see above left). When the clamp is OFF, the arc continues around aligning the selected elements into a circle (right).

> When OFF (`Alt`) all selected elements follow a circle, even when outside the segment between the 3d cursor and the mouse.

Note

Unlike most other transform modes *Bend* isn't effected by *Pivot Point* or *Transform Orientation*, always using the View Plane instead.

Hint

You can turn the bend angle through multiple rotations potentially forming a spiral shape.