2.4 Interface - Tools

Undo and Redo

The commands listed below will let you roll back an accidental action, redo your last action, or let you choose to recover to a specific point, by picking from a list of recent actions recorded by Blender.

Undo

If you want to undo your last action, just press `Ctrl-Z`

See *Editing Preferences* section on undo to change defaults.

Redo

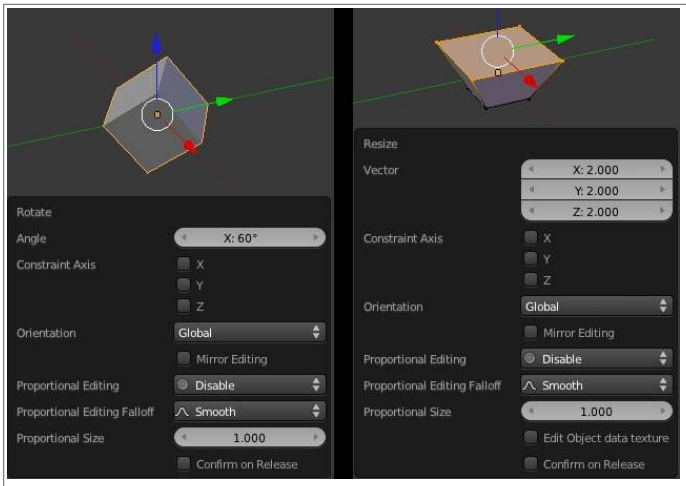
To roll back your Undo action, press `Ctrl-Shift-Z`

Redo Last

Redo Last is short for *Redo(ing your) Last (Action)*. Hitting `F6` after an action will present you a context-sensitive Pop-Up Window based on your last action taken and the *Mode* and *Window* in which Blender is being used.

For example, if your last action was a rotation in *Object* Mode, the Window will show you the last value changed for the angle (see Fig:Redo Last - Rotation), where you can change your action back completely by typing **0** (zero) in the numeric field. There are other useful options, based on your action context, and you can not only Undo actions, but change them completely using the available options.

If you are in *Edit* Mode, the Window will also change its contents based on your last action taken. In our second example (at the right), the last action taken was a Vertex Move; we did a *Scale* on a Face, and, as you can see, the contents of the Pop-Up Window are different, because of your context (Edit Mode). (See Fig:Redo Last - Scale)



Left Image: Redo Last- Rotation (Object Mode, 60 degrees)

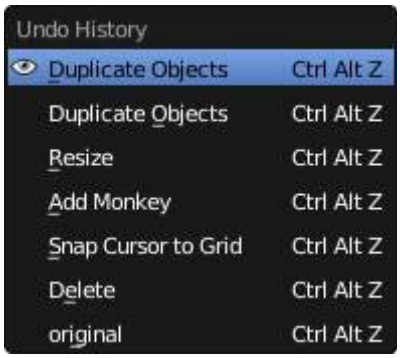
Right Right: Redo Last- Scale (Edit Mode, Resize face)

Tip

Operations using Redo Last

Some operations produce particularly useful results if you tweak their parameters with the `F6` Menu. Take, for example, adding a Circle. If you reduce the Vertex count to 3, you get a perfect equilateral triangle.

Undo History



The Undo History Menu

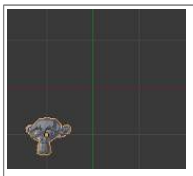
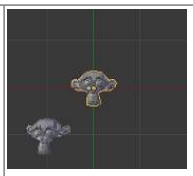
There is also a Undo History of your actions, recorded by Blender. You can access the history with `Ctrl-Alt-Z`.

Rolling back actions using the *Undo History* feature will take you back to the action you choose. Much like how you can alternate between going backward in time with `Ctrl-Z` and then forward with `Ctrl-Shift-Z`, you can hop around on the Undo timeline as much as you want as long as you do not make a new change. Once you do make a new change, the Undo History is truncated at that point.

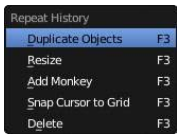
Repeat Last

The Repeat Last feature will Repeat your last action when you press `Shift-R`.

In the example Images below, we duplicated a *Monkey Mesh*, and then we moved the Object a bit. Using repeat `Shift-R`, the *Monkey* was also duplicated and moved.

		
Suzanne.	After a Shift-D and move.	After a Shift-R.

Repeat History



The Repeat Menu

The *Repeat History* feature will present you a list of the last repeated actions, and you can choose the actions you want to repeat. It works in the same way as the Undo History, explained above, but the list contains only repeated actions. To access Repeat History, use `F3`.

Note
Blender uses two separate Histories, one dedicated for the *Edit* Mode, and one dedicated for the *Object* Mode.

Important

When you quit Blender, the complete list of user actions will be lost, even if you save your file before quitting.

See also

Troubleshooting section on *Recovering your lost work*

Screen Capture

Screenshots

Reference

Mode: All modes
Menu: Window ‣ Save Screenshot
Hotkey: `Ctrl-F3`

Save Screenshot Option

`Ctrl-F3` will take a screenshot of your Blender window and then open the Blender *File Browser* window, allowing you to specify the name and location of the screenshot. In the example image at the right, the PNG format will be the output of the screenshot taken (settings are the same as the ones available to save render results). When the Blender *File Browser* window opens for you, at the left, there is a tab called *Save Screenshot* where you can find format settings and a checkbox with the option *Full Screen*.

- Check the Option to save the entire Blender window (full width and height of the Blender window you are using when you call the command).
- Uncheck the box to save only your active window (where your mouse is located when you call the command).

Screencasts

Reference

Mode: All modes
Menu: Window ‣ Make Screencast
Hotkey: `Alt-F3`

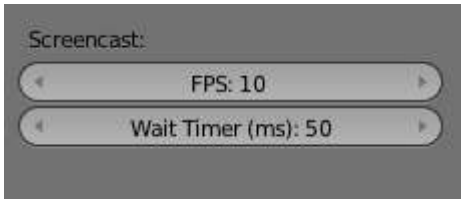
This is a quick way to make screen-casts from within Blender.

Note

This is limited to a single window and does *not* support audio.

For recording tutorials you may want to use more comprehensive, 3rd party solutions.

Screencasts will record your actions over time either as a video or sequence of image files. The type and location of the output is determined by the settings in the *Output panel* of the Render context window. The default settings will generate a screencast consisting of a series of PNG images captured every 50 ms and stored in the */tmp* folder. If you want to record a video, set the *Output* to one of the *Movie File Formats* supported by your system listed in the *Output panel* format menu. If you are unsure what video codecs your system supports, select *AVI JPEG*.



Options in the User Preferences Editor

The FPS for video Screencasts and time between each Screenshot for an image series Screencast can be set from the *System panel* of the *User Preferences* window.

When you start Blender Screencasts, the header of the *Info Window* will change, and it will show you a button for stopping your capture.

Below, we show the normal header of the *Info Window*, when in normal Blender operation (See Fig: Info Window - Header - Normal Operation), and with the Stop button for the Screencast, when in Screencast Mode. (See Fig: Info Window - Header - Capture Stop Button).

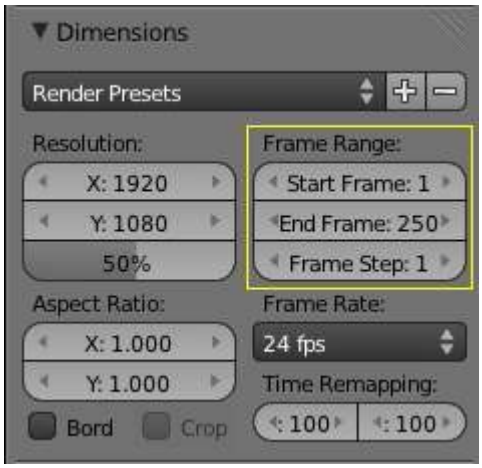
Info Window - Header - Normal Operation

Info Window - Header - Capture Stop Button

Note

The only way to stop the Screencast

Pressing the Stop button in the header of the Info Window is the only way to stop the Screencast capture. If you press `Esc`, the shortcut will only work for operations performed in the Blender *User Interface*, (it will stop animations, playbacks and so on...), but will not work to stop *Screencasts*.



Dimensions Panel - Frame Range

The frames are stored using a suffix added to their file name, where the suffix is composed of the numbers present in the fields for *start* and *end frames*, defined in the Frame Range of the Dimensions panel, Render context. (See Fig: Dimensions Panel - Frame Range - highlighted in yellow)

Note

The configuration of the End frame, present in the Frame Range of the Dimensions Panel, **will not** stop your capture automatically. You will always have to stop the Screencast manually, using the Stop button.

The Videos are generated internally in the same manner as the *Screenshots*, using the width and height of the Window you are working in. If you choose to capture to a Video file, Blender will have to pass those frames to a Video codec.

Warning

Some codecs limit the output width/height or the video quality.

- When you save your *Screencast* in an Image format, the Images will be saved using the entire Blender Window, with full width and height, and the quality of the Image will be defined by its type (i.e. JPG, PNG, and so on) and configuration (i.e. Slider *quality* of the .JPG format).
- When you save your *Screencast* in a Video format, it will be sent to a codec. Depending on the codec limitations, the resulting output Video could be scaled down. Furthermore, some combinations of Window width and height cannot be processed by certain codecs. In these cases, the *Screencast* will try to start, but will immediately stop. In order to solve this, choose another Window format and/or another codec.

Blender Window Dimension

There is a way to match the Blender Window dimensions with the Output Video File, achieving standard dimensions for the output of the Blender Screencast. (I.e. NTSC, HD, Full HD, etc). You can control the width and height of your Blender Window, starting Blender from a Command Line. To learn more about starting Blender from a command line, see the page about *Blender Console Window.*

Grease Pencil

Introduction

Use the *Grease Pencil* tool to draw freehand sketches and annotations in the 3D View, UV/Image Editor, Node Editor, or Movie Clip Editor. The sketches are saved with the blend file. Planning animation poses and motion curves, sketching out model topology, and use as director’s shot review tool are just a few of the applications.

The Grease Pencil in action.

The next few pages explain how to use this tool:

- *Drawing sketches*.
- *Layers and Animation*.
- *Converting sketches to geometry.*

Drawing With Grease Pencil

- Enable the *Grease Pencil* by clicking *Draw, Line, Poly or Erase* from the Toolshelf (T). A new layer will be automatically added for you to draw on.
- A new layer can be added from the *Grease Pencil Properties panel*. This panel can also be used to customize the color, opacity and thickness of the pencil lines. Changes to these settings will affect all strokes on the current layer.

Grease Pencil Tool Shelf and Properties Panel.

Grease Pencil sketches can be converted to editable geometry and used to aid the animation process.

- *Read more about Layers and Animation*
- *Read more about Converting sketches to geometry*

Drawing

The Toolshelf provides a number of options for drawing with the *Grease Pencil* which are detailed below. The Toolshelf can be seen in the screenshot *Grease Pencil Tool Shelf and Properties Panel* above.

Grease Pencil Mode and Shortcut Summary

Draw `D-LMB`
: Draw a new stroke (multiple short, connected lines). The stroke will finish when you release the mouse button.

Line `Ctrl-D-LMB`
: Draw a new line in rubber band mode. The line will finish when you release the mouse button.

Poly `Ctrl-D-RMB`
: Draw connected lines by clicking at various points. Lines will be automatically added to connect the two points.

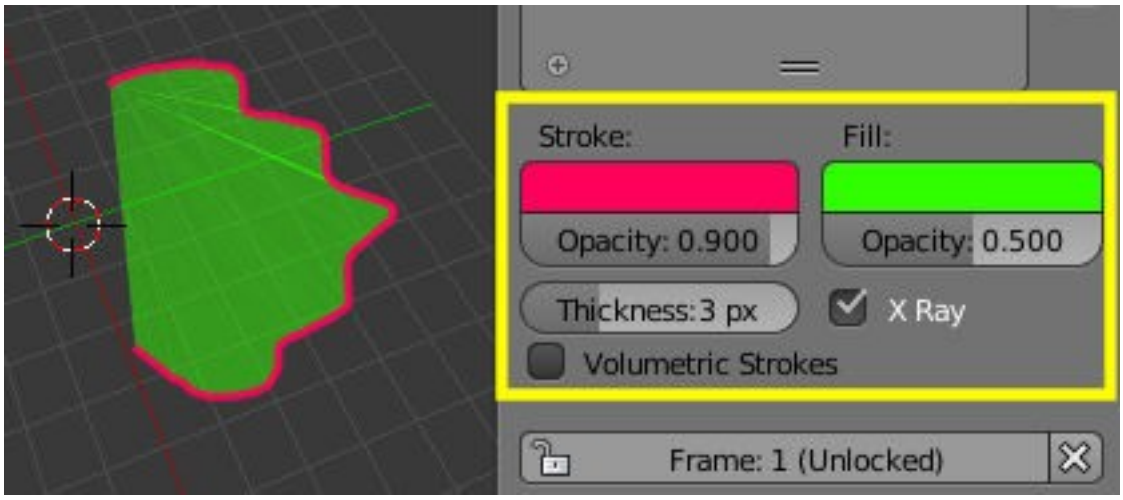
Erase `D-RMB`
: Erases segments of strokes that fall within the radius of the eraser "brush". The erasing will continue until the mouse button is released. If begun with *Erase*, either `RMB` or `LMB` will erase strokes. The size of the eraser "brush" can be controlled with `Wheel` or (`NumpadPlus`, `NumpadMinus`) keys (while still holding `RMB`).

Sketching Sessions

A Sketching Session allows for rapid sketching with the *Grease Pencil* when multiple strokes are desired. With this option set, a sketching session starts when a *Grease Pencil* stroke is made. The type of session (Draw, Line, Poly, Erase) is determined by the first stroke made which can be done via hotkeys or the Toolshelf. Use `Esc` or `Return` to exit the sketching session. Note that in a Erase Sketching Session both `LMB` or `RMB` can be used once the session has started.

Appearance Settings

Set the color, line width and other aspects of the grease pencil's appearance in the *Grease Pencil Panel* of the *Properties* shelf (`N`) shown here.



Grease pencil properties

There are separate settings for each layer with those of the active layer shown in the panel. All the strokes on a

layer (not just those made after a particular change) are affected by that layer's grease pencil properties.

Stroke
: Sets the line color and opacity.

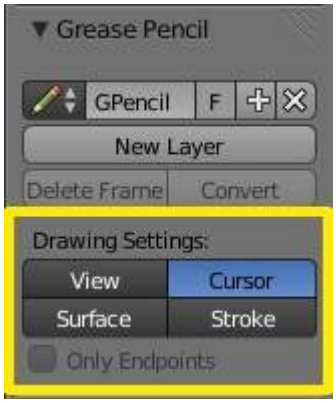
Fill
: Sets the color of the interior space enclosed by the strokes. Increase the opacity from zero to make the fill visible. Fill works best on convex shapes.

Thickness
: Width of the line strokes.

X-Ray
: Makes the lines visible when they pass behind other objects in the scene.

Volumetric Strokes
: Draw strokes as a series of filled spheres, resulting in an interesting volumetric effect. Get best results with partial opacity and large stroke widths.

Drawing Settings



Grease Pencil Drawing Settings.

In the *Grease Pencil Panel* of the *Tool* shelf (T) there are several choices for *Drawing Settings*.

View
: New strokes are locked to the view.

Cursor *(3D view only)*
: New strokes are drawn in 3D-space, with position determined by the 3D cursor and the view rotation at the time of drawing. *Cursor* is available as an option in the *UV/Image Editor* but it functions identically to the *View* option.

Surface *(3D view only)*
: New strokes are drawn in 3D-space, with their position projected onto the first visible surface.

Stroke *(3D view only)*
: New strokes are drawn in 3D-space, with their position projected onto existing visible strokes. Note that strokes created with *View* are not in 3D-space and are not considered for this projection.

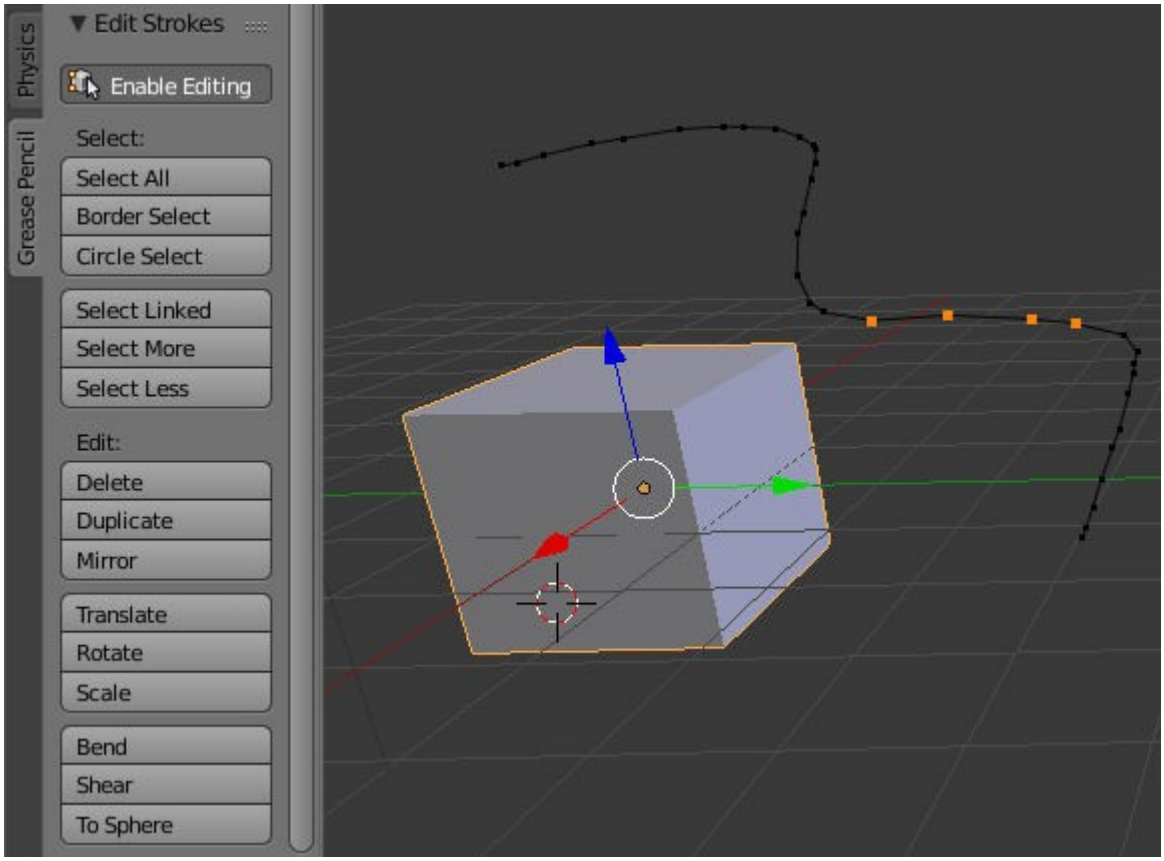
Enabling the *Only Endpoints* setting applies the drawing setting only to the endpoints of the stroke. The part of the stroke between the endpoints is adjusted to lie on a plane passing through the endpoints.

The effect of different Drawing Settings on Grease Pencil strokes.

Editing

These tools let you move and reshape grease pencil strokes after they have been drawn.

Open the Grease Pencil tab on the Toolshelf (T). Look for the tools in the Edit Strokes panel shown here:



Edit panel with grease pencil strokes.

The basic steps are:

- enter the grease pencil edit mode
- select some strokes
- move and reshape them

Edit Mode

Enable Editing **(`D-Tab`)**

Enters or exits the edit mode.

While in the grease pencil editing mode, Blender redirects the common editing keys to operate on the grease pencil layer instead of the 3D scene components.

Select

Grease pencil strokes are formed from a series of connected vertex points. To make changes, first select points on the strokes that you want to edit. You can only select points on the active layer. The selected points are highlighted as in the image above.

Hint
Set the layer's *Stroke Thickness* to 1 to make the points more visible.

Use the mouse to select the points, or one of the selection buttons in the panel as detailed in *Basic Selection*.

Various selection functions similar to those available when editing meshes can be used:

Select All	`A`
Border Select	`B`
Circle Select	`C`
Select Linked	`Ctrl-L`
Select More	`Ctrl-NumpadPlus`
Select Less	`Ctrl-NumpadMinus`
Select Stroke	`Alt-LMB`

Edit

Delete **(`X`)**

Choose from:

- Points - delete the selected points, leaving a gap in the stroke
- Dissolve - reconnect the ends so there is no gap in the stroke
- Strokes - delete the entire stroke containing any selected points
- Frame - delete a frame when doing *Animating Sketches*.

Duplicate **(`Shift-D`)**

Make a copy of the selected points at the same location. Use the mouse to *Translate* them into position.

LMB places them at their new position. RMB cancels and removes the duplicates.

***Translate* (G) *Rotate* (R) *Scale* (S)**
Move the selected points with the mouse. LMB places them at their new position. Refine these operations with *Pivot Center*, *View* or *Global* transform orientations, snap to *Increment* and *Proportional Editing* detailed in the general *Transformations Instructions*.

***Mirror* (Ctrl-M) *Bend* (Shift-W) *Shear* (Shift-Ctrl-Alt-S) *To Sphere* (Shift-Alt-S)**
These are similar to the equivalent mesh operations detailed in *Deforming Instructions*.

Sensitivity When Drawing

The default settings for the sensitivity of mouse/stylus movement when drawing have been set to reduce jitter while still allowing fine movement. However, if these are not appropriate they can be altered in User Preferences window ‣ Editing ‣ Grease Pencil.

Manhattan Distance
The minimum number of pixels the mouse should have moved either horizontally or vertically before the movement is recorded. Decreasing this should work better for curvy lines.

Euclidean Distance
The minimum distance that the mouse should have traveled before movement is recorded.

Eraser Radius
The size of the eraser “brush”.

Smooth Stroke
This turns on the post-processing step of smoothing the stroke to remove jitter. It is only relevant when not drawing straight lines. By default this is enabled. It should be noted that it can often cause “shrinking” of drawings, and may be turned off if the results are not desirable.

Simplify Stroke
This turns on the post-processing step of simplifying the stroke to remove about half of current points in it. It is only relevant when not drawing straight lines. By default this is disabled. As with *Smooth Stroke*, it can often cause “shrinking” of drawings, and loss of precision, accuracy and smoothness.

Additional Notes For Tablet Users

- The thickness of a stroke at a particular point is affected by the pressure used when drawing that part of the stroke.
- The “eraser” end of the stylus can be used to erase strokes.

Layers

Grease Pencil sketches are organized in layers, much like the image layers in the GIMP or Photoshop. These layers are not related to any of the other layer systems in Blender.

The layers’ main purpose is to gather sketches that are related in some meaningful way (i.e. “blocking notes”, “director’s comments on blocking”, or “guidelines”). For this reason, all the strokes on a layer (not just those made after a particular change) are affected by that layer’s color, opacity, and stroke thickness settings.

Layers are managed in the *Grease Pencil Panel* of the *Properties* region (N) shown here.

Grease Pencil Panel

Use the adjacent controls to Add, Remove or adjust the position of a layer in the list. Each layer has a visibility icon, and a lock icon to protect it from further changes. Double click on a layer name to rename it.

There is a list of layers attached to each scene and a list of layers associated with each object. The buttons above the list box control its contents, showing either the layers associated with the active scene or the list of layers associated with the active object.

By default, most operations occur only on the *active* layer highlighted in the list.

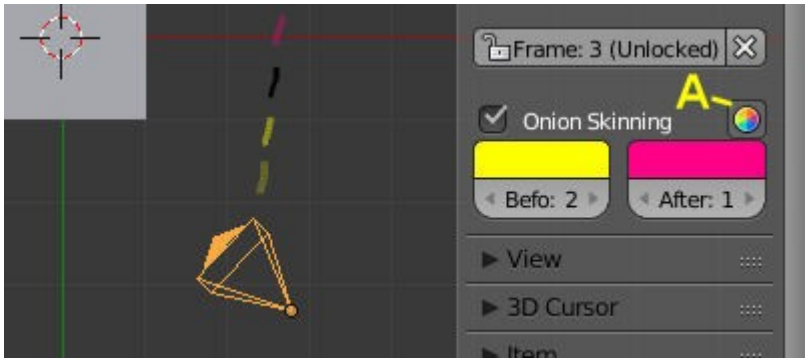
Animating Sketches

Use the Grease Pencil to do basic pencil tests (i.e. 2D animation in flipbook style). Sketches are stored on the frame that they were drawn on, as a separate drawing (only on the layer that they exist on). Each drawing is visible until the next drawing for that layer is encountered. The only exception to this is the first drawing for a layer, which will also be visible before the frame it was drawn on.

Therefore, it is simple to make a pencil-test/series of animated sketches:

- Go to first relevant frame. Draw.
- Jump to next relevant frame. Draw some more.
- Keep repeating process, and drawing until satisfied. Voila! Animated sketches.

Onion Skinning



Grease Pencil Onion Skinning

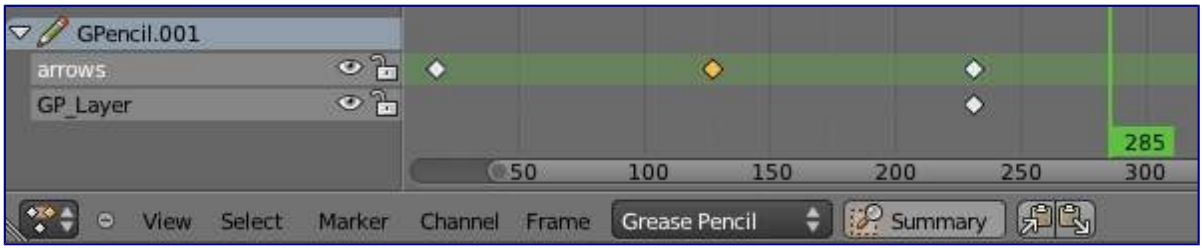
Onion-skinning, also known as ghosting, helps an animator by displaying the neighboring frames as a faded trail. Enable the option with the *Onion Skin* button in the grease pencil properties panel (shown above).

Use *Before* and *After* to set the number of ghost frames drawn on either side of the current frame. When *Use Custom Colors* (Marked **A**) is enabled, you can also use the *Before* and *After* controls to change the color of the ghosted frames.

Adjusting Timing of Sketches

It is possible to set a Grease-Pencil block to be loaded up in the *DopeSheet* for editing of the timings of the drawings. This is especially useful for animators blocking out shots, where the ability to re-time blocking is one of the main purposes of the whole exercise.

- In an *Dope Sheet* window, change the mode selector (found beside the menus) to *Grease Pencil* (by default, it should be set to *DopeSheet*).
- At this point, the *DopeSheet* should now display a few “channels” with some “keyframes” on them. These “channels” are the layers, and the “keyframes” are the frames at which the layer has a sketch defined. They can be manipulated like any other data in the *DopeSheet* can be.



All the available Grease-Pencil blocks for the current screen layout will be shown. The Area/Grease-Pencil data-blocks are drawn as green channels, and are named with relevant info from the views. They are also labeled with the area (i.e. window) index (which is currently not shown anywhere else though).

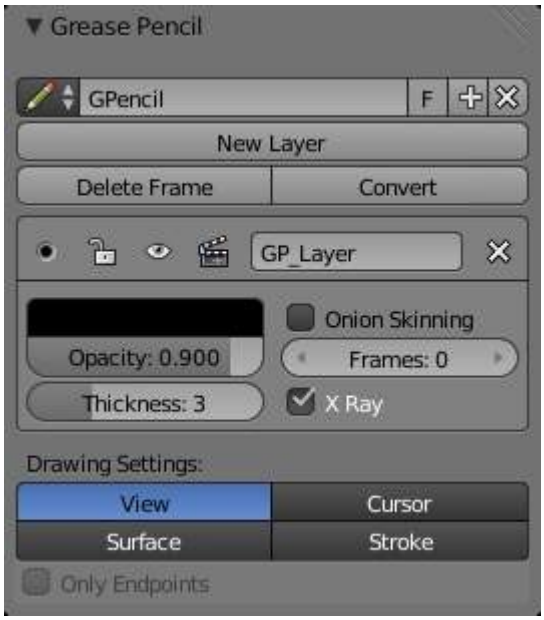
Copying Sketches

It is possible to copy sketches from a layer/layers to other layers in the *Action Editor*, using the “Copy”/”Paste” buttons in the header. This works in a similar way as the copy/paste tools for keyframes in the *Action Editor.*

Sketches can also be copied from one screen (or view) to another using these tools. It is important to keep in mind that keyframes will only be pasted into selected layers, so layers will need to be created for the destination areas too.

Converting Sketches to Objects

In the 3D view, sketches on the active layer can be converted to geometry, based on the current view settings, by transforming the points recorded when drawing (which make up the strokes) into 3D-space. Currently, all points will be used, so it may be necessary to simplify or subdivide parts of the created geometry for standard use.



Grease Pencil panel in 3D View.

Sketches can currently be converted into curves, as proposed by the *Convert Grease Pencil* menu popped-up by the *Convert* button in the grease pencil properties

Path
: Create NURBS 3D curves of order 2 (i.e. behaving like polylines).

Bezier Curve
: Create Bezier curves, with free “aligned” handles (i.e. also behaving like polylines).

Note

Why “polyline-like” curves?

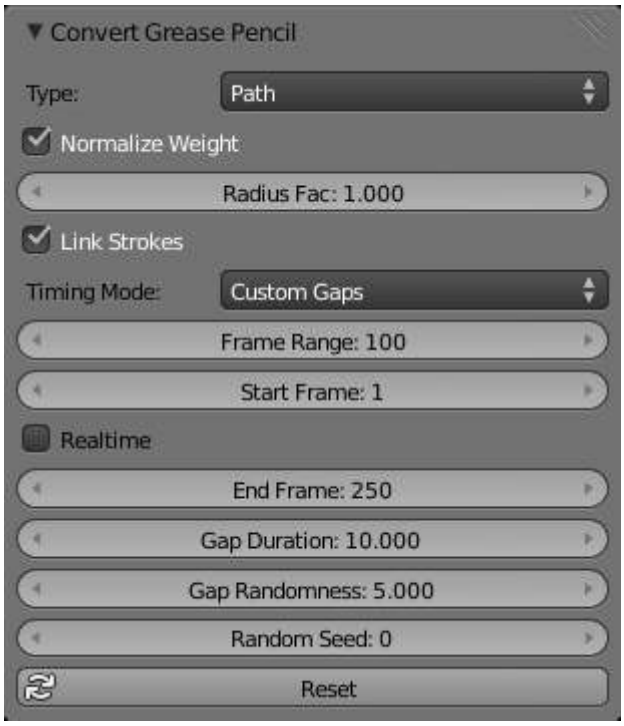
To get by default curves following exactly the grease pencil strokes. If you want a smoothed curve, just edit it to get auto handles (for Bezier), or raise its order (for NURBS).

Note

Converting to Mesh

If you want to convert your sketch to a mesh, simply choose first *NURBS*, and then convert the created curve to a mesh.

General Options



The Convert to Curve options.

Stroke's width will be used to set the curve's control points' radii and weights (**not** NURBS weights, but those used e.g. as goal by the softbody simulation...). The default behavior is to get strokes' width (as defined in its settings - and which might have been modulated by the pen pressure), to multiply it by a given constant (0.1), and to assign it directly to weights. Radii get the same value scaled by the *Radius Fac* factor (e.g. with a **10.0** factor, a stroke width of **3** will give radii of **3.0** ...).

Normalize Weight (enabled by default) will scale weights value so that they tightly fit into the `[0.0, 1.0]` range.

All this means that with a pressure tablet, you can directly control the radius and weight of the created curve, which can affect e.g. the width of an extrusion, or the size of an object through a *Follow Path* constraint or *Curve* modifier!

Link Strokes (enabled by default) will create a single spline (i.e. curve element) from all strokes in active grease pencil layer. This especially useful if you want to use the curve as a path. All the strokes are linked in the curve by "zero weights/radii" sections.

Timing

Grease pencil now stores "dynamic" data, i.e. how fast they were drawn. When converting to curve, those data can be used to create an *Evaluate Time* F-Curve (in other words, a path animation), that can be used e.g. to control another object's position along that curve (*Follow Path* constraint, or, trough a driver, *Curve* modifier). So this allows you to reproduce your drawing movements.

Warning
All those "timing" options need *Link Stroke* to be enabled - else they would not make much sense!

Note

Please note that if you use this tool with older grease pencil's strokes (i.e. some without any timing data), you will only have a subset of those options available (namely, only linear progression along the curve over a specified range of frames).

Timing Mode

This control let you choose how timing data are used.

No Timing
Just create the curve, without any animation data (hence all following options will be hidden)...

Linear
The path animation will be a linear one.

Original
The path animation will reflect to original timing, including for the "gaps" (i.e. time between strokes drawing).

Custom Gaps
The path animation will reflect to original timing, but the "gaps" will get custom values. This is especially useful if you have very large pauses between some of your strokes, and would rather like to have "reasonable" ones!

Frame Range
The "length" of the created path animation, in frames. In other words, the highest value of *Evaluation Time*.

Start Frame
The starting frame of the path animation.

Realtime
When enabled, the path animation will last exactly the same duration it took you do draw the strokes.

End Frame
When *Realtime* is disabled, this defines the end frame of the path animation. This means that the drawing timing will be scaled up or down to fit into the specified range.

Gap Duration
Custom Gaps only. The average duration (in frames) of each gap between actual strokes. Please note that the value entered here will only be exact if *Realtime* is enabled, else it will be scaled, exactly as the actual strokes' timing is!

Gap Randomness
Only when *Gap Duration* is non-null. The number of frames actual gap duration can vary of. This allows the creation of gaps having an average well defined duration, yet keeping some random variations to avoid an "always the same" effect.

Random Seed
The seed fed to the random generator managing gaps duration variations. Change it to get another set of gaps duration in the path animation.

Example

Here is a simple "hand writing" video created with curves converted from sketch data:

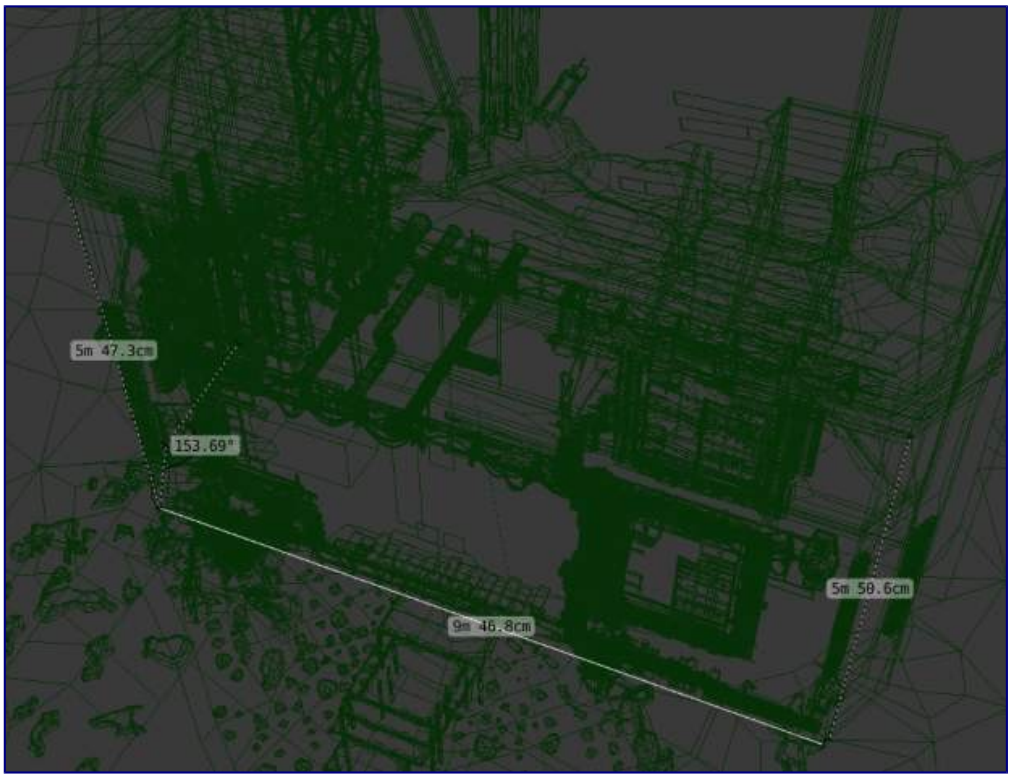
https://www.youtube.com/watch?v=VwWEXrnQAFI

And the blend file: File:ManGreasePencilConvertToCurveDynamicExample.blend

http://wiki.blender.org/index.php/file:ManGreasePencilConvertToCurveDynamicExample.blend

Ruler and Protractor

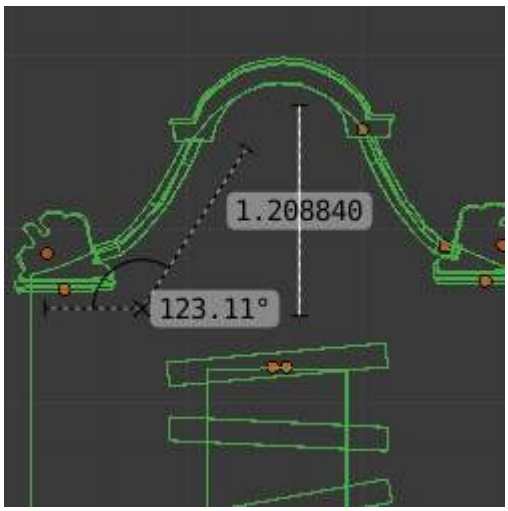
The ruler can be accessed from the toolshelf, once activated you can use the ruler to measure lengths and angles in the scene.



Example of the ruler and protractor.

Example using the ruler to measure thickness.

Usage



Here are common steps for using the ruler.

- Activate the Ruler from the toolshelf.
- Click and drag in the view-port to define the initial start/end point for the ruler.
- Orbit the view and click on either end of the ruler to re-position it. Holding `Ctrl` enables snap to elements.
- Click on the middle to measure angles.
- Press `Return` to store the ruler for later use or `Esc` to cancel.

Note
Editing operations can be used while the ruler is running, however tools like the knife can’t be used at the

same time.

Note

Unit settings and scale from the scene are used for displaying dimensions.

Shortcuts

- `Ctrl-LMB` Adds new ruler.
- `LMB` Drag end-points to place them, Hold Ctrl to snap, Hold Shift to measure thickness.
- `LMB` Drag center-point to measure angles, drag out of the view to convert back to a ruler.
- `Delete` Deletes the ruler.
- `Ctrl-C` Copies the rulers value to the clipboard.
- `Esc` Exits
- `Return` Saves the rulers for the next time the tool is activated.