SHAPES

Blend Shape Editor for Maya®

User Guide

Version 1.1

Preface

SHAPES assists in setting up regular blend shapes and corrective shapes.

It allows for sculpting new shapes in a posed state of the model and creates the driving relationship for each target either trough set driven keys, the weight driver node, which is provided as a plugin, or shape combos.

In-between shapes can be easily created and interactively adjusted to enhance the corrective shape.

SHAPES also allows for mirroring targets and comes with a variety of tools for splitting, merging, duplicating and more.

SHAPES only works with mesh objects.

General Notes

Plug-Ins
The plugin *SHAPESTools* is required using SHAPES. It is provided with the script and loaded automatically when running the tool.

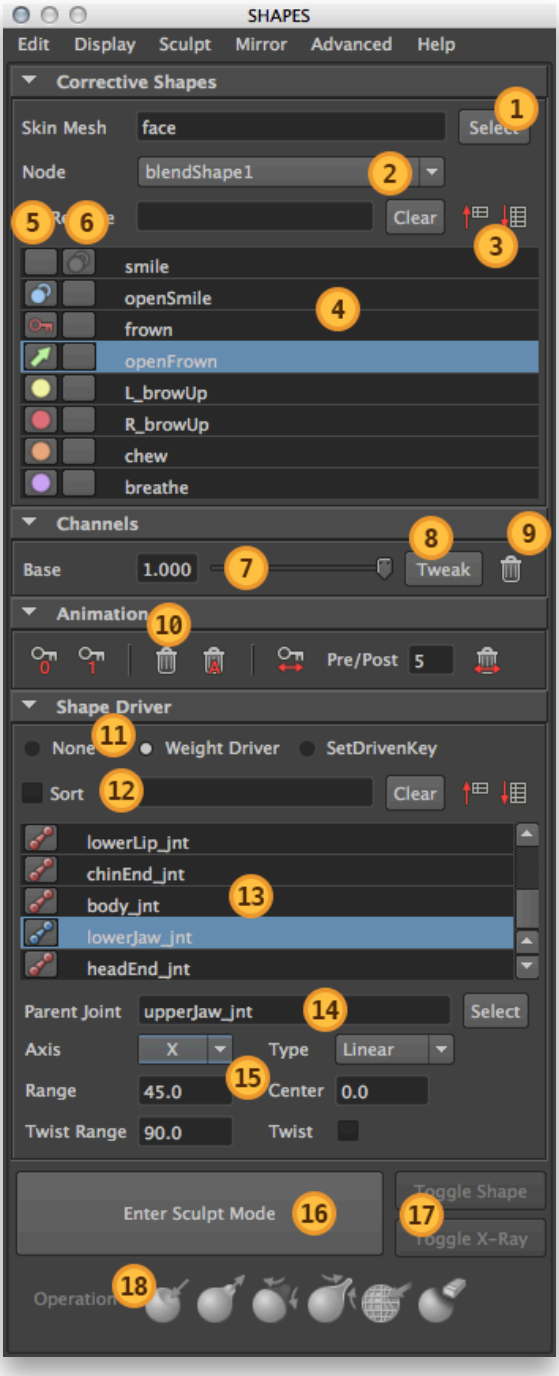
In case a scene is set up utilizing the weight driver node, which is part of the *SHAPESTools* plugin, and the scene is to be passed on to a third party, the separate available *WeightDriver* plugin can be downloaded for free from the SHAPES website to allow full compatibility.

Performance
When working with multiple weight driver nodes in the scene it is advised to either hide these nodes or turn off the drawing for the cone and the weight as these will slow down the scene if used in larger amounts.

Compatibility
The weight driver node only displays in the default viewport for Maya 2013.5 and earlier. Viewport 2.0 compatibility is supported for Maya 2014 and later.

Workflow
SHAPES currently doesn't support undo.

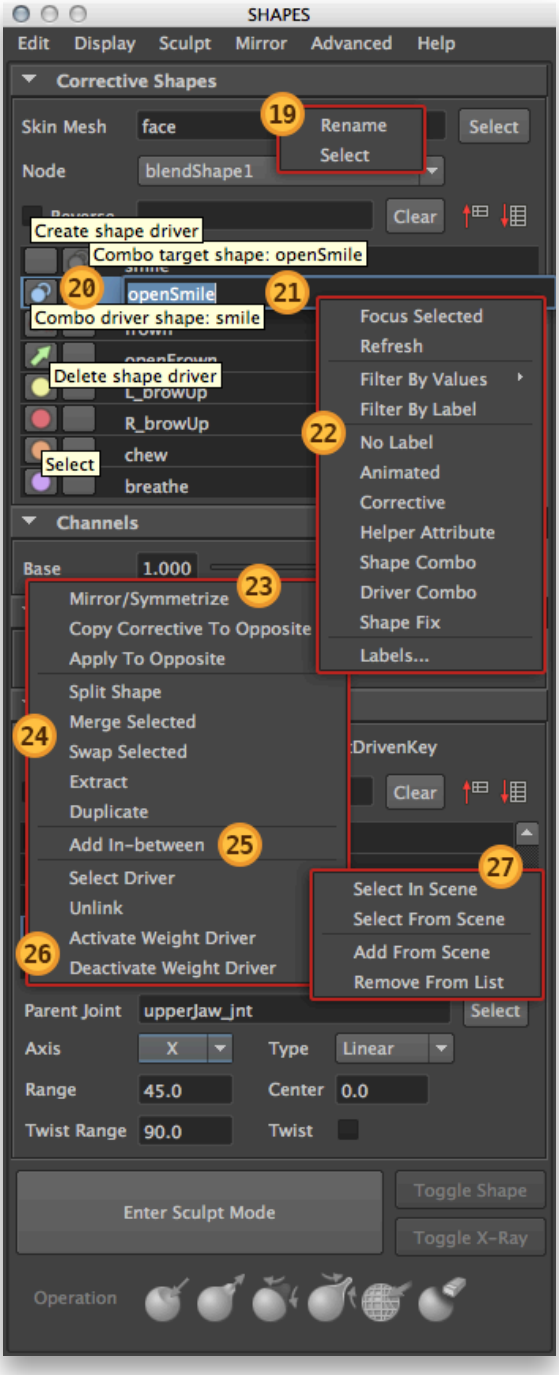
Interface Overview



1. Select the mesh that needs editing. Valid meshes can be bound to a skin cluster node but this is no requirement.
2. Displays the blend shape node being edited.
3. Buttons to resize the target and driver list.
4. The target list, displaying all shapes of the currently selected blend shape node.
5. Driver button column. Each button creates or removes the corresponding shape driver and displays the type of incoming connection for each shape. Colored dots indicate other connections (keyframe, direct connections or expressions)
6. Combo button column: Create or delete a shape combo.
7. The channel slider shows and edits the value of the currently selected shape.
8. The tweak button enters the sculpt mode for the selected shape to make adjustments to the model.
9. Delete the selected shape.
10. Create keyframes for selected shapes for corrective animation.
11. Defines the type of shape driver used for the current shape or a new shape before entering sculpt mode.
12. Sort the driver list alphabetically and search for a given string.
13. The list of all joints found in the skeletal hierarchy of the connected skin cluster. Skin joints appear with a red joint icon.
14. The parent joint is the direct parent of the selected driving joint for the shape and only needed for using the weight driver node.
15. Attributes for defining the shape driver.
16. Enters sculpt mode or exits it if already in sculpt mode.
17. Control the display of the original mesh while in sculpt mode.

18. Artisan sculpt buttons. These will only display when sculpting in Maya is enabled but also can be turned off.

Context Menus



19. Rename or select the current blend shape node.

20. Button tooltips.
21. Rename the target shape.

22. Target list filtering and labels.

23. Mirror Actions.

24. Target Actions.

25. Create a new in-between for the selected shape.
26. Weight driver actions.
27. Select the highlighted node in the scene or choose the respective list item based on the scene selection. Add or remove custom nodes from the driver list.

Contents

Installation

SHAPES installs as a module to reduce the need to manually copy all necessary files to the target directories.

To install the SHAPES module unzip the downloaded archive and choose the folder which represents your Maya version.

1. Copy the contained SHAPES folder to a location of your choice. It doesn't necessarily have to be in your Maya user directory.

2. Within the SHAPES folder you find the **SHAPES.mod** file which contains all necessary information about the module. Open the file in a text editor and edit the sample path at the end of the line to match the path where you copied the SHAPES folder from step 1.

   Please note that the path must end with the name of the SHAPES folder itself.

3. Save the changes.

4. Place a copy of the **SHAPES.mod** file in the **modules** folder of your Maya user directory. If such folder doesn't exist create a new folder with the name **modules**.

   Windows
   C:\Documents and Settings\userName\My Documents \maya\2014-x64\modules

   OS X
   /Users/USERNAME/Library/Preferences/Autodesk/maya/ 2014-x64/modules

   Linux
   /home/USERNAME/maya/2014-x64/modules

5. Restart Maya.

Running SHAPES

To add a shelf button to the currently active shelf type the following command in the command line and execute it:

```
SHAPES_install
```

Alternatively you can manually create a shelf button.
Open the script editor with a new Python tab.
Enter the following lines and optionally middle-mouse drag these to the shelf to create a shelf button:

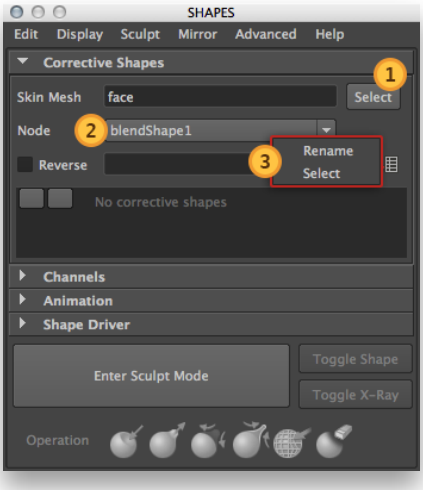
```
import SHAPES
SHAPES._buildSHAPESUI()
```

You can use the provided icon to decorate your shelf button.

Known Issues

SHAPES has not been tested with third party skinning plugins.

Selecting a Mesh



1. Select the mesh and click the **Select** button at the top of the UI.

   The name of the mesh will appear in the **Skin Mesh** field.

   The selection can be of two types:

   - Simple meshes without a blend shape node, skin cluster or any other node.
   - Skinned meshes bound to a skeleton. Only this type allows for setting up shape drivers.

2. After successfully loading the mesh the first blend shape node will be listed in the **Node** pulldown menu, if it exists.

3. Right-clicking the pulldown menu allows for selecting the current blend shape node or to rename it.

Mesh Validation

Intermediate Shapes

When the mesh object is chosen, SHAPES will check for valid geometry, in particular if a shape node is present and if the intermediate object is a valid mesh.
Intermediate objects are present, if the mesh is already deformed.

However, it is possible that the mesh contains more than one intermediate shape node due to various actions.
If more than one intermediate shape is present SHAPES will inform you with the option to delete it.

Deleting additional intermediate shapes is necessary in order to load the mesh.

Symmetry

During the mesh validation process SHAPES also gathers information about the line of symmetry if **Menu > Advanced > Order Based Mirror** is enabled (default).

The line of symmetry of a mesh is defined by an edge which has both vertices placed at the zero coordinate of the defined mirror axis.

If no edge of the mesh meets this requirement the symmetry process will fail.
In this case the symmetry edge can be defined manually.

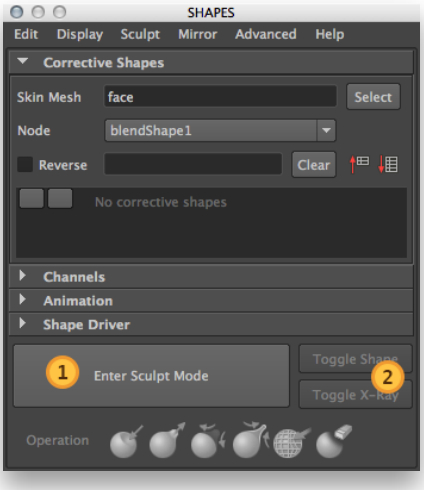
See **Mirror Modes** for details.

Also, with **Order Based Mirror** enabled the mesh needs to be only one shell.
If a mesh is build with more than one shell the validation process will inform you and disable **Order Based Mirror**.

Working With a Simple Mesh

Simple meshes can be used right away for sculpting.
No skin cluster or a previously assigned blend shape node is necessary.

Enter Sculpt Mode



1. Click the **Enter Sculpt Mode** button at the bottom of the UI.

   SHAPES will immediately put you in sculpt mode to create the first blend shape target.

   The sculpt mode automatically:

   - creates a copy of the defined mesh and names it *newCorrective*. It appears at the same hierarchy level right next to the source mesh.
   - displays the sculpt mesh in isolation mode.
   - enables the sculpting tool and activates the sculpt operation buttons right below the sculpt mode button.
   - displays buttons in the HUD to exit or cancel the sculpt mode.

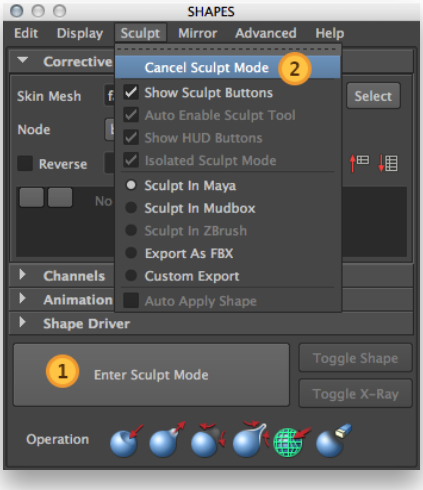
   All display settings can be individually controlled via **SHAPES Menu > Sculpt**:

   - Auto Enable Sculpt Tool
   - Show HUD Buttons
   - Isolated Sculpt Mode

2. To better compare the original and the currently sculpted shape use one of the provided buttons:

   - **Toggle Shape** toggles between the display of the original shape or the currently sculpted shape
   - **Toggle X-Ray** displays the sculpted shape in x-ray and shows the original shape.

Exit Sculpt Mode

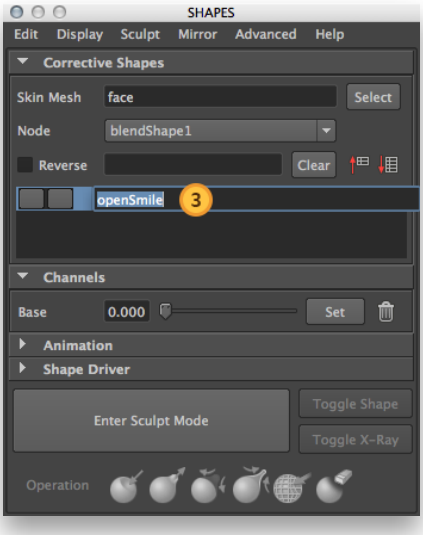


1. To exit the sculpt mode press either the **Exit Sculpt Mode** button at the bottom of the UI or the **Exit Sculpt Mode** HUD button.

2. To cancel the sculpt mode use the **Cancel** HUD button or go to **Menu > Sculpt > Cancel Sculpt Mode**.

   Canceling the sculpt mode deletes the sculpted mesh but still creates a new blend shape node.

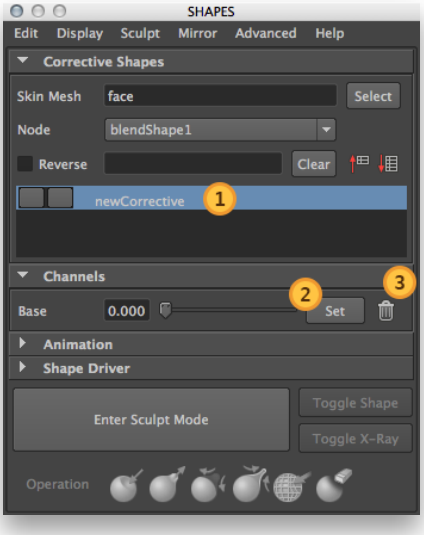
   After exiting the sculpt mode the sculpted shape will be added as a new target to the current blend shape node and gets listed in the target list, right below the blend shape node pulldown menu.



3. To rename the new target double click the target and enter a new name.

   Renaming a target will automatically rename the connected driver and combo nodes if these exist.

Editing the Target Weight



1. Select the target to edit from the target list.

   The Base channel will appear in the Channels folder.

   The slider controls the weight of the blend shape target. It is directly controlling the blend shape target weight and also updates itself when driving the target weight through any kind of connection (Note: except for Maya 2014 SAP SP1 due to a blend shape node bug)

2. Click the **Set** button to set the slider to the channel's value.
   In case of the base channel this will be 1.0. If the target has any in-between shapes the value will be the position of the in-between shape.

   If the target is connected to a driving node, clicking the **Set** button will temporarily disconnect the driver.
   See also **Unlinking Driven Targets** for more information.

3. Use the **Trash** Icon to remove the target.

Unlinking Driven Targets

If a target shape is connected to a driving node, for example an animation curve or set driven key, the Base channel slider will always return to the value from the driving node after it has been released with the mouse. This behavior is due to the nature of connections in Maya.

If you need to temporarily disable the dependency right-click the Base slider label and choose **Unlink** from the menu.
The connection will be broken allowing you to freely set the value of the target shape.

The connection will be re-established if:

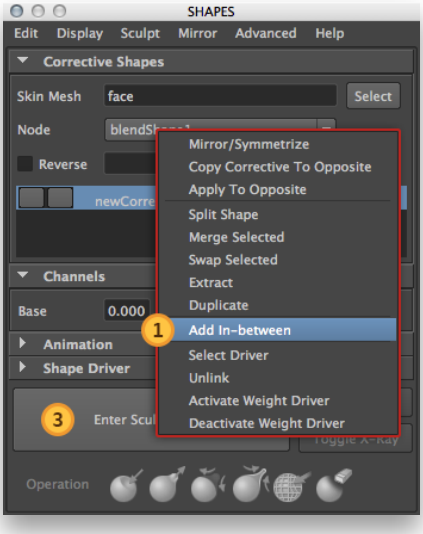
- the currently active target shape is re-selected in the target list
- the target list is refreshed

- a new mesh is loaded

A target shape will also be unlinked automatically if the **Set** button is clicked to set the target shape to it's maximum value in order to tweak it.

In-betweens

Adding In-betweens



1. If you want to add an in-between shape right-click the Base slider and choose **Add In-between**.

   If the base slider is either at 0 or 1 the default in-between value will be set to 0.5.
   You can also set the Base slider to the value of where the in-between should be added.

2. A new slider appears. It also allows to redefine the position of the in-between.

   Note, that the value of the Base slider is instrumental for generating the in-between regardless of the position of the in-between slider, which only defines where the in-between will be positioned.

3. Click the **Enter Sculpt Mode** button to sculpt the in-between shape.

4. After exiting the sculpt mode the new in-between is added and a new slider will appear in the **Channels** folder defining the position of the in-between.

Editing the In-Between Position

Drag the slider of the in-between to re-define the position within the base target range.
This can be used to adjust how the shape transitions between the different shapes.

Tweak an Existing Target or In-Between

1. If a target or in-between shape needs additional sculpting click the **Set** button to the right of the slider.
   This sets the slider to the value of the according shape and the button will change to **Tweak**.

   In case the target is connected to a driving node, clicking the **Set** button will temporarily disconnect the driver.
   See also **Unlinking Driven Targets** for more information.

2. Click the **Tweak** button to enter sculpting mode and re-shape the target.

3. After applying your edits exit the sculpt mode to update the blend shape target.

Sculpt with Mudbox

SHAPES allows for using Mudbox for the sculpting process. This feature is only available if Mudbox is installed and the Maya file menu contains the *Send to Mudbox* menu item.

To enable sculpting with Mudbox go to **Menu > Sculpt** and activate **Sculpt In Mudbox**. This will automatically send the corrective mesh to Mudbox.

The maya sculpt tool buttons at the bottom of the UI will be hidden when using Mudbox.

After finishing sculpting in Mudbox and sending the mesh back to Maya SHAPES will delete all unnecessary shading nodes and assign the default lambert shader to the mesh.

Auto Apply Shape

With this option enabled the mesh coming from Mudbox will be automatically applied as a new shape and the sculpting mode exited.

Sculpt with ZBrush

SHAPES allows for using ZBrush for the sculpting process. This feature is only available if ZBrush is installed and the default ZBrush install path exists.

Windows
C:/Users/Public/Pixologic/

OS X
/Users/Shared/Pixologic/

To enable sculpting with ZBrush go to **Menu > Sculpt** and activate **Sculpt In ZBrush**. This will automatically send the corrective mesh to ZBrush.

The maya sculpt tool buttons at the bottom of the UI will be hidden when using ZBrush.

After finishing sculpting in ZBrush and sending the mesh back to Maya SHAPES will delete all unnecessary shading nodes and assign the default lambert shader to the mesh.

Auto Apply Shape

With this option enabled the mesh coming from ZBrush will be automatically applied as a new shape and the sculpting mode exited.

Sculpt Outside Maya

If sculpting in an external application is preferred it can be easily done with SHAPES.

Export As FBX

To enable sculpting with the FBX option go to **Menu > Sculpt** and activate **Export As FBX**. This will automatically export the corrective mesh as a FBX file.

The **Enter Sculpt Mode** button label will change to **Export As FBX** and the maya sculpt tool buttons at the bottom of the UI will be hidden.

When using FBX export for the first time SHAPES will ask you for a path to store the FBX file.
By default this will be the data subfolder of the current project but you can also use any other location.
The path will be remembered by SHAPES until the project changes.

After exporting via FBX the mesh is saved as *newCorrective.fbx* at the defined path and the sculpt mode button label will change to **Import From FBX**.

After finishing with the external sculpting the mesh can be re-imported by clicking the **Import From FBX** button, which also directly applies it to the blend shape node.

The import process assumes that the final shape has been saved to the same location and with the same file name as after the export.

Custom Export

To enable sculpting with the custom export option go to **Menu > Sculpt** and activate **Custom Export**.
This allows you to export the corrective shape individually with the file format of your choice.

When using custom export the corrective shape is selected and placed at the world hierarchy level.
With this selection active use the regular Maya export or any custom export option to save the mesh.

After manually re-importing the modeled shape click the **Exit Sculpt Mode** button to add it to the blend shape node.

Add Selection as New Target

If you want to add a new target based on a separate mesh node in the scene select the shape you want to add and choose one of the following options:

- **Menu > Edit > Add Selection As New Default Target**

  This command simply adds the selected shape to the blend shape node. It's basically the same as manually adding the blend shape target through the Maya menu.

- **Menu > Edit > Add Selection As New Posed Target**

  This command performs additional calculations to correctly apply the new shape when the model is in a deformed state. It undergoes the same process like any sculpted shape when exiting the sculpt mode.

This applies the selected shape to the current blend shape node and deletes the object from the scene.

Target List

SHAPES provides several functions which help improve the workflow with a large number of target shapes.

Reordering

For better organization of corrective shapes it is possible to reorder the target list by dragging an item with the middle mouse button.

Note, that reordering the target items in the list does not actually change the order of the attributes on the blend shape node but rather stores the user defined order on a custom attribute on the node.

Reorder Below

As the target list grows reordering via drag & drop can become quite tedious.
In this case you can use the **Reorder Below...** option to easily place the selected item right underneath the next target item clicked.

Labels

Each item in the target list can be color coded for keeping track of individual items or visually group target shapes.

SHAPES has a pre-defined set of labels but which can be individually changed or extended to a total of 12 labels.

Add a Label

- Select a target shape in the list, right-click and choose a label for the item. The combo button of the selected item will receive the label color.
- To clear a label select **No Label** from the right-click menu.

Edit Labels

To edit the list of available labels

1. select a target shape in the list, right-click and choose **Labels...** from the bottom of the menu.
2. The **Label Preferences** window will open listing all currently set labels and colors.
3. Edit the label you want to change. Any label which is not labeled **Label[1-12]** will appear as valid label in the right-click menu of the target list.
4. To clear a label name double-click the label name and delete the name followed by pressing the Enter key. The label name will revert to the numbered label name.
5. Click the **Default Labels** button to reset all labels to their default names.

Filter by Label

To filter the target list to show only all targets associated with a specific label

1. select the target shape in the list which is assigned to the type of label you want to filter.
2. Right-click and choose **Filter By Labels** from the menu.

The same process applies when the list should be unfiltered.

Filter by Values

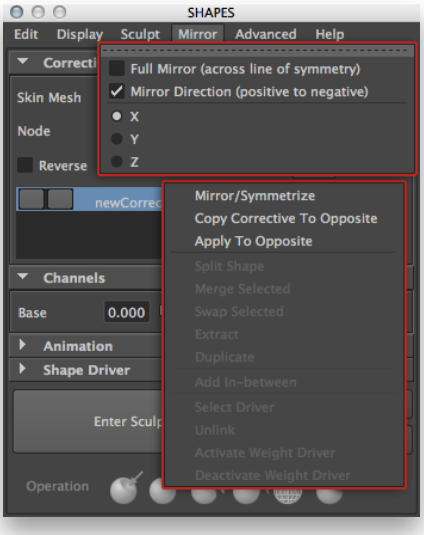
To filter the target list to only show all active channels

1. Right-click the target list and choose **Filter By Values** from the menu.
2. Select **All Active** from the submenu to show all target shapes which currently have a channel value other than 0.

3. Select **All Max** from the submenu to show all target shapes which currently have a channel value of 1 or greater.

4. Select **Clear** from the submenu to unfilter the list and show all target shapes.

Mirror Target shapes



Shapes can be mirrored on various ways.

The **Mirror** options are available through **Menu** > **Mirror**.

The mirror process is independent from the underlying mirror mode. See **Mirror Mode** for details.

Mirror Direction

By default the mirroring is performed from positive X to negative X, assuming the workflow of starting on the left side of the model first and then mirroring the shapes over to the right side.

Full Mirror

Leaving this option off ignores all points on the far side of the model restricting shapes to one side of the symmetry line.

However, some shapes might extend over the line of symmetry. In this case turn on this option to correctly mirror the shape.

Mirror Actions

To mirror a shape right-click the target channel you want to mirror and choose between the following options:

Mirror/Symmetrize

Makes a shape symmetrical, applying the vertex positions of the source side to the target side.

Copy Corrective To Opposite

Copies the entire blend shape channel, including its in-betweens, to a new channel for the other side of the model.

This option is only available for the base shape of each target. In-betweens can only be copied to the other side as part of the entire blend shape channel.

Apply To Opposite

After making adjustments to a shape on one side of the model this can be used to apply the same edit to the shape on the other side. The process requires correctly named target channels in order to find the sibling of the shape.

Identifiers

The following identifiers can be used to differentiate between both sides of the model:

- L_/R_
- _L/_R
- l_/r_
- _l/_r
- left_/right_
- _left/_right
- Left_/Right_
- _Left/_Right
- lt_/rt_
- _lt/_rt
- Lt_/Rt_
- _Lt/_Rt
- lft_/rgt_
- _lft/_rgt
- Lft_/Rgt
- _Lft/_Rgt
- Lf_/Rg_
- _Lf/_Rg
- lf_/rg_
- _lf/_rg

Mirror with Shape Drivers

If a shape is copied to the other side to create a new shape sibling the connected shape driver is mirrored as well.

The behavior of the mirrored shape driver depends on the type of driver and if the joint is positioned at the center of the model or on an explicit side.

After mirroring it might be necessary to adjust the shape driver for the correct result.

Mirror with Shape Combos

When mirroring a shape which is the target for a shape combo the combo relationship will be mirrored as well.

However, if the mirror source shape is driven by a combo based on a shape restricted to one side of the model the sibling for the shape must exist prior to mirroring.

The mirror process only creates a mirrored combo relationship but not the actual combo driver.

If a target shape is mirrored which acts as a combo driver no outgoing combo connections will be mirrored.
Only incoming combos are respected for the mirror process.

Mirror Modes

SHAPES has two basic modes for performing the mirror process.

- Order Based Mirror
- Position Based Mirror

Each mode has it's own advantages and disadvantages and can have an impact on the mirror result or even the success of the mirror process.

Order Based Mirror

This mode is the default setting of SHAPES.

The mirror process is based on the vertex order of the mesh which allows to even work with shapes which are not 100% symmetrical.

Please note that even this makes it possible to work with asymmetrical meshes there is no guarantee that the mirrored result works as expected in all cases.
A symmetrical mesh is always the best starting point for a successful mirror.

Symmetry Edge

The order based mirroring relies on a symmetry center defined by an edge which has both vertices placed at the zero coordinate of the set mirror axis.

SHAPES tries to automatically find the symmetry edge during the mesh evaluation process when loading the object.

If the symmetry edge has been found it will be listed as a menu item at **Menu > Advanced > Define Symmetry Center > Symmetry Edge: ...**

Selecting this menu item selects the edge component of the mesh.

Set Symmetry Edge

If you want to set a different edge component as the symmetry edge:

- Select the edge of the shape you want to use as the symmetry edge.
- Select **Menu > Advanced > Define Symmetry Center > Set Symmetry Edge**.

Symmetry Edge Errors

If the mesh evaluation process fails to find a valid symmetry edge and reports an error, perform the **Set Symmetry Edge** process to manually set the symmetry edge and reload the mesh.

Limitations

Order based mirroring can not be used if the mesh is composed of more than one shell.
If the selected mesh has more than one shell the mesh evaluation process will give a warning and order based mirroring will be disabled.

Position Based Mirror

If **Order Based Mirror** is disabled the mirror process will be based on the position of the vertices.

The advantage of position based mirroring is that the mesh is not limited to one shell only.

The drawback of position based mirroring is that the mesh needs to be fully symmetrical in order to find the vertices on the other side of the model.

A symmetrical mesh is always the best starting point for a successful mirror.

If a model is not perfectly symmetrical the mirror process tries to find the corresponding vertex on the other side of the model based on distance.

In case of slightly asymmetrical shapes it is possible that the mirroring will find the wrong mirror vertices which results in a falsely mirrored shape.

The mirror process will fail if the no mirrored vertex is found within the range of 0.01 units (default) from the mirrored source position.

The tolerance value can be set manually.

Tolerance

If the mirror process fails or results in unexpected mirrored shapes it is possible that the default value for finding mirrored vertices are incompatible with the geometry.

In this case try to adjust the tolerance value by going to **Menu > Advanced > Set Mirror Tolerance...**.

Setting the tolerance value too high might also result in expected mirrored shapes.

There is no guarantee that the mirror process will work in all cases.

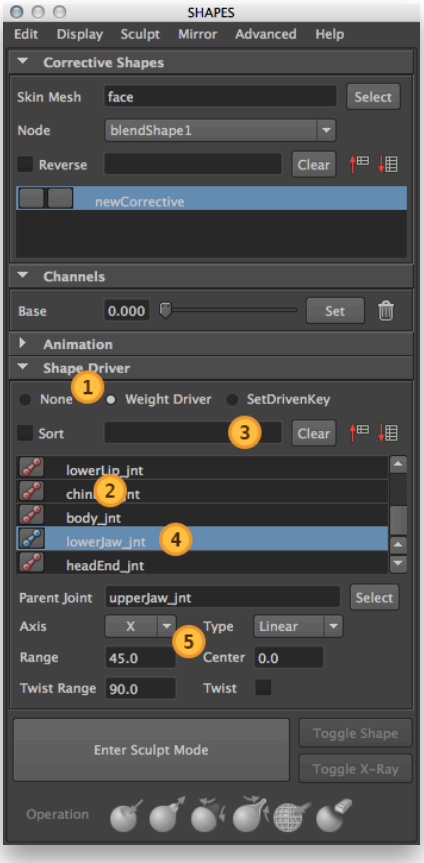
Shape Drivers

If the model is bound to a skeleton with a skin cluster a shape driver can be added to control the shape for the current pose when creating new shapes. Alternatively the shape driver can also be added later.

Shape drivers can be either regular set driven keys or via the weight driver node, which is supplied with SHAPES.

By default no shape driver is created.

Creating a New Shape with a Shape Driver



To create a new shape with a shape driver enable

- **Menu > Advanced > Auto Add Shape Driver.**

By default this option is turned off to prevent that the new shape is connected to a shape driver if shape driver settings are still present from a previous target shape selection.

Usually it is more convenient to first create the target shape and set up the shape driver in a separate step (see **Assigning a Shape Driver to an Existing Shape**).

Before entering sculpt mode to create a new shape define the shape driver attributes in the **Shape Driver** folder.

1. Set the driver to either **Weight Driver** or **SetDrivenKey**. The available parameters will change accordingly.
2. The driver list will show all joints of the model. Joints used for skinning will appear with a red joint icon.
3. You can optionally search for the driving node.
4. Select the driving node from the driver list. Double clicking the joint name will select the node in the scene.
5. Adjust the attributes for the shape driver if needed.

You can right-click the driver list for more selection options.

Weight Driver Attributes

The weight driver is a vector reader which determines the output weight by a target vector rather than a joint angle.

Driver List

The selected joint in the driver list defines the current axis of the pose and the pose angle. A locator will be parented to this joint serving as a target vector for the weight driver.

Parent Joint

This field is automatically populated when selecting a joint in the list. It is the direct parent of the selection and will be used to parent the weight driver node to. You can also select a different node in the scene and click the **Select** button.

Axis

The selection is defined by the down/first axis of the selected joint in the list and used to define the direction for the weight driver. If the joint orientation is not set up properly the assumed axis might not be correct and must be changed manually.

Range

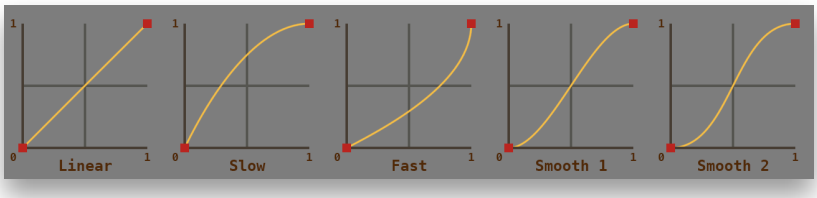
This value shows the current joint rotation related to the pose. It defines the radius of the cone of influence with the current pose at its center and the neutral pose at the edge of the cone.

Center

A value larger then 0 will widen the center area of the weight driver where the resulting weight value will be 1, allowing for some motion within the target angle without sacrificing the weight value.

Type

Defines how the resulting weight values will be interpolated between 0 and 1.



Twist / Twist Range

With this enabled the resulting weight of the weight driver is also dependent of the orientation of the target locator.
If the target vector is positioned in a way that the output weight would be 1 but the target locator has a rotation value matching the twist value or greater the output weight would still be 0.

The **Twist Range** defines how far the target locator can twist in either direction affecting the output weight.

SetDrivenKey Attributes

This defines a regular Maya based set driven key relationship between the selected joint and the target shape.

Attribute

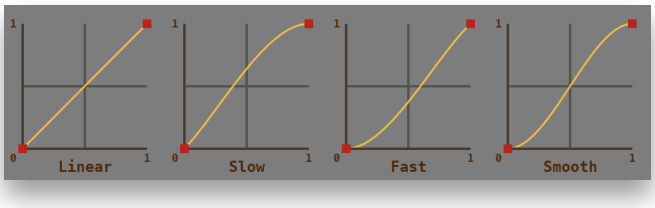
A list of all key-able attributes of the selected driver.
Changing the attribute selection updates the **Start/End** fields with the attribute values at the time of selection.

Start/End

The **End** field shows the attribute value of the selected driver and attribute at the time of the driver selection.

Type

Defines the types of keyframe interpolation used to build the set driven keyframe curve.



Infinity

Sets the pre/post infinity for the set driven keyframe curve.

Exiting the Sculpt Mode and Adding a Shape Driver

If the **Shape Driver** options have been properly set up the driving relationship will be automatically created when the sculpt mode is exited.

Working With a Shape Driver

When a shape is controlled either by a weight driver node or set driven keyframe the target channel slider will always reflect the target weight.

If the slider is moved manually the driving influence of the shape driver is temporarily disabled, allowing for testing the influence of the current shape.

If the slider is dropped the shape driver will re-gain its influence and the slider will be set back to the current value of the shape driver.

If you need to temporarily disable the dependency right-click the Base slider label and choose **Unlink** from the menu.
The connection will be broken allowing you to freely set the value of the target shape.
See also **Unlinking Driven Targets** for more information.

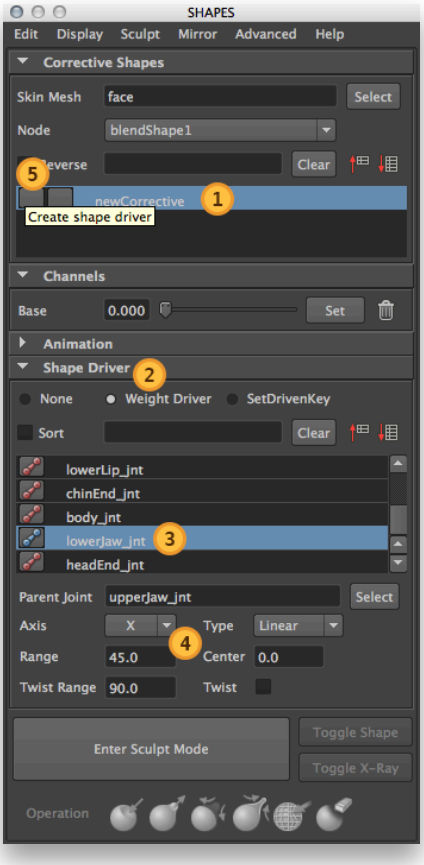
Deactivating/Activating the Weight Driver Node

Any weight driver node can be deactivated to see the effect of the blend shape without the control of the driving weight.

To deactivate or re-activate the according driver right-click the **Base** channel of the selected target and choose **Deactivate Weight Driver**. The weight driver will be bypassed and the weight will be set to 0.

You can also use **Menu > Display** to control the visibility of the weight driver nodes or to activate/deactivate all weight drivers in the scene.

Assigning a Shape Driver to an Existing Shape



If a shape driver hasn't been assigned to a shape at the time of sculpting it is possible to add the driver afterwards.

1. Select the shape in the target list to add the shape driver to.

2. In the **Shape Driver** folder set the driver to either **Weight Driver** or **SetDrivenKey**. The available parameters will change accordingly.

3. Select the driving node from the driver list.

4. Adjust the attributes for the shape driver if needed.

5. Click the left button of the shape in the target list. The tooltip will display *Create shape driver*.

6. A dialogue shows, asking to confirm creating the shape driver.

7. After confirming the process the shape driver will be setup immediately and the icon for the selected driver type will display on the button; an arrow for a weight driver node and a key symbol for set driven key.

Removing a Shape Driver

If a shape driver should be no longer associated with a target shape

1. click the (left) shape driver button of the target shape in the list, which displays the symbol of the shape driver.

2. Confirm the deletion of the node.

Overriding the Confirmation Dialogue

Creating and deleting shape drivers, as well as setting up and removing combos has been streamlined as much as possible.

However, the process has been made so easy that it's almost too easy to create new or delete existing relationships with one click.

In order to avoid accidental connections or disconnections the confirmation dialogue has been included.

If needed the dialogue can be overridden be disabling **Menu > Advanced > Confirm Button Action**.

Updating Existing Driver Attributes

If a target shape is selected which is driven by a shape driver the shape driver folder will reflect the current settings of the driving node.

Changing any of the settings related to the current driver will automatically update the driver.

Ignore Skin Joints

When loading a mesh with a skin cluster all joints will be added to the driver list which are influencing the skin or are within the same hierarchy as the skinning joints.

If listing all joints is not necessary or if the number of joints is very large and adding all joints is not favored the automatic listing can be ignored.

To ignore the listing of skin joints disable the option found in **Menu > Advanced > Auto List Joints On Load**.

Add New Nodes to the Driver List

If a node which should act as a shape driver but is not listed in the driver list it can be added by

- selecting the node in the scene you want to add, right-click the driver list and choose **Add From Scene**.

Auto Add Unlisted Driver

New nodes can automatically be added if the option **Menu > Advanced > Auto Add Unlisted Driver** is enabled.

- Select the node in the scene you want to add, right-click the driver list and choose Select From Scene.
- If the node is not already listed it will be added and then selected in the driver list.

If a target is selected which is driven by node not listed in the driver list and the option **Auto Add Unlisted Driver** is enabled the driving node will be added to the driver list.

Remove Nodes from the Driver List

If you want to remove a node from the driver list

- right-click the driver list and choose **Remove From List**.

Filter by Driver Type

You can filter the driver list by the type of driver to quickly find a certain node by type rather than by name.

- To filter the driver list click the button to the left of the driver name to display only drivers which match the node type of the clicked button.
- To unfilter the list click any icon button of the driver list.

Shape Combos

A very important part in working with corrective shapes is the creation of specific relationships between shapes.

For example, a smile shape might work well with the mouth closed but might doesn't give the expected result when the mouth is opened.
Therefore a new corrective shape is needed to fix the smile with the mouth in its opened state but only when the smile is active.
Shape combos allow for the creation of such relationships.

In the above example of the smile the smile corrective for the open mouth would need to be driven by the joint that creates the open mouth pose.

The shape combo would then create the relationship between this driven pose and the state of the smile shape.

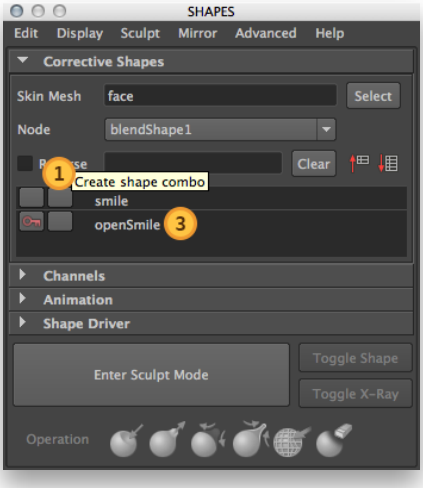
Two types of shape combos can be created:

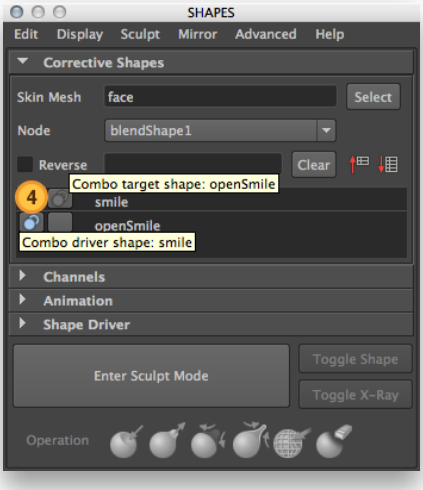
Shape Based Combo
A shape based combo is created when the values of two shapes should be used to control the target shape state

Driver Based Combo
A driver based combo is chosen when the target shape is already controlled by a shape driver but should additionally be depending on the state of another shape.

The example from above would be using a driver based combo.

Creating a Shape Combo





To set up a shape combo between two shapes

1. click on the right button of the target shape which should control the relationship. In the above example of the smile this would be the smile shape. The button tooltip will display *Create shape combo*.

2. From the confirmation dialogue select **Driver Based Combo**.

3. Select the name of the target shape.

4. The shape combo driver item in the list will display a muted combo symbol, indicating that it's controlling a shape combo. The combo target item in the list will display a blue combo symbol on the left button, indicating that it's being influenced by a shape combo.

Moving the mouse over the muted combo source button will display the combo target shapes in the tooltip.

Moving the mouse over the right combo driver button of the target shape the tooltip will display the shape name of the combo source.

A shape target can be used as the source for multiple shape combos but each target can only be controlled by one driver.

Deleting a Shape Combo

1. Click the left button displaying the combo symbol of the target shape that should be removed from the combo relationship.

2. After confirming the action the combo is deleted and the original shape driver re-connected to the target shape.

Channel Actions

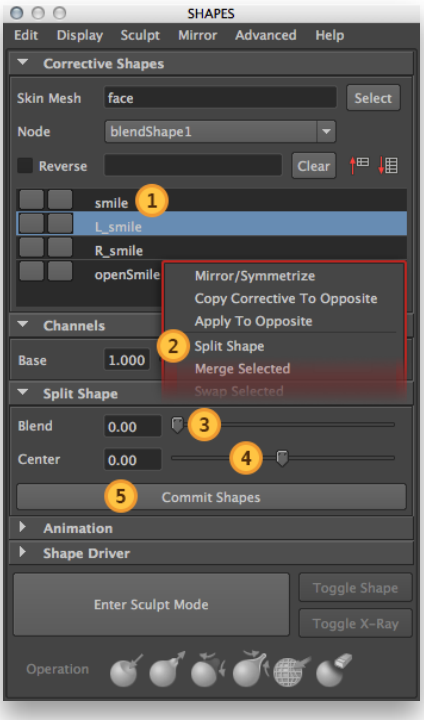
When a target shape is selected in the target list various target actions are available from the slider right-click menu in the **Channels** folder.

Split Shape

This action splits a target shape into separate shapes for the left and right side.

Splitting a shape is an interactive process which allows you to define the position and blending of the two resulting shapes.

To split a shape:



1. Select the target shape in the list you want to split.

2. Right-click the Base slider and choose **Split Shape** from the menu.

   The two resulting shapes for the left and right side will be created and listed underneath the source shape in the target list.

   The shape for the left side is set to 1 to visualize the result of the split shape sliders.

   Below the **Channels** folder the **Split Shape** folder shows the split shape sliders and the commit button.

3. Adjust the **Blend** slider to define how far the blending will extend from the center position to the left and right side. The value of the blend slider represents Maya scene units.

4. Adjust the **Center** slider to define the center position of the blending. A positive value moves the center in positive direction of the defined axis (**Menu > Mirror > Axis**).

   The **Blend** value is centered around this **Center** value.

5. After adjusting the blend values click the **Commit Shapes** button to transfer the blend values to the shape for the right side.

Merge Selected

If you need to combine two or more shapes into one you can use this action.

1. Select any number of target shapes in the list you want to use for the merging process.

2. Right-click the Base slider and choose **Merge Selected** from the menu.

   A new shape will be created and listed right below the first selected target.

Swap Selected

Allows you to exchange the blend shape data between the two selected target shapes. Only the shape information will be replaced while any connections to the targets will remain.

This makes it easy to replace an already existing shape with an updated version without the need to rebuild all the related connections and driving relationships.

1. Select the two shapes which you would like to use to replace each other.

2. Right-click the Base slider and choose **Swap Selected** from the menu.

Extract

Right-click the Base or in-between slider of a target in the **Channels** folder and select **Extract** from the menu.

The blend shape target data is used to create a new mesh resembling the selected shape.

Duplicate

Right-click the Base slider of a target in the **Channels** folder and select **Duplicate** from the menu.

The blend shape target data is then copied to a new target and appears directly underneath the selected item in the list.

Corrective Animation

SHAPES has a basic toolset for setting up and working with corrective animation.

Corrective animation comes into play after the actual animation process. At this point the animated geometry is the result based on skin clusters, blend shapes and many other deformers and nodes allowing to put the mesh in to a particular pose. But no matter how much effort has been put into the setup and rigging of the model there will always be specific poses which will not work correctly or were not anticipated during rigging. Or maybe the current pose should be pushed just a little further and the given controls don't allow for this modification.

Corrective animation can be used in these situations to create a better and stronger pose or to iron out deformation problems in specific areas.

Animated correctives are just simple blend shapes which blend in and out at specific frames helping you to model the final result while being in the current pose - something that SHAPES does anyway.

Set Up

Preparing for corrective animation is very simple.
You can either use your already existing blend shape node and use the animation features of SHAPES or you can add an additional blend shape node to carry only the shapes used for corrective animation.

To create a new blend shape node for corrective animation:

1. Select the last blend shape node from the **Node** pulldown menu at the top of the window.

2. Select **Menu > Edit > Add Blend Shape Node After Current**.

It's also possible to create a blend shape node at the front of the chain with **Menu > Edit > Add Blend Shape Node** but adding one after the last blend shape node in the chain is more logical.

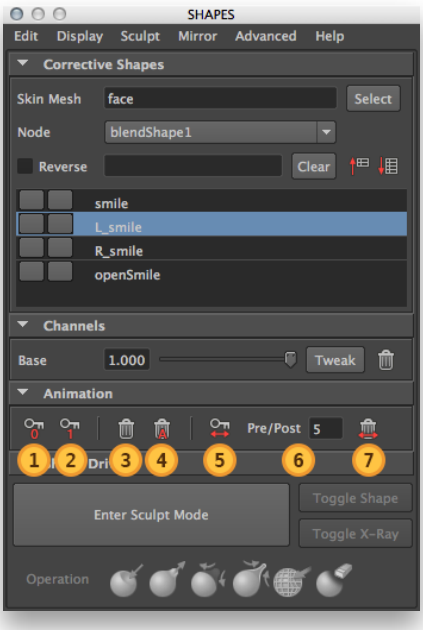
If you want to add a new blend shape node manually make sure that it's ordered before the skin cluster node if one exists. This is important for extracting the corrective shape based on the current pose of the model.

Animation

Open the Animation folder of the interface to expose the controls to set and delete keyframes for the currently selected target shapes.

Opening the Animation folder automatically selects the current blend shape node so that you can see any related keyframes in the time slider of the Maya interface.

Selecting a shape from the target list while the Animation folder is open selects any connected animation curve node to only display keyframes relating to the current selection.



1. **Key Selected With Zero Weight**
   Sets a keyframe for the selected shapes with a weight value of 0.

2. **Key Selected With Full Weight**
   Sets a keyframe for the selected shapes with a weight value of 1.

3. **Remove Key At Current Frame**
   Deletes the keyframe for the selected shapes at the current time and sets the weight to 0.

4. **Remove All Keys**
   Deletes all keyframes for the selected shapes and sets their weight to 0.

5. **Key Selected With Range**
   Sets a keyframe for the selected shapes with a weight value of 1 at the current frame and also creates bracketing keyframes with a weight of 0 before and after. The range is defined by the **Pre/Pose** range value.

6. **Pre/Pose Range**
   Defines how far apart the pre/post keyframes are from the current time when setting a shape keyframe with range.

7. **Remove Key In Range**
   Deletes the keyframe for the selected shapes at the current time and sets the weight to 0.
   SHAPES will also look at neighboring keyframes with a value of 0 and deletes these as well. The distance of these bracketing keyframes does not have to match the value of the **Pre/Post** field, only the keyframe value of 0 is considered.
   If a neighboring keyframe is not 0 it will not get removed.

Helper Attribute

In some situations it can be necessary to add an additional attribute to either use for a controlling mechanism or to simply use as a divider to organize large amounts of target shapes.

The shape helper attribute is a custom attribute on the blend shape node which can be utilized for many needs.

To add a shape helper attribute select **Menu > Edit > Add Shape Helper Attribute**.
The attribute is added to the blend shape node and listed in the target list.

Note, that the selected helper attribute is labeled *Helper* with it's slider in the **Channels** folder and setting the slider to 1 doesn't switch the **Set** button to *Tweak*.

Create Attributes From Selection

This function allows for creating custom attributes from the selected items in the target list on the selected node in the scene with existing connections.

It can be useful to create animatable attributes on controllers without having to animate the blend shape channels directly.

1. Select a node in the scene you want to add attributes to.
2. Select one or more target shapes in the target list.
3. Select **Menu > Edit > Create Attributes From Selection**.
4. A new window will appear allowing you to define the range of the attribute which will be created and the shape value range it will control.

   If **Limit To Range** is selected both value ranges will be limited.
5. Click **Add Attributes** to add the attributes to the selected node.

Cleanup Tweak Node

During the creative sculpt process it can happen that the mesh is modified assuming an active sculpt mode which actually is not the case.
As a result the modeled changes are stored in the tweak node of the mesh's history resulting in unpredictable and unwanted sculpt results further down the line.

If this is the case this action can be used to replace the current tweak node containing the unwanted vertex offsets with a new node.

If you experience that after sculpting a new shape or tweaking an existing one the result after exiting the sculpt mode doesn't match your actual work you have done it is possible that you previously made changes to mesh while not being in sculpt mode.

In this case go to **Menu > Advanced > Cleanup Tweak Node** to replace the existing tweak node with a new one.

If, for some reason, your node network misses a tweak node the process will inform you and give you the option to re-create the tweak node and all related nodes.

Please save your work before executing this command. It cannot be guaranteed that this will work in all cases and solve the issue.

Export Node Data

If it is necessary to rebuild the rig because of fundamental changes you can export the entire blend shape setup including all set driven keys, weight driver nodes, combos and direct connections and apply the setup back into a fresh scene.

All blend shape targets will be extracted and saved as a Maya ASCII file. All target information will be written to a MEL file. Both files are saved to a SHAPES folder in the data subfolder of the current project.

Note, that the process will not export any animation curves or expressions.

To export the blend shape setup go to **Menu > Advanced > Export Node Data...**

To import the blend shape setup go to **Menu > Advanced > Import Node Data** and select the blend shape setup from the submenu you want to import.
This simply sources the MEL file created during the export process.

Python Commands

The following python commands can be used to control SHAPES functions via hotkeys:

SHAPES._toggleSculptModeDisplay('shape')

SHAPES._toggleSculptModeDisplay('xray', '')