Normals

See also

The Normal Edit Modifier can be used to edit normals.

The Weighted Normal Modifier can be used to affect normals by various methods, including *Face Strength* (see below).

You can also copy normals from another mesh using Mesh Data Transfer (operator or modifier).

Flip

Reference

Mode:
Edit Mode
Menu:
Mesh ‣ Normals ‣ Flip

This will reverse the normals direction of all selected faces. Note that this allows you to precisely control the direction (**not** the orientation, which is alway perpendicular to the face) of your normals, as only the selected faces are flipped.

Recalculate

Reference

Mode:
Edit Mode
Menu:
Mesh ‣ Normals ‣ Recalculate Outside and Mesh ‣ Normals ‣ Recalculate Inside
Shortcut:
`Shift - N` and `Shift - Ctrl - N`

These tools will recalculate the normals of selected faces so that they point outside (respectively inside) the volume that the face belongs to. The volume does not need to be closed; inside and outside are determined by the angles with adjacent faces. This means that the face of interest must be adjacent to least one non-coplanar other face. For example, with a *Grid* primitive, recalculating normals does not have a meaningful result.

Set from Faces

Reference

Mode:
Edit Mode
Menu:
Mesh ‣ Normals ‣ Set from Faces

Set the custom normals at corners to be the same as the face normal that the corner is part of.

Rotate

Reference

Mode:
Edit Mode
Menu:
Mesh ‣ Normals ‣ Rotate

Shortcut:
R N

This is an interactive tool. As you move the mouse around, the selected normals are rotated. You can also invoke the Rotate Normals tool by pressing th Rotate transform key R, followed by N.

Point to Target

Reference

Mode:
Edit Mode
Menu:
Mesh ▸ Normals ▸ Point to Target
Shortcut:
Alt - L

All selected normals are set to point from their vertex to the target after confirmed by Return or LMB.

A target is set by the keys:

- The mouse cursor M
- The pivot L
- The object origin O
- The cursor (set at this click) Ctrl - LMB
- A mesh item selection (set by this click) Ctrl - RMB

Mode
The tool operation can be modified; if one of the following keys has been previously pressed:

Align A
All normals will point in the same direction: from the center of selected points to the target.

Spherize S
Each normal will be an interpolation between its original value and the direction to the target.

Invert I
The normal directions are reversed from what was specified above.

Reset R
Will reset the custom normals back to what they were when the operation started.

Merge

Reference

Mode:
Edit Mode
Menu:
Mesh ▸ Normals ▸ Merge

Merge all of the normals at selected vertices, making one average normal for all of the faces.

Split

Reference

Mode:

Edit Mode

Menu:

Mesh ‣ Normals ‣ Split

Split the normals at all selected vertices so that there are separate normals for each face, pointing in the same direction as those faces.

Average

Reference

Mode:

Edit Mode

Menu:

Mesh ‣ Normals ‣ Average

Average all of the normals in each fan of faces between sharp edges at a vertex.

Copy Vectors

Reference

Mode:

Edit Mode

Menu:

Mesh ‣ Normals ‣ Copy Vectors

If a single normal is selected, copy it to an internal vector buffer.

Paste Vectors

Reference

Mode:

Edit Mode

Menu:

Mesh ‣ Normals ‣ Paste Vectors

Replace the selected normals with the one in the internal vector buffer.

Smooth Vectors

Reference

Mode:

Edit Mode

Menu:

Mesh ‣ Normals ‣ Smooth Vectors

Adjust the normals to bring them closer to their adjacent vertex normals.

Reset Vectors

Reference

Mode:

Edit Mode

Menu:

Mesh ▸ Normals ▸ Reset Vectors

Put normals back the to default calculation of the normals.

Select by Face Strength

Reference

Mode:
Edit Mode
Menu:
Mesh ▸ Normals ▸ Select by Face Strength

Another way to affect normals is to set a *Face Strength* on the faces of the model. The Face Strength can be either *Weak*, *Medium*, or *Strong*. The ide is that the Weighted Normal Modifier can be set to pay attention to the Face Strength as follows: When combining the normals that meet at a vertex, onl the faces with the strongest Face Strength will contribute to the final value.

For example, if three faces meet at a vertex and have the face weights weak, medium, and strong, then only the normal associated with the strong face w be used to set the final result.

Use the submenu to pick one of *Weak*, *Medium*, or *Strong*. Then this tool selects those faces that have the chosen face strength.

Set Face Strength

Reference

Mode:
Edit Mode
Menu:
Mesh ▸ Normals ▸ Set Face Strength

Use the submenu to pick one of *Weak*, *Medium*, or *Strong*. Then this tool changes the Face Strength of currently selected faces to the chosen face strength.