

Shape Keys [↗](#)

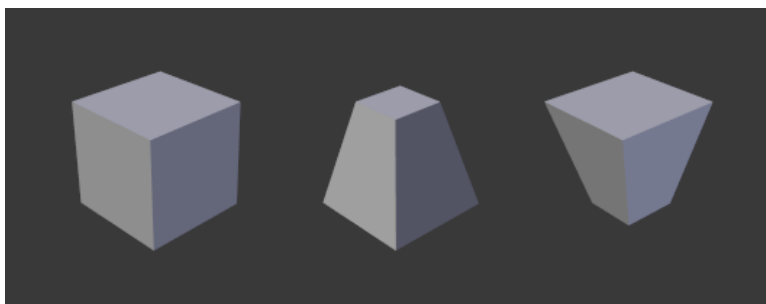
- [Introduction](#)
- [Workflow](#)
- [Relative or Absolute Shape Keys](#)
- [Shape Keys Panel](#)
- [Relative Shape Keys](#)
- [Absolute Shape Keys](#)
- [Workflow](#)
- [Relative Shape Keys](#)
- [Absolute Shape Keys](#)

Introduction [↗](#)

Shape keys are used to deform objects into new shapes for animation. In other terminology, shape keys may be called “morph targets” or “blend shapes”.

The most popular use cases for shape keys are in character facial animation and in tweaking and refining a skeletal rig. They are particularly useful for modeling organic soft parts and muscles where there is a need for more control over the resulting shape than what can be achieved with combination of rotation and scale.

Shape keys can be applied on object types with vertices like mesh, curve, surface and lattice.



Example of a mesh with different shape keys applied. [↗](#)

Workflow [↗](#)

Shape keys are authored in the [Shape Keys panel](#) which is accessed in the Object Data tab of the Properties (e.g. the Mesh tab for mesh objects).

A shape key is modified by first selecting a shape key in the panel, and then moving the object's vertices to a new position in the 3D Viewport.


The panel has controls for affecting the current *Value* (influence, weight) of a shape. It is possible to see a shape in isolation or how it combines with others.

Adding and Removing Vertices

It is not possible to add or remove vertices in a shape key. The number of vertices and how they connect is specified by the mesh, curve, surface or lattice. A shape key merely records a position for each vertex and therefore shapes always contain all the object's vertices.

When adding a vertex, all shape keys will record it with the position in which it is created. Workflow-wise, adding and deleting vertices after creating shape keys is possible, but it is best to leave the creation of shape keys for when the mesh is finished or its topology is stable.

Adding Shape Keys

When adding a new shape key with the  button next to the list, the new shape will be a copy of the Basis shape, independently of the current result visible in the 3D Viewport.

When adding a new shape key from **Specials ▸ New Shape from Mix**, the shape will start of with the vertex configuration that is visible at that moment.

When doing facial animation with relative shape keys, it can be useful to first create a shape key with a complex extreme pose (e.g. anger or surprise), and then break this complex shape into components by applying a temporary vertex group to the complex shape and creating a copy with *New Shape from Mix*. This technique helps reducing conflicts between different shape keys that would otherwise produce a double effect.

Relative or Absolute Shape Keys

A mesh (curve, surface or lattice) has a stack of shape keys. The stack may be of *Relative* or *Absolute* type.

Relative

Mainly used for muscles, limb joints, and facial animation.

Each shape is defined relative to the Basis or to another specified shape key.

The resulting effect visible in the 3D Viewport, also called *Mix*, is the cumulative effect of each shape with its current value. Starting with the Basis shape, the result is obtained by **adding** each shape's weighted **relative** offset to its reference key.

Value

Represents the weight of the blend between a shape key and its reference key.

A value of 0.0 denotes 100% influence of the reference key and 1.0 of the shape key. Blender can extrapolate the blend between the two shapes above 1.0 and below 0.0.

Basis

Basis is the name given to the first (top-most) key in the stack.

The Basis shape represents the state of the object's vertices in their original position. It has no weight value and it is not keyable. This is the default *Reference Key* when creating other shapes.

Absolute

Mainly used to deform the objects into different shapes over time.

Each shape defines how the object's shape will be at *Evaluation Time* specified in its *Value*.

The resulting shape, or *Mix*, is the interpolation of the previous and next shape given the current *Evaluation Time*.

Value

Represents the *Evaluation Time* at which that shape key will be active.

Basis

Basis is the name given to the first (topmost) key in the stack.

The Basis shape represents the state of the object's vertices in their original position.

Shape Keys Panel³

Reference

Editor:

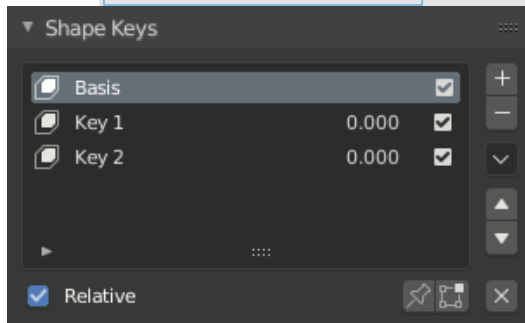
Properties

Mode:

All modes

Panel:

Object Data ▸ Shape Keys



Shape Keys panel. [↗](#)

The Shape Keys panel is used for authoring shape keys.

Active Shape Key Index

A [List View](#).

Value/Frame (number)

In Relative mode: Value is the current influence of the shape key used for blending between the shape (value=1.0) and its reference key (value=0.0). The reference key is usually the Basis shape. The weight of the blend can be extrapolated above 1.0 and below 0.0.

In Absolute mode: Value is the *Evaluation Time* at which the shape will have maximum influence.

Mute (check mark)

If unchecked, the shape key will not be taken into consideration when mixing the shape key stack into the result visible in the 3D Viewport.

Shape Key Specials

New Shape from Mix

Add a new shape key with the current deformed shape of the object. This differs from the [+](#) button of the list, as that one always copies the Basis shape independently of the current mix.

Mirror Shape Key

If your mesh is symmetrical, in *Object Mode*, you can mirror the shape keys on the X axis. This will not work unless the mesh vertices are perfectly symmetrical. Use the [Mesh ▸ Symmetrize](#) tool in *Edit Mode*.

Mirror Shape Key (Topology)

Same as *Mirror Shape Key* though it detects the mirrored vertices based on the topology of the mesh. The mesh vertices do not have to be perfectly symmetrical for this action to work.

Join as Shapes (Transfer Mix)

Transfer the current resulting shape from a different object.

Select the object to copy, then the object to copy into. Use this action and a new shape key will be added to the active object with the current mix of the first object.

Transfer Shape Key

Transfer the active shape key from a different object regardless of its current influence.

Select the object to copy, then the object to copy into. Use this action and a new shape key will be added to the active object with the active shape of the first object.

Delete All Shape Keys

Removes all Shape Keys and any effect that they had on the mesh.

Apply All Shape Keys

Saves the current visible shape to the mesh data and deletes all Shape Keys.

Relative

Set the shape keys to *Relative* or *Absolute*. See [Relative or Absolute Shape Keys](#).

Shape Key Lock (pin icon)

Show the active shape in the 3D Viewport without blending. *Shape Key Lock* gets automatically enabled while the object is in *Edit Mode*.

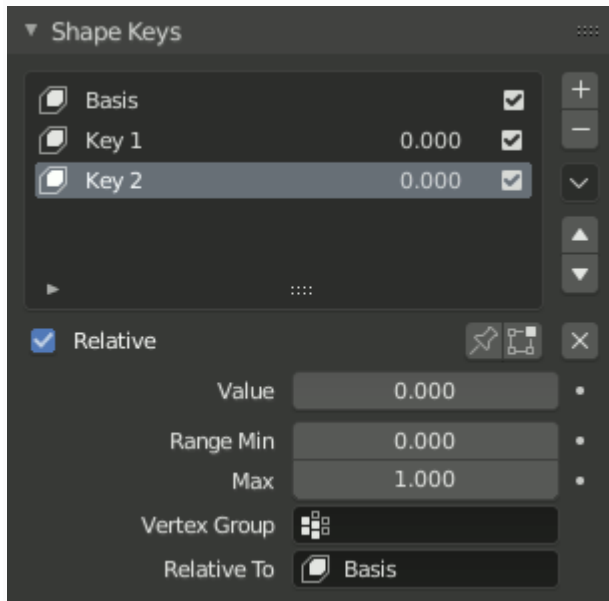
Shape Key Edit Mode (edit mode icon)

If enabled, when entering *Edit Mode* the active shape key will **not** take maximum influence as is default. Instead, the current blend of shape keys will be visible and can be edited from that state.

Add Rest Position

Creates an [Attribute](#) in the vertex domain called `rest_position` which is a copy of the `position` attribute before shape keys and modifiers are evaluated. Only mesh objects support this option.

Relative Shape Keys



Relative Shape Keys options.

See [Relative or Absolute Shape Keys](#).

With relative shape keys, the value shown for each shape in the list represents the current weight or influence of that shape in the current *Mix*.

Clear Shape Keys x

Set all influence values, or weights, to zero. Useful to quickly guarantee that the result shown in the 3D Viewport is not affected by shapes.

Value

The weight of the blend between the shape key and its reference key (usually the Basis shape).

A value of 0.0 denotes 100% influence of the reference key and 1.0 of the shape key.

Range

Minimum and maximum range for the influence value of the active shape key. Blender can extrapolate results when the *Value* goes lower than 0.0 or above 1.0.

Vertex Group

Limit the active shape key deformation to a vertex group. Useful to break down a complex shape into components by assigning temporary vertex groups to the complex shape and copying the result into new simpler shapes.

Relative To

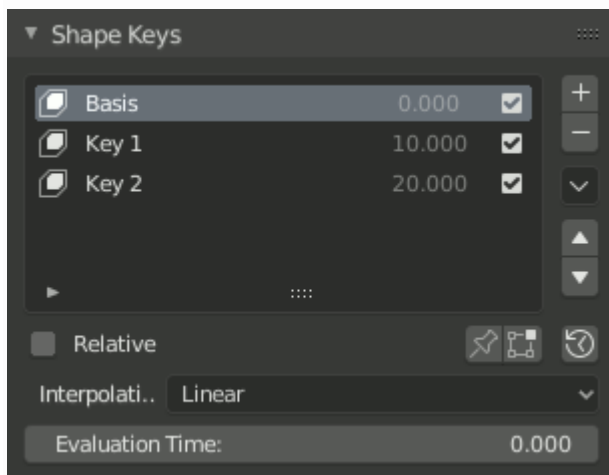
Select the shape key to deform from. This is called the *Reference Key* for that shape.

Note

Rather than storing offsets directly, internally relative keys are stored as snapshots of the mesh shape. The relative deformation offsets are computed by subtracting *Reference Key* from that snapshot.

Therefore, replacing the *Reference Key* has the effect of subtracting the difference between the new and old reference from the relative deformation of the current key.

Absolute Shape Keys [↗](#)



Absolute Shape Keys options. [↗](#)

See [Relative or Absolute Shape Keys](#).

With absolute shape keys, the value shown for each shape in the list represents the *Evaluation Time* at which that shape key will be active.

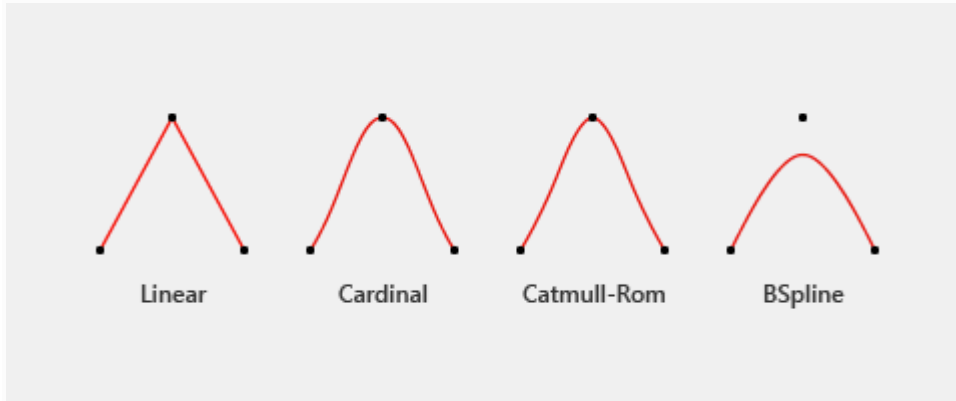
Re-Time Shape Keys (clock icon)

Absolute shape keys are timed, by order in the list, at a constant interval. This button resets the timing for the keys. Useful if keys were removed or re-ordered.

Interpolation

Controls the interpolation between shape keys.

Linear, Cardinal, Catmull-Rom, B-Spline



Different types of interpolation. [↗](#)

The red line represents interpolated values between keys (black dots).

Evaluation Time

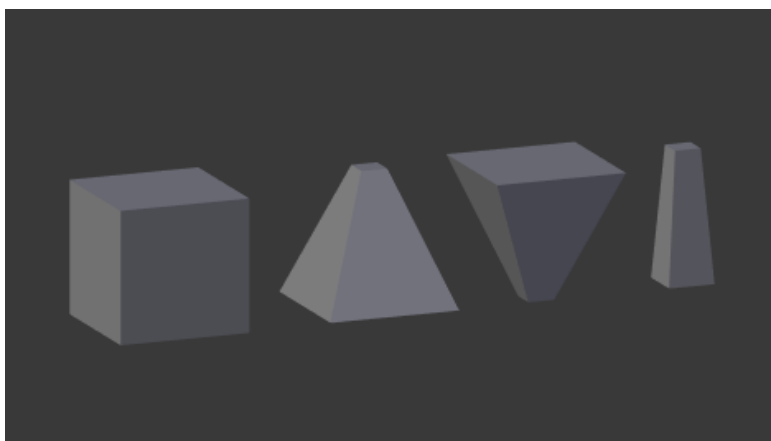
Controls the shape key influence. Scrub to see the effect of the current configuration. Typically, this property is keyed for animation or rigged with a driver.

Workflow [↗](#)

Relative Shape Keys [↗](#)

1. In *Object Mode*, add a new shape key via the *Shape Key* panel with the button.
2. “Basis” is the rest shape. “Key 1”, “Key 2”, etc. will be the new shapes.
3. Switch to *Edit Mode*, select “Key 1” in the *Shape Key* panel.
4. Deform mesh as you want (do not remove or add vertices).
5. Select “Key 2”, the mesh will be changed to the rest shape.
6. Transform “Key 2” and keep going for other shape keys.
7. Switch back to *Object Mode*.
8. Set the *Value* for “Key 1”, “Key 2”, etc. to see the transformation between the shape keys.

In the figure below, from left to right shows: “Basis”, “Key 1”, “Key 2” and mix (“Key 1” and “Key 2”) shape keys in *Object Mode*.

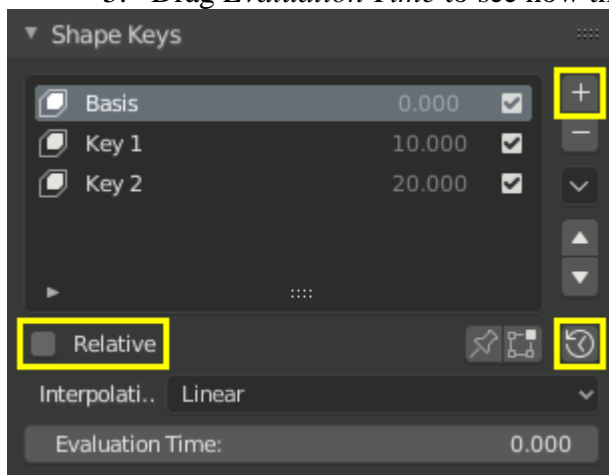


Relative shape keys example. [↗](#)

For more practical examples, see [how to combine shape keys and drivers](#).

Absolute Shape Keys [↗](#)

1. Add sequence of shape keys as described above for relative shape keys.
2. Uncheck the *Relative* checkbox.
3. Click the *Reset Timing* button.
4. Switch to *Object Mode*.
5. Drag *Evaluation Time* to see how the shapes succeed one to the next.



Absolute shape keys workflow. [↗](#)

By adding a [driver](#) or setting [keyframes](#) to *Evaluation Time* you can create an animation.