COMPONENT SPRAY TOOL v1.4.2
for SketchUp v6 and higher (Free and Pro)

This script is a tool to quickly populate your model with components (trees, people, rocks, grass...) based on support shapes, options and constraints.

PC Installation:

First of all remove entirely any previous installation of the script.
Unpack the archive in the SketchUp Plugins folder, typically:
C:\Program Files\Google\Google SketchUp 8\Plugins
Then you should have:

- "compoSprayToolbar.rb" in your Plugins folder
- A sub-folder "CompoSpray" in your Plugins folder
- This pdf guide in your Plugins folder. You can move this file where convenient.

MAC Installation:

First of all remove entirely any previous installation of the script.
OSX has a system Library folder and a User Library folder that looks very similar, and some users end up adding plugins to User Library. Don't do that, please install here: /Library/Application Support/Google SketchUp X/SketchUp/Plugins

Unpack the archive in the Plugins folder, you should have:

- "compoSprayToolbar.rb" in your Plugins folder
- A sub-folder "CompoSpray" in your Plugins folder
- This pdf guide in your Plugins folder. You can move this file where convenient.

What's new in v1.4:

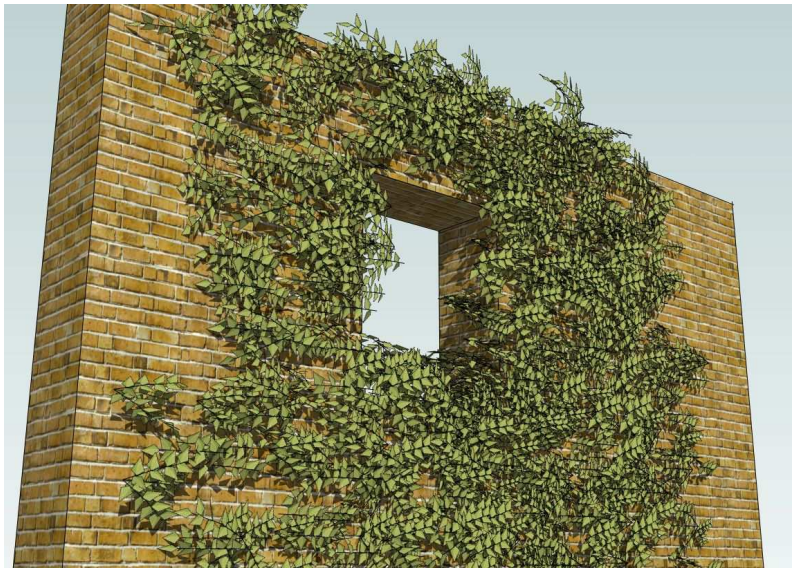
- New random function to spray components, avoiding the bunching of components at the center of the area to spray on,
- Web dialog as main interface, toolbar, custom cursors,
- precise values for pressure, altitude, steepness, scale,
- 2 more components types available in the list of components to spray (8 vs 6),
- 3 more shapes to spray with,
- collision detection option,
- current options are maintained during all the session,

What's new in 1.4.1.:

- bug fixes with SU8,
- Backward compatibility (SU7 and SU6) for Undo's operations,
- true "ignore hidden geometry" option (masked entites and invisible layers),
- non-modal Web Dialog.

What's new in 1.4.2.:

- bug fix with destination layer using the PointTool and SelectedSurfacesTool,
- bug fix of random rotation not working using the SelectedSurfacesTool,
- bug fix of altitude constraints when using the "Selected Faces" shape,
- new "shape" to drop components at vertices of edges or curves,
- new "shape" to evenly drop components at divisions of edges,
- suppressed "OnMouseLeave" function that caused the tools to exit when the mouse left the graphic window.
- dropping components on other components with the point shape is now possible,
- localization files available (German, Danish, French, Portuguese, English, and Spanish as the base set)
- settings to customize the dialog box behaviour,
- experimental directional spray tool, so you can populate walls with ivy for inst ance.

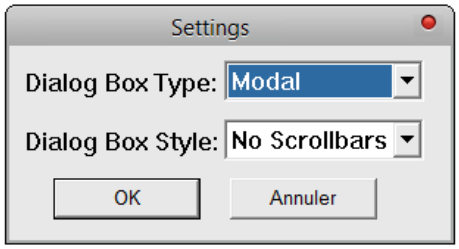


Usage:

Once installed, you'll find a "Components Spray" under the "Draw" menu, and a new toolbar in the "Display > Toolbars" menu:
Select this toolbar and you'll get a three icons toolbar as shown below:

The compoSpray Toolbar

The "Component Spray" left pink icon launches the tool that drops components in a top-down manner, the second yellow icon drops components perpendicularly to faces, while the third icon on the right displays this dialog box:



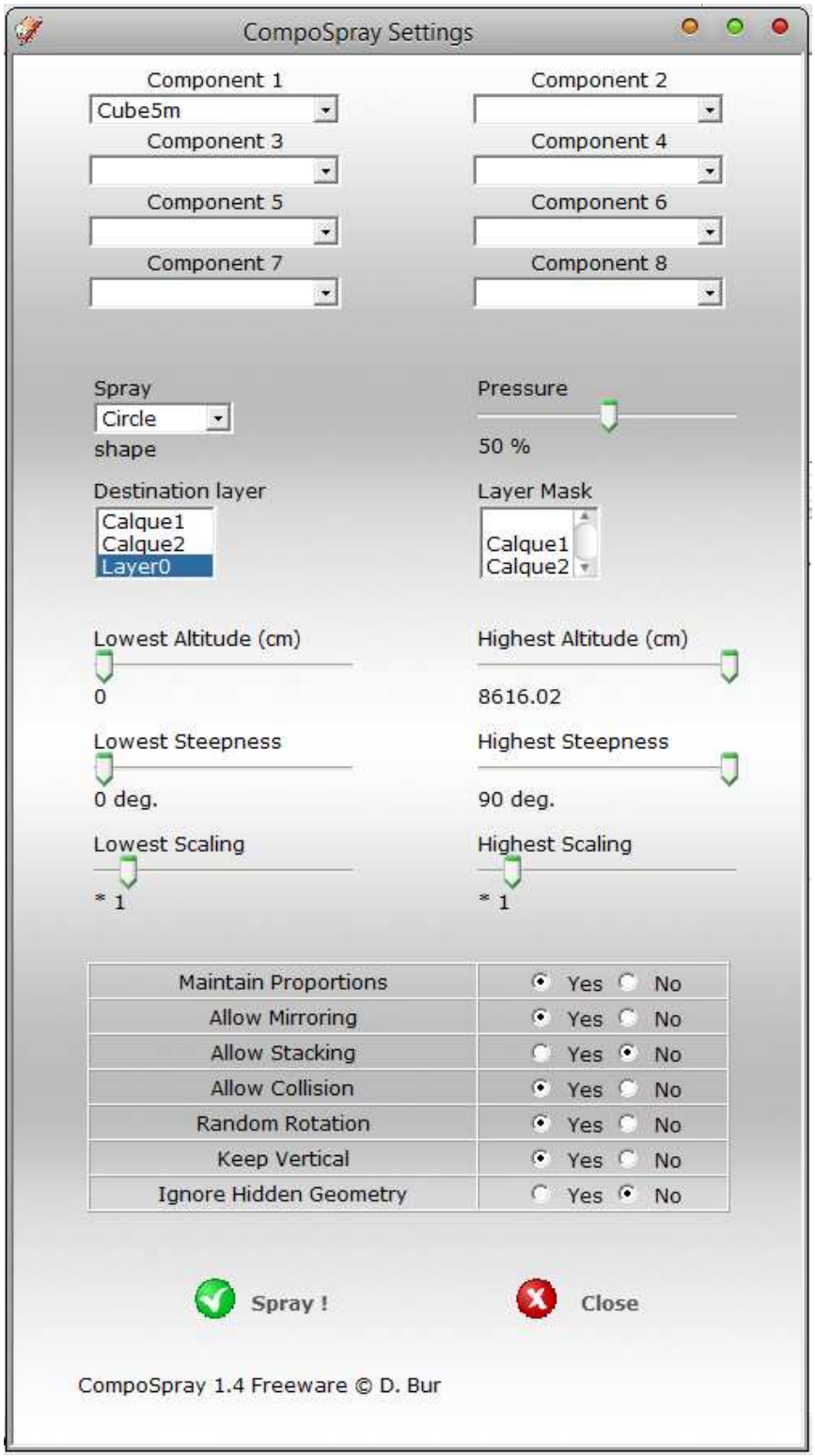
- Choose your dialog box type, modal or non-modal. A modal box waits until you click on "Spray!" or "Close" buttons before you can change anything in the graphic viewport. A non-modal dialog lets you interacts in the graphic window, change parameters as long as it is displayed, and click on the "Spray!" button to drop components with the new parameters. It closes only if you hit the "Close" button. Note that under OSX, dialogs aren't true modal - they don't act like they do on Windows.

- Choose to add scrollbars or not. no toolbars is particularly useful for low res screens under 900 pixels in height. If you select "Scrollbars", the dialog is resizable.

1. Foreword

When selecting the commands from the Draw menu or clicking the icon, the script scans the model to define its lowest and highest altitudes, to list the layers, available components, etc.

So every change you make in your model will be taken into account between two consecutive "sprays". The script then writes the webdialog on-the-fly and displays it:



Note: the width of the dialog can be greater if one of the components name is more than 25 letters long.

- The first area of the dialog lets you select from 1 to 8 components to spray.
- The second area of the dialog lets you select a shape, a pressure, layers, and geometric or 3D constraints.
- The third area of the dialog lets you select additional constraints.

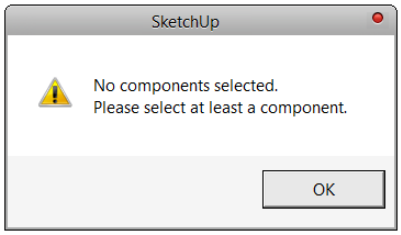
The following is a short description of these parameters and how to use them.

2. Components selection

Eight lists are available to select what component(s) to use for spraying.

These are dropdown lists where you will find the components already present in your model. When dropping components, the tool randomly mixes 1 to 8 different components.

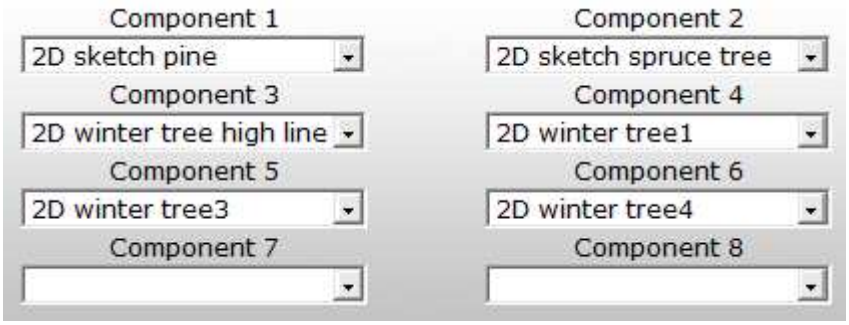
You must select at least one component, if you don't, you'll get this message:



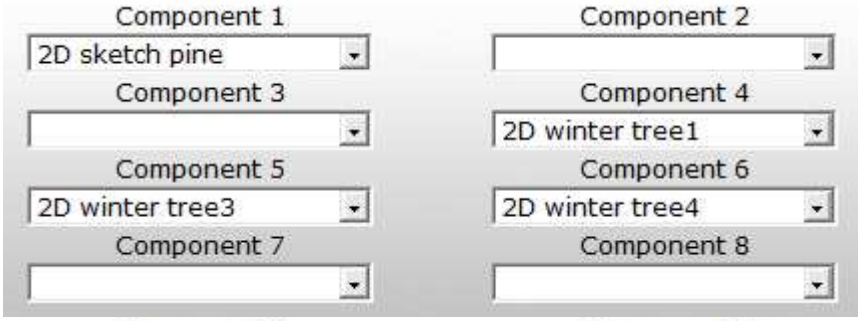
Select other components in the dropdown lists, or leave them blank. You can proportion the amount of components if you select twice the same component name in more than one list.

Examples:

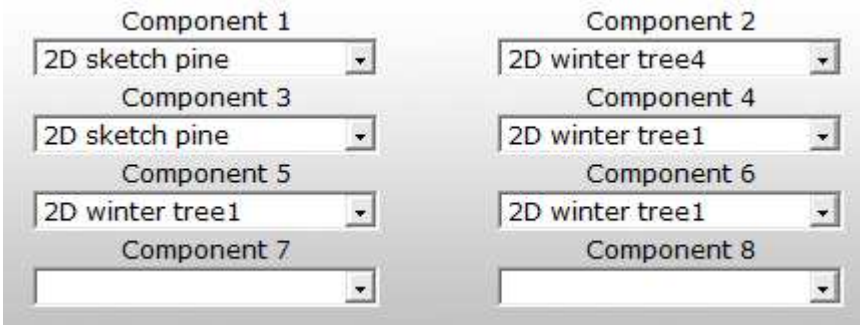
6 different components selected, each of them has the same probability to be used.



4 different components selected, each of them has the same probability to be randomly used, but note that blank fields between two lists doesn't matter.



3 different components selected. Because "2D winter tree 1" was selected 3 times, it has three times more chances to be used than the other components. "2D sketch pine" was selected twice, thus it has 1 chance among 3 to be used.

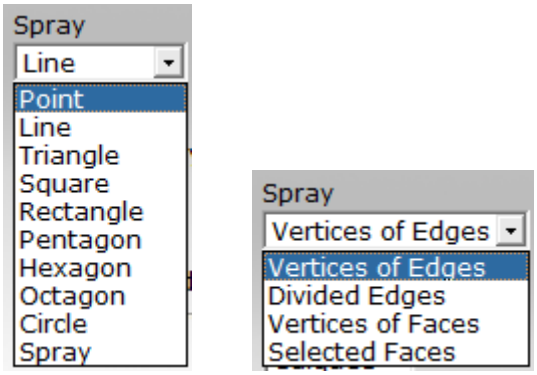


Note: I could have made multi-select lists, but I didn't because you wouldn't have that possibility to "balance" the amount of each component.

3. Spray shape and pressure

Ten "shapes" (or ways of dropping components) are available in the dropdown list: point, line, triangle, square, rectangle, pentagon, hexagon, octagon, circle, spray:

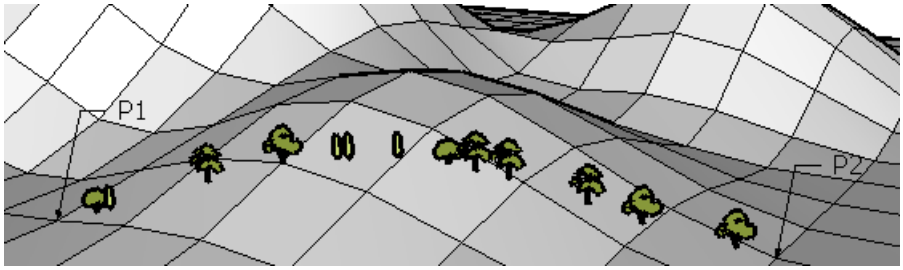
Four additional ways to spray component are "Vertices of Edges", "Divided Edges", "Vertices of Faces" and "Selected Faces". These are particular because they only appear in the list when your current selection isn't empty:



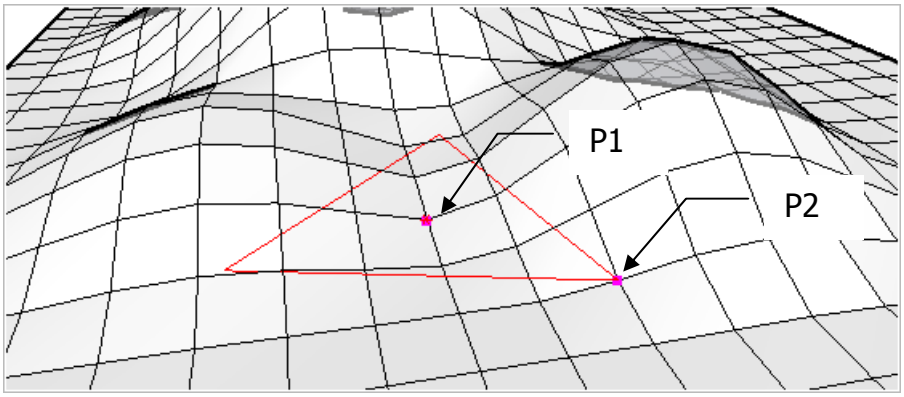
Regular shapes when nothing selected and options when something selected

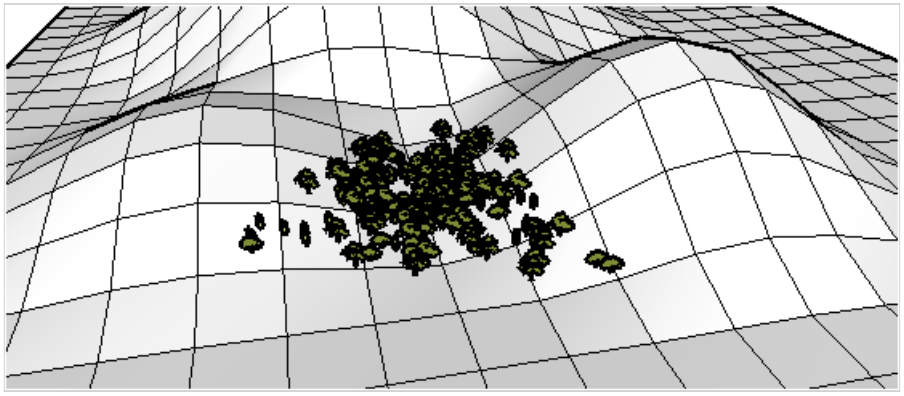
- **Point**: inserts a single component instance at the point you click. The first component is the first in the list of selected components, next click will drop the second on the list, and so on. Other options apply as well.

- **Line**: Click two points and component instances are randomly inserted between the two points. Other options apply as well (see below). Components origins are right on the line you drew. After the first point, you can enter a length for the line in the VCB.

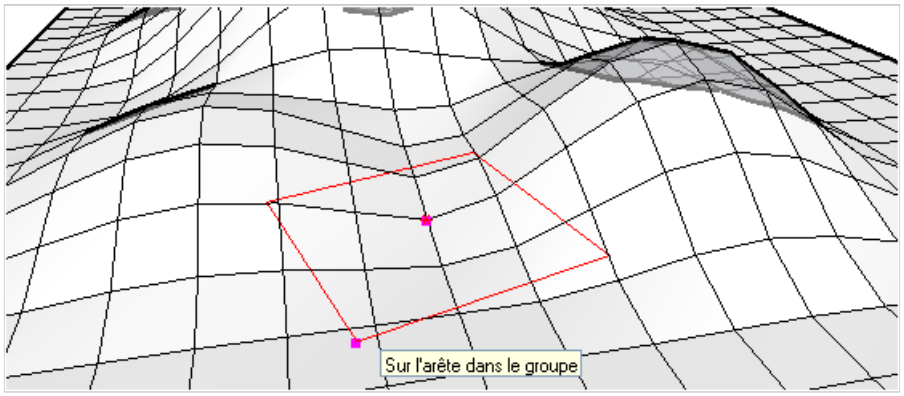


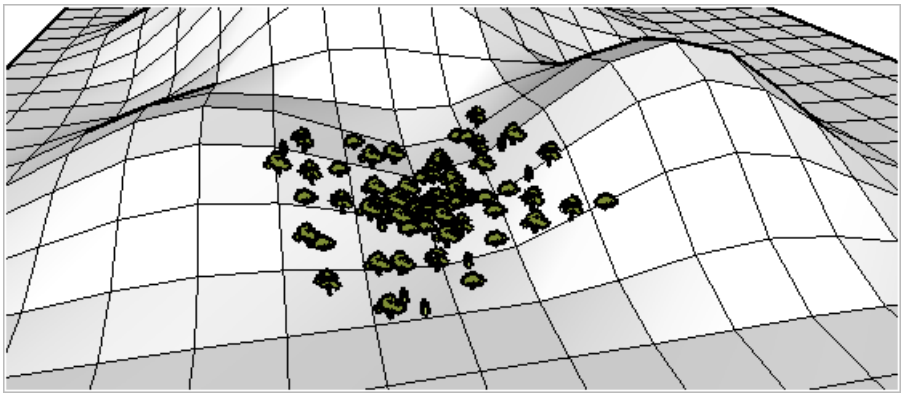
- **Triangle**: Click a point to locate the center of an equilateral triangle. Click a second point to define a vertex of the triangle. Component instances are randomly inserted on an area defined by the triangle. After the first point, you can enter a length for the distance between the center and the vertex in the VCB. Other options apply as well.



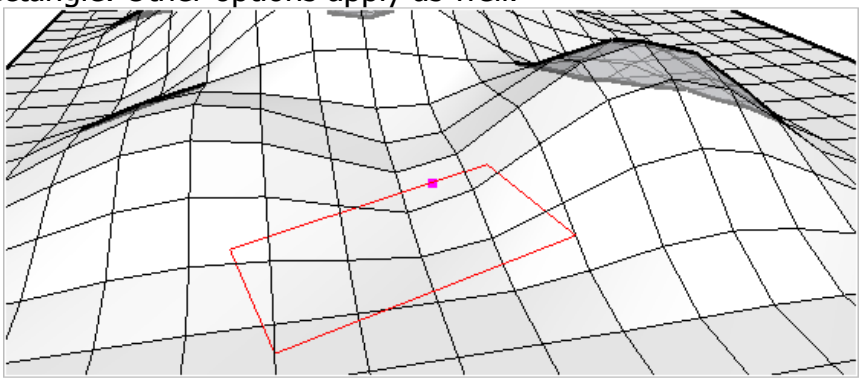


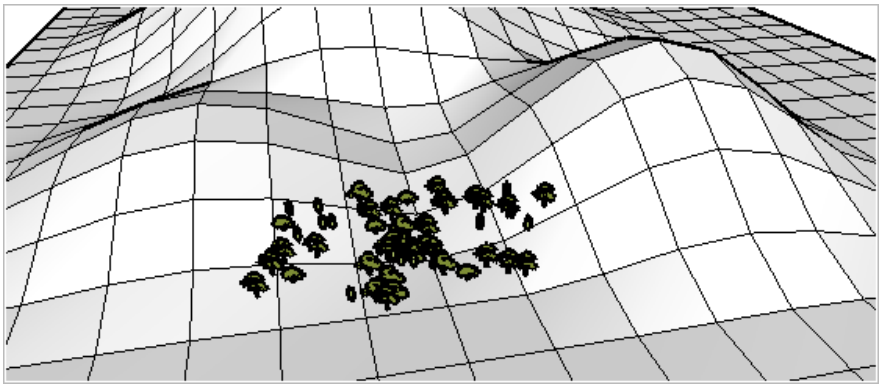
- **Square**: Click a point to locate the center of the square. Click a second point to define a vertex of the square. Component instances are randomly dropped on an area defined by the square. After the first point, you can enter a length for the distance between the center and the vertex in the VCB. Other options apply as well.



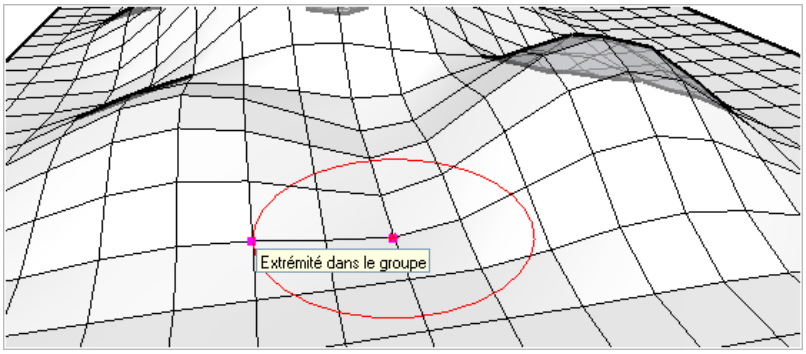


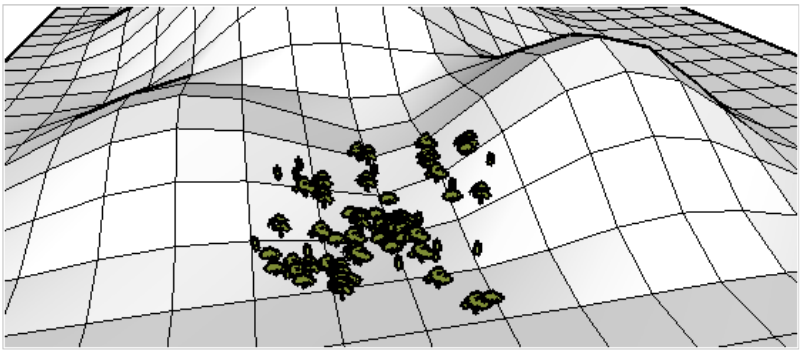
-  **Rectangle**: Click a point to locate the starting point of the length of the rectangle. Click a second point to define the ending point of the length of the rectangle, or enter a length in the VCB. Click a third point to define the width of the rectangle, or enter a width in the VCB. Component instances are randomly dropped on an area defined by the rectangle. Other options apply as well.





-  **Circle**: Click a point to locate the center of the circle. Click a second point to define the radius of the circle. Component instances are randomly dropped on an area defined by the circle. After the center point, you can enter a length for the radius in the VCB. Other options apply as well.



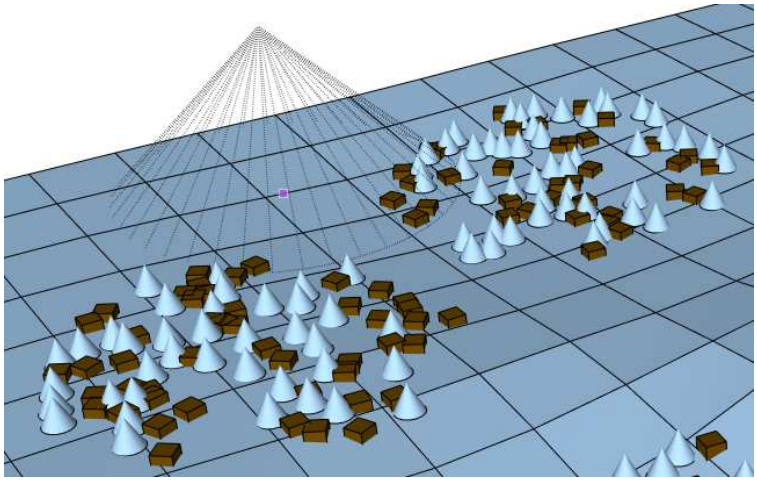


- **Pentagon**: Click a point to locate the center of the pentagon. Click a second point to define the radius of the pentagon. Component instances are randomly dropped on an area defined by the pentagon. After the center point, you can enter a length for the radius in the VCB. Other options apply as well.

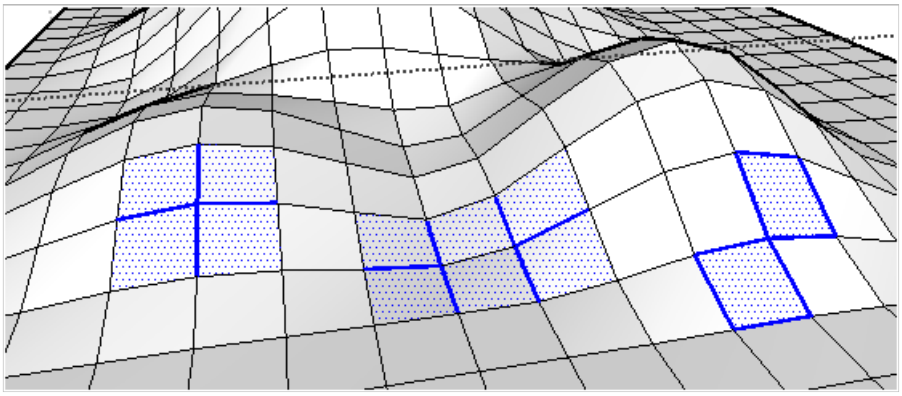
- **Hexagon**: Click a point to locate the center of the hexagon. Click a second point to define the radius of the hexagon. Component instances are randomly dropped on an area defined by the hexagon. After the center point, you can enter a length for the radius in the VCB. Other options apply as well.

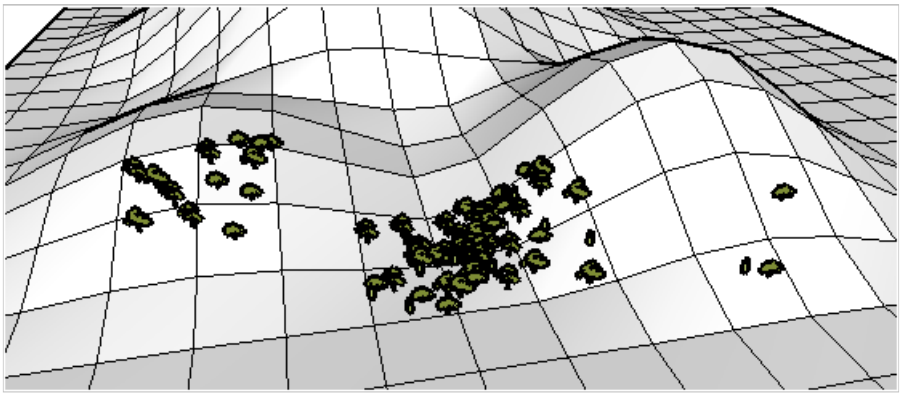
- **Octagon**: Click a point to locate the center of the octagon. Click a second point to define the radius of the octagon. Component instances are randomly dropped on an area defined by the octagon. After the center point, you can enter a length for the radius in the VCB. Other options apply as well.

- **Spray:** this is basically similar to circle, but you can drop components on circular areas as many times as you want without clicking the center and radius, and/or modify the radius of the spray between each drop. Move the mouse over your model and you'll see a grey cone. The center of the base is the center of the circular drop area. Click a point and components are dropped, move the mouse, click again, etc. To change the cone radius, enter its value in the VCB.

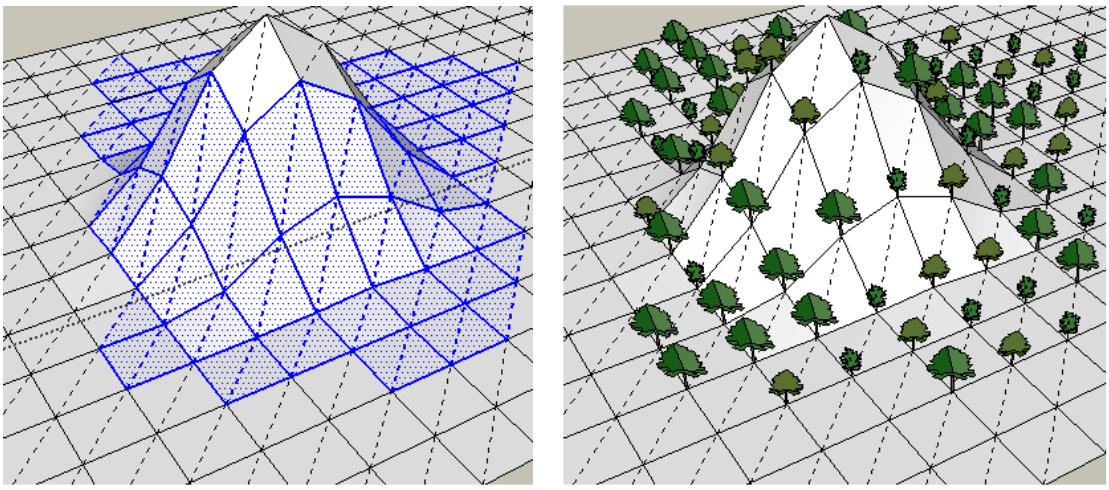


- **Selected faces**: as said before, this option is only available from the list if you have selected objects before launching the tool. Objects that are not faces are ignored. They can be selected in the model itself or within a group (in this case, components will NOT be enclosed in the group, but will dropped at the model level). Component instances are randomly dropped on area(s) defined by the boundaries of the faces. Selected faces can be adjacent to each other or not. Other options apply as well.

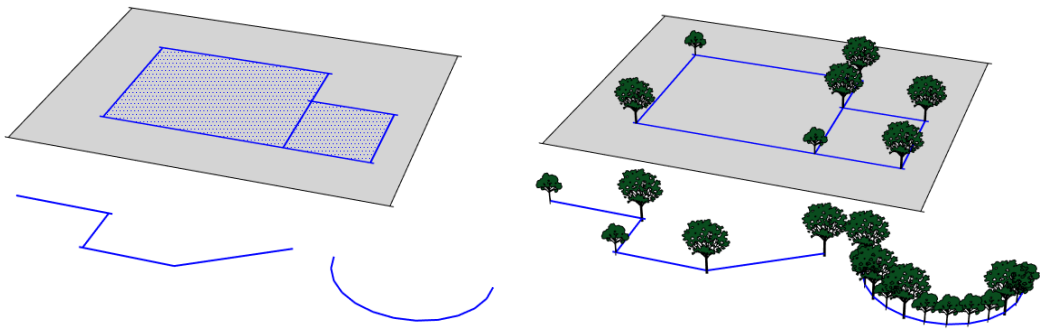




- **Vertices of faces:** Select faces before launching the tool. A component is inserted at each vertex of each face. Other options apply as well. Note that when faces share vertices, only one component is dropped at a shared vertex.

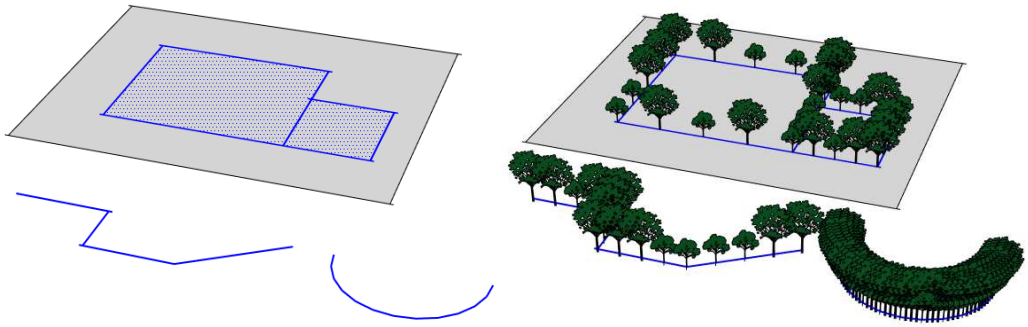


- **Vertices of Edges:** Select edges before launching the tool. A component is inserted at each end of each edge. Other options apply as well. Note that when edges share vertices, only one component is dropped at a shared vertex. This option also works with arcs, circles, free-hand drawn lines, Bezier curves.



Selected edges and resulting components drops.

- **Divided Edges:** Select edges before launching the tool. A component is inserted at each end of each edge and at divisions of edges: enter a number of segments when prompted, each edge is then divided in segments with a component at each end of segment. Other options apply as well. Note that when edges share vertices, only one component is dropped at a shared vertex. This option also works with arcs, circles, free-hand drawn lines, Bezier curves.



Selected edges and a division of 4 segments per edge

- **Pressure**: move the slider to select a pressure percentage, from 0% to 100%. Selecting 0% will drop only one component, while selecting 100% will NOT cover the entire area with components (see below what pressure means and how pressure is calculated).

- **Destination layer:** this is the layer on which the components will be on. Default value is the current active layer. This list is NOT a multi-select list of course (only one layer active at a time), this is only to prevent a too big dropdown list when having many layers in the model. Note that hidden layers are not available in the dropdown list.

- **Layer mask:** this is the layer on which the script will drop components, all other layers can't receive components. Leave this field blank if you don't want to use a layer mask. This list is NOT a multi-select list. This is only to prevent a huge dropdown list going out of the screen when having many layers in the model.

4. Geometric constraints

Three options are available to restraint the spray of components: altitude, slope, and scaling.

- **Altitude**: move the sliders to limit the dropped components between lowest and highest altitudes. A component will be dropped between these two values if its insertion point Z value matches the range. Default values are the actual lowest and highest altitudes of the model (no constraint). If high altitude is lower than low altitude, values will be inverted, and vice-versa. Negative altitudes may cause the lowest altitude slider to disappear !
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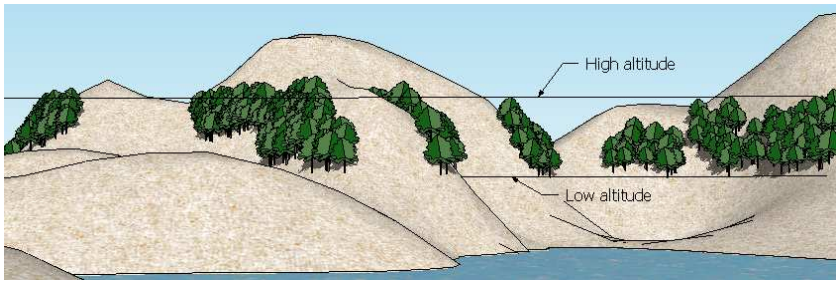
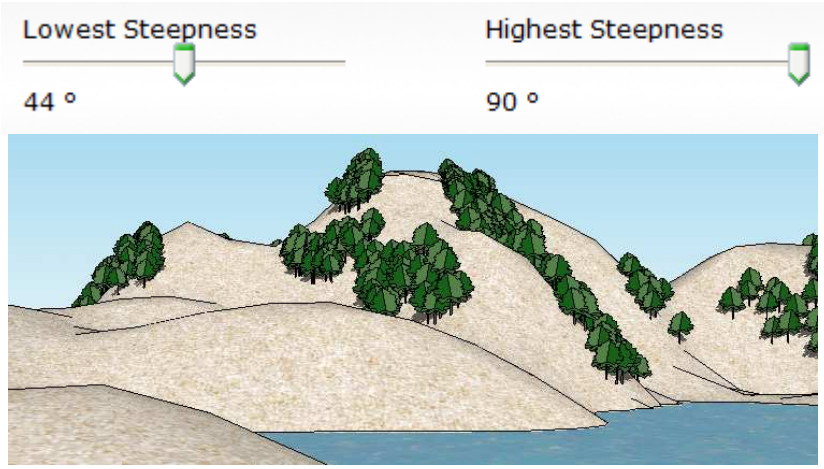
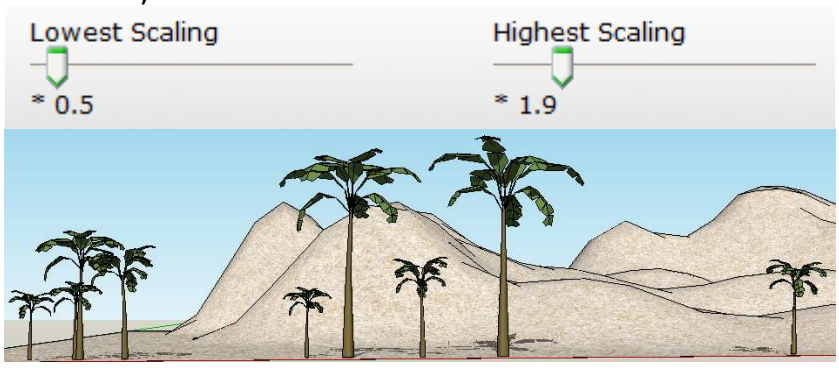


- **Slope**: move the sliders to limit the dropped components on surfaces that are inclined between lowest and highest steepness. Steepness is the angle [0=horizontal -> 90=vertical] measured from the XY (red-green) plane. When the raycast method hits an edge instead of a face, the same principle is applied. Default values are 0° and 90° (no constraint). If high slope is lower than low slope, values will be inverted, and vice-versa.



- **Scaling**: move the sliders to scale the dropped components between lowest and highest scaling values. Default values are 1 and 1 (no scaling). Zero scaling will be reset to 0.01. If high scaling is lower than low scaling, values will be inverted, and vice-versa.



5. Optional constraints

Seven options are available to restraint the spray of components or to modify the way components are dropped and set.

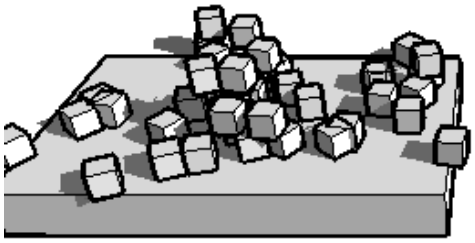
Default values are as follows:

Maintain Proportions	(•) Yes ( ) No
Allow Mirroring	(•) Yes ( ) No
Allow Stacking	( ) Yes (•) No
Allow Collision	(•) Yes ( ) No
Random Rotation	(•) Yes ( ) No
Keep Vertical	(•) Yes ( ) No
Ignore Hidden Geometry	(•) Yes ( ) No

- **Maintain proportions:** Select "Yes" if you want to keep X,Y and Z scale values equal for each dropped component (a cube will always be a cube, a sphere will always be a sphere, and so on...).

- **Allow mirroring**: Select "Yes" if you want to let the script use negative scaling values.

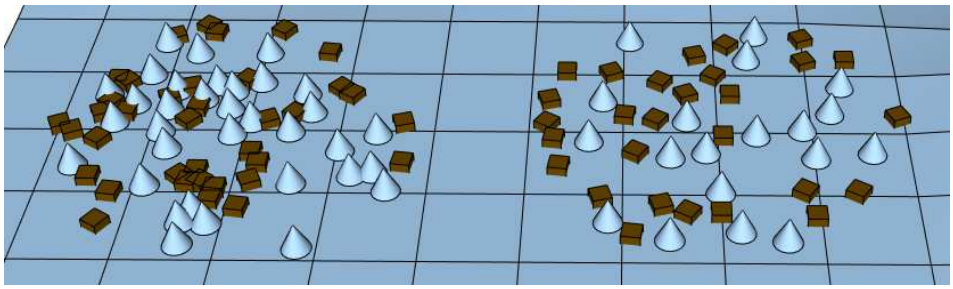
- **Allow stacking**: Select "Yes" if you want to let the components to be dropped one on the other.



Allow stacking : Yes

Allow stacking: No

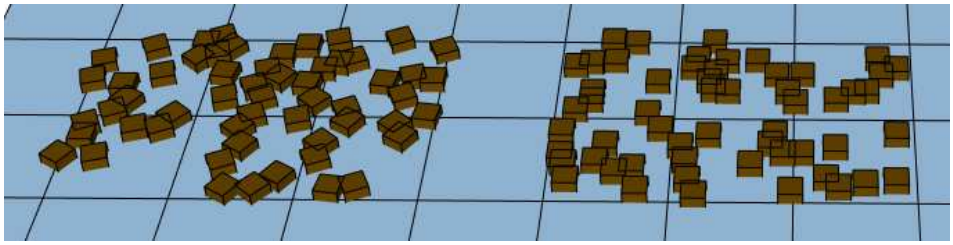
- **Allow Collision**: Select "Yes" if you want to let the script drop components that may intersect each other. Note that not allowing collision can be VERY slow, it can even display the hourglass for several minutes before completing.



Allow collision : Yes

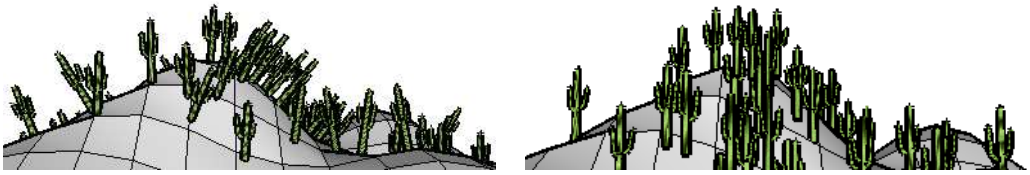
Allow collision: No

- **Random rotation**: select "Yes" to allow a random rotation of each component instance along its own blue (Z) axis.



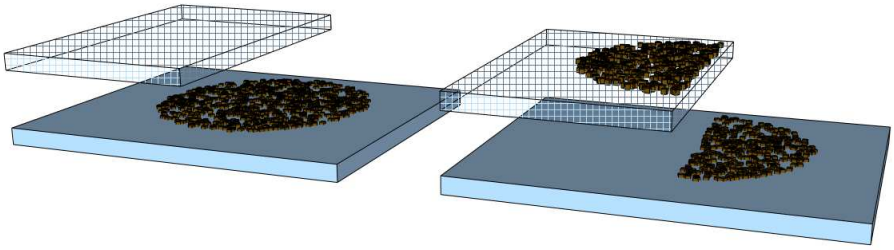
Random rotation : Yes *Random rotation: No*

- **Keep vertical**: Select "Yes" if you want all the components blue (Z) axis aligned with the Z axis of the model. When selecting "No", all components Z axis are parallel to the normal of the face they are on (perpendicular to the face's plane).



Keep vertical : No *Keep vertical: Yes*

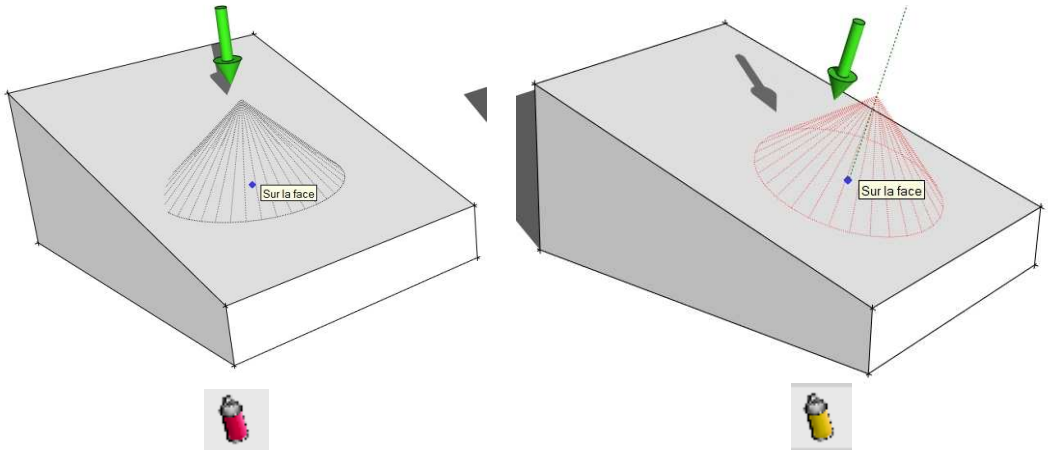
- **Ignore hidden geometry**: This option let you choose if you want a "wysiwyg" spray or not. Select "Yes" if you want all the components to be dropped through hidden geometry. Note that this works with hidden entities, and also with entities that are on hidden (invisible) layers.



Ignore hidden geometry : Yes *Ignore hidden geometry : No*
(Thanks to Thomthom for his help on this)

6. Directional spray

This is basically the same tool than the standard one, except that the rays that are cast to drop components are not top-down oriented, but normal (perpendicular) to the face the cursor is on.

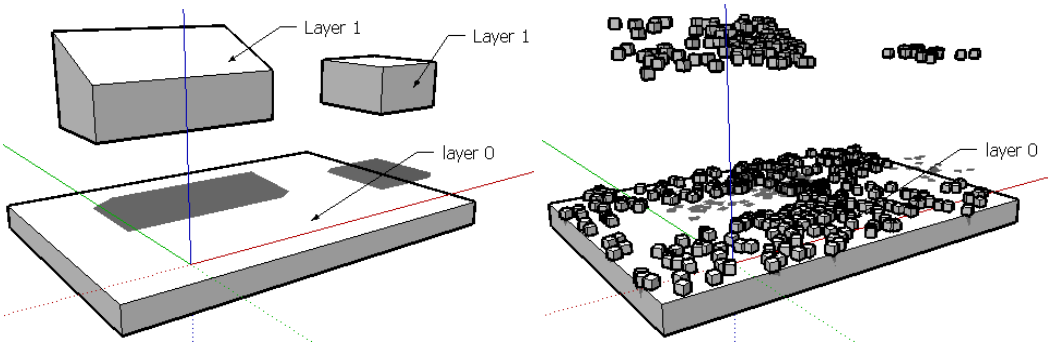


Using the directional spray, the cone is red, and the droping direction is shown as a green line. It only appears when the cursor is on a face, to show you that you can spray component at that location.
The dialog box is the same than the standard spray, except that only the "Point" shape and "Spray" shape are available yet.

7. Additional notes

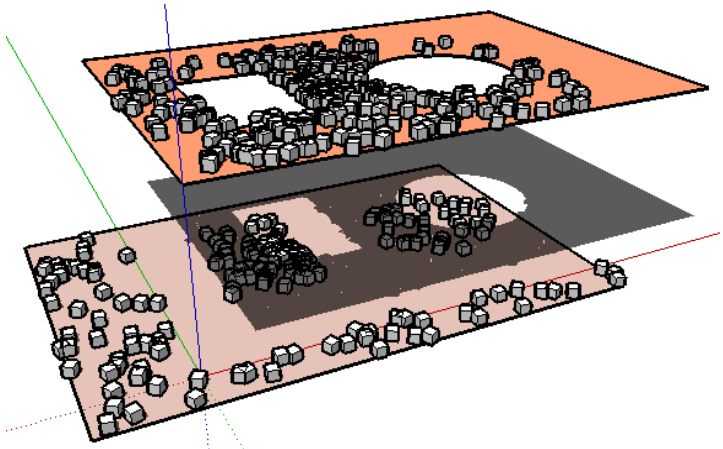
You should be aware that all constraints you set can be inconsistent or incoherent, and that no check or validation is made by the script when running, so it may lead to unpredictable results, crashes, freezes or bugsplats.

- All of the above tools are ready to run again with the same parameters, once executed the first time (you don't have to re-launch the dialog box to redefine another drop area).
- When the mouse goes out of the drawing window, the current tool is cancelled and the select tool activated.
- The only kind of object you cannot drop components on is the component instance, except when allowing stacking. Images, groups, and of course faces can receive components.
- Since components are dropped downwards from top of the model, the first object hit by the ray-tracing method through the defined shape is considered as the receiver. This means that if you have objects on inactive layers they are also considered to receive components, when the option "Ignore hidden geometry" is set to "No".



2 groups on layer 1 *result when layer 1 is inactive*

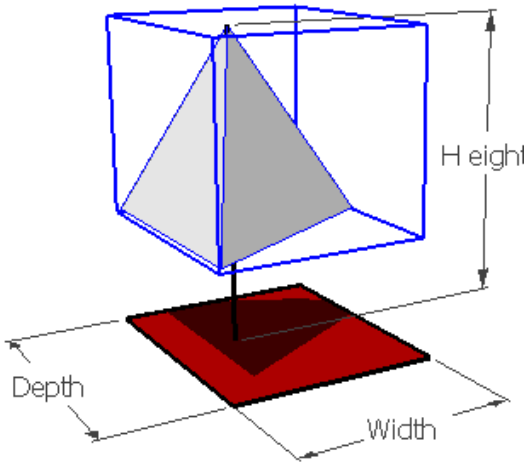
- Holes in the model or within faces don't affect the behavior of the tool:



In the above figure, the lowest face were selected and cubes have "felt" through the holes of the highest face.

3. Miscellaneous

How pressure is calculated ?



Each component has internal bounds values: depth, with, and height. Only width and depth are considered , thus each component has an "area", here shown as the red surface.
The script calculates the average area of all the selected components to drop, then divides the defined area on which to drop by this average area: this gives the total number of components to drop.
This number is multiplied by the pressure percentage as set in the dialog box.

When using "Face me" flat components, depth and width are considered equal (avoiding an extremely high number of components to drop).

When using the line shape, the length of the line is divided by the average widthes of all selected components to define the total number of components to drop along the line, then this number is multiplied by the pressure percentage from the dialog box.

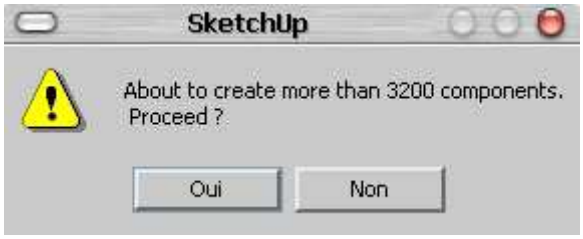
Controls, errors and timers

Some shapes are very quick to fill, some are slower, especially when dropping on large areas, and some are much slower (when using constraints for instance). It even occurs that they can not end successfully. That's why several basic controls are done during the process.

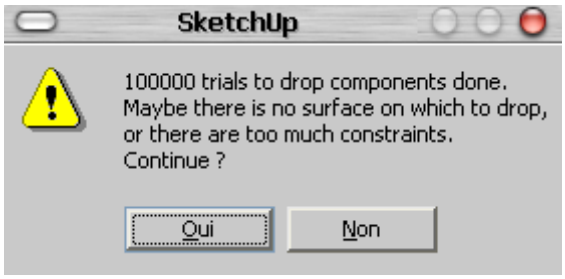
- Each time the script is executed, watch the status bar to see what happens: a progress bar (Thanks to T. Burch for his original, slightly modified class) is displayed, showing the percentage done and the expected ETA.

29%. End @ 13:50:27

- When the dialog box is validated, the script estimates how much components will be droped. When it exceeds 500, you will get a message such like this (feel free to accept or not, you'll be warned !):



- When the script tries to drop components and there is less and less place for them, or when the slope and altitude constraints make that there is not enough place for the components, or when the script tries to drop components on an area where there is no surface under, you'll get the following message:



Click on "Yes" to let it try another 100000 times, or on "No" to cancel.

- When the expected end time exceeds 3 minutes, you will get the following message:

Click on "Yes" to give it a 3 minutes additionnal time, or on "No" to stop.

- When using the "Point" shape and when the constraints aren't satisfied at the point you clicked, the following error messages are displayed in the status bar:

- The "Cannot place a component here !" message also appears when you try to drop a component on another component and the option "Allow stacking" is off, or when you want to drop a component on nothing.

- Undo is available at each step of all the commands.

4. Translations

How can I translate CompoSpray into my own language ?

Quite simple in fact:
When it loads, the script looks for your local version of SketchUp and looks for the corresponding localization file named:

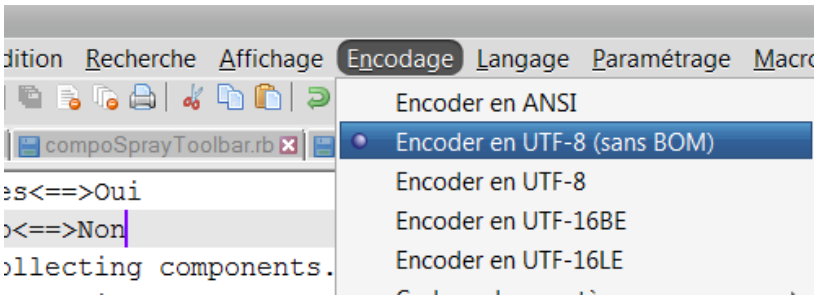
compoSprayUS.lingvo for US English [typically the base set]
compoSprayES.lingvo for ESpañol
compoSprayFR.lingvo for FRançais
compoSprayDE.lingvo for german
etc.

To make a 'lingvo' file for compoSpray, copy an existing file (compoSprayUS.lingvo for instance) and rename it compoSprayXX.lingvo, where XX are the 2 letters that stand for your country (see below).

Translate all the sentences and words that are at the right side of the <==> signs.

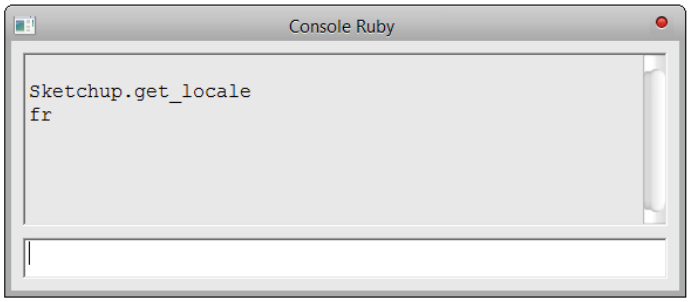
Example:
Hello<==>Bonjour
Good Bye<==>Au revoir

To correctly save the file and see all the special characters of your language, it is mandatory to use a plain text editor (no Word or similar) and save it using a UTF-8 (without BOM) encoding.
I personally use Notepad++ for that (see below), and most of the free editors can do it.



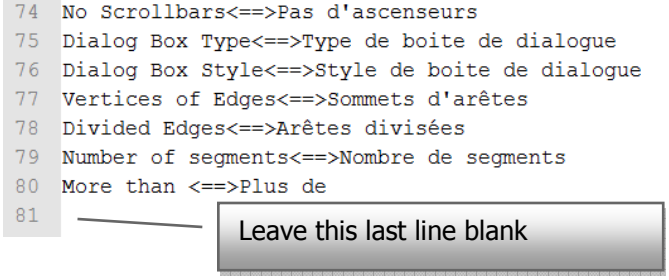
On MacOS, to configure TextEdit for proper UTF-8 editing and saving, go to:
TextEdit > Preferences > New Document > Format
and select the "Plain text" button. Then go to:
TextEdit > Preferences > Open and Save > Plain Text File Encoding > Saving files
and choose "Unicode (UTF-8)" from the dropdown menu.

What is my 'locale' ?
In SketchUp, open the Ruby Console Window and type:



The returned 2 characters are your country code (FR in my case), so the French lingvo file is "compoSprayFR.lingvo".

- Note that everything it is case sensitive.
- Remember to keep any punctuation and all leading/trailing spaces.
- Never change the first left [original] field.
- Do not type manual newlines in the text.
- The file must end with a single blank line:



How can I test my lingvo file ?

- Move your compSprayXX.lingvo file to your compoSpray folder
  (e.g. C:\Program Files\Google\Google SketchUp 8\Plugins\compoSpray\)
- Restart SketchUp and open the Ruby console.
- Check the toolbar name, the tooltips of the icons, the settings dialog box, the main dialog box, the messages and status bar prompts.

If something goes wrong an error message will be displayed in the console window, it's more than likely that you made a typo in the lingvo file.
In this case you must edit the lingvo file, save it and restart SketchUp to check if it's OK.

Please send me your lingvo file so I can include it in next releases or upload it to my site for other users to download !

Acceptable language codes are:

Arabic - AR	
Bulgarian - BG	
Catalan - CA	
Chinese (simplified) - ZH-CN	
Chinese (traditional) - ZH-TW	
Croatian - HR	
Czech - CS	
Danish – DA	*** INCLUDED IN THE BASE SET *** K.F. Blom Balleby, aka Frederik
Dutch - NL	
English (UK) - EN-GB	*** INCLUDED IN THE BASE SET *** D. Bur
English (US) - EN-US	*** INCLUDED IN THE BASE SET *** D. Bur
Finnish - FI	
French – FR	*** INCLUDED IN THE BASE SET *** D. Bur
German – DE	*** INCLUDED IN THE BASE SET *** K. Hauser, aka Charly
Greek - EL	
Hebrew - IW	
Hindi - HI	
Hungarian -HU	
Indonesian - ID	
Italian – IT	
Japanese - JA	
Korean - KO	
Latvian - LV	
Lithuanian - LT	
Norwegian - NO	
Polish - PL	
Portuguese (Brazil) - PT-BR	*** INCLUDED IN THE BASE SET *** E. Mahfuz, aka Edson
Portuguese (Portugal) - PT	
Romanian - RO	
Russian - RU	
Serbian - SR	
Slovak - SK	
Slovenian - SL	
Spanish – ES	*** INCLUDED IN THE BASE SET *** Oxer, aka Oscar
Swedish - SV	
Tagalog - TL	
Thai - TH	
Turkish - TR	
Ukrainian - UK	
Vietnamese – VI	
